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Pathways, Transitions and Backcasting for Low-Carbon and Sustainable Lifestyles

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Pathways, Transitions and Backcasting for low-carbon and sustainable lifestyles

Overview and Introduction

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Introduction

Local sustainability has been on the agenda since 1992 when at the United Nations Conference on Environment and Development (UNCED) in Rio de Janeiro Agenda 21 was adopted. A decade later, sustainable consumption was put on the international policy agenda during the World Summit on Sustainable Development (WSSD) in Johannesburg in 2002. Ever since, a range of approaches has been applied to foster local sustainability, sustainable consumption and sustainable lifestyles; it should be noted that these concepts are related and cannot be easily separated. The range of approaches to facilitate sustainability in consumption and local settings includes Local Agenda 21, behavioural approaches - sometimes referred to as ABC (Attitude, Behaviour, Choice, for a critical discussion see Shove 2010) -, and green innovation oriented approaches. Despite their relevance, all these approaches have shown limitations too. For instance, behavioural approaches have been constrained by the so-called awareness-behaviour gap (e.g. Shove 2010). In addition, green innovations and technologies have not only led to rebound effects (Hertwich 2005), but also contributed to further economic growth, which has come along with increasing use of resources and shifting production and its environmental burden to other parts of the world.

More recently, a systemic, multi-disciplinary and multiple-domain approach was proposed connecting sustainable consumption and production (SCP) in the EU funded SCORE! (Sustainable Consumption Research Exchanges) network project (Tukker *et al.* 2008). Building on the Oslo declaration on sustainable consumption (Tukker *et al.* 2006), the SCORE! Project used as starting points (i) that targeting sustainable consumption is not possible without taking the production perspective into account, (ii) that bringing about SCP requires collaboration of actors and experts from several domains including consumption, system innovation policy, design and business development, and (iii) that challenges for SCP are different for different types of economies like developed, emerging and bottom-of-the pyramid economies (Tukker *et al.* 2008: 6-7). SCORE! inspired the establishment of SCORAI (Sustainable Consumption Research & Action Initiative) network in Northern America and its 2012 offspring SCORAI

Europe. SCORAI promotes and facilitates exchange and discussion between researchers and practitioners from domains relevant for SCP through workshops and meetings, (e.g. Cohen *et al.* 2013, Cohen *et al.* 2010, Lorek and Backhaus 2012, SCORAI Europe 2013, see also <http://scorai.org/>). Recent developments in sustainable consumption include an emerging interest in social practices and transition approaches to (e.g. Seyfang and Haxeltine 2012, Spaargaren *et al.* 2012), which includes employing transition management and backcasting for developing long-term futures and pathways for sustainable consumption and sustainable communities (e.g. Quist *et al.* 2001, Carlsson-Kanyama *et al.* 2007, Mont *et al.* 2013, Nevens *et al.* 2013, Wittmayer *et al.* 2011, Doyle and Davis 2013). The latter also includes a renewed interest in action research and facilitating agency for change *towards* sustainable consumption and communities (e.g. Wittmayer *et al.* 2013). Since the economic crisis, sustainable consumption has also been related to austerity (e.g. O’Riordan 2012), social economies (e.g. Sahakian 2012), de-growth (e.g. Schneider *et al.* 2010) and going beyond green growth (Lorek and Spangenberg 2013). Of course, pleas for a steady-state economy (as proposed by Herman Daly) and for prosperity without growth (Jackson 2009) have already been around for some time.

The growing interest in long-term and systemic approaches to sustainable consumption and communities was also clear in the 2009 EU call ‘ENV.2010.4.2.3-1 Foresight to enhance behavioural and societal changes enabling the transition towards sustainable paths in Europe’. It called for bottom-up approaches addressing how to overcome the gap between on the one hand awareness on the behavioural and societal changes for sustainability and on the other hand concrete individual and societal engagement through sustainability driven action. It also called for the analysis of enabling and constraining factors for pathways towards low-carbon and sustainable lifestyles that should be fed into scenario development and backcasting exercises in order to identify potential paths to support the transition to a sustainable Europe. Relevant questions included ‘how to engage individuals and collectives on sustainable paths’, ‘what is needed to address the barriers’ and ‘how to make the most of the drivers for sustainable development through both new policy mixes and novel innovative mechanisms for cooperation and partnerships between actors in the public sector, the private sector and civil society’.

Under this call, three projects were funded that started between late 2010 and early 2011: InContext (<http://incontext-fp7.eu>), LOCAW (<http://www.locaw-fp7.com>) and CRISP (<http://www.crisp-futures.eu>). Brief descriptions can be found in the box below. By mid 2013 these three projects have generated most of their results with regard to bottom-up vision and pathway development towards sustainable lifestyles, communities, regions and at work. Meanwhile, several other research projects in which sustainable consumption and long-term pathways are key, such as SPREAD (e.g. Mont *et al.* 2013, www.sustainable-lifestyles.eu) and RESPONDER (www.scp-responder.eu), and CORPUS (www.scp-knowledge.eu) have been (nearly) completed. Therefore, it seemed to be a good time to bring together results and approaches from a range of participatory and bottom-up endeavours in a scientific workshop to discuss the state of the art in pathways, transitions and backcasting for sustainable and low-carbon lifestyles aiming at an exchange of the state of the art of concepts, results and approaches.

InContext stands for ‘Individuals in Context: supportive environments for sustainable living’. In an exemplary manner, the project has identified framework conditions that enable societal transitions towards an environmentally sound, economically successful, and culturally diverse future. The goal was to better understand how sustainable behaviour is shaped by the interplay between external factors (e.g. social norms, policies, and infrastructure) and internal conditions (e.g. values and beliefs). Research was carried out in four case studies and three pilot projects: The case studies looked at existing cases of alternative practices in energy and food consumption. The pilot projects developed an innovative action-research method, the ‘community arena’, and applied it in three local communities. The processes aimed at empowering individuals to develop a long-term

vision for a sustainable community and to take immediate action. The community arena integrates insights from transition management, backcasting and social psychology.

Low Carbon at Work (LOCAW) focuses on the drivers of and barriers to sustainable lifestyles and how these constrain and enable the everyday practices and behaviours within larger organizations. The project includes (i) the analysis of the patterns of production and consumption in the workplace and their resulting GHG emissions; (ii) organizational strategies to reduce emissions and implement EU regulations regarding the greening of their production processes (iii) everyday practices and behaviours at work of employees on different levels of decision-making within the organization, and the relationship between behaviours and practices at work and behaviours and practices outside work, as well as the drivers and barriers for implementation of sustainable practices and behaviours in the workplace.

CRISP stands for 'CReating Innovative Sustainability Pathways' and seeks to identify potential pathways that will aid the EU towards the transition to a sustainable, low carbon Europe. CRISP works on developing profoundly different visions – and their implementation trajectories – and has adopted Transition Management (TM) as a methodology to develop practical, radical and implementable visions. Transition management (TM) distinguishes between three interdependent levels, namely macro (society and economy overall), meso (organisations and specific entities within the macro level) and micro (lifestyles, individuals, households) and will be combined with innovation system elements

Workshop scope & focus

The idea of such a workshop got widely positive responses among researchers involved in the three projects, but as well as among colleagues involved in the SCORAI network and related projects. As a next step a call was developed and dates were set (see Appendix III for the full text). The workshop could be funded under the InContext project, which allowed for travel reimbursements and enabled shorter preparation periods than usual. The aim of the workshop was to present and discuss papers and results to exchange and compare concepts, methodologies and results on visions, scenarios, transitions and pathways for sustainable lifestyles and communities from the three projects mentioned, as well as from related projects. An additional aim was to search for similarities, complementarities and further lessons, not only for researchers and practitioners, but also to develop additional recommendations with regard to pathway development and facilitation to the EU and to learn from bottom-up emerging developments like in transition towns and sustainable energy cooperatives. It was expected that such a workshop could also shed more light on developments in transition management and backcasting with regard to the involvement of end-users, citizens, employees, consumers and communities. Moreover, it should also address how this could complement more widely applied multi-stakeholder led initiatives and top-down initiatives led by the government targeting the provision system rather than the consumption system. Interestingly, transition management, participatory backcasting and related approaches are currently experiencing a broadening from transitions in functional societal systems (e.g. energy, mobility) to addressing transitions at the level of communities, cities and consumption practices. Such a shift reflects a growing focus on bottom-up approaches led by end-users, consumers or citizens aiming at systemic change. These aspects have been rather neglected in the research in Sustainability Transitions until now, despite some exceptions and a growing interest in so-called alternative consumption niches and grassroots innovations (e.g. Seyfang and Smith 2007, Seyfang and Haseltine 2012).

Obviously, a major challenge in sustainability transitions is not only to address the (active) involvement of citizens, employees, consumers and end-users, but also taking these actors and

their activities into account when analysing transitions or applying transition management and backcasting. In order to address all aspects and issues discussed above, the workshop called for the following topics:

- Cases and methods on local transitions or consumption transitions, focusing on participation, visioning, and pathway development.
- Conceptualization of the individual consumer-citizen and how this relates to grassroots and alternative consumption practices, as well as to individual needs-opportunities-capabilities approaches.
- Comparison of methodologies addressing individual actors such as citizens or consumers in influencing transitions including lessons learned from other participatory methodologies addressing local communities and consumers, such as participatory backcasting, and Local Agenda 21.
- Cases exploring niches of alternative consumption, grassroots innovation niches, and local communities as sites of social innovation and their relevance for pathways towards low-carbon and sustainable lifestyles.

The SCORAI Europe workshop format was used as a starting point which includes the following elements:

- (i) It aims to maximize discussion and interaction among participants.
- (ii) Space is limited to 25-35 participants, including authors.
- (iii) Paper presentations are short and are followed by both discussant contributions and substantial discussion on the broader relevance of the papers.
- (iv) All participants are strongly encouraged to read the papers in advance.
- (v) Participants are asked to take active roles like chairing, discussant or note taker.

There were two adjustments in the Rotterdam workshop: (i) the workshop was a two-day workshop (instead of a one-day workshop), (ii) in addition to full paper sessions, there were working sessions that combined short paper presentations with moderated discussion sessions focusing on interaction as well as sharing results and experiences of participants. Because of the two types of sessions, two types of papers were accepted for the workshop:

- Full papers that presented comprehensive results and/or methodologies and that were fed into full paper discussion session.
- Short papers, position papers, case descriptions or methodological evaluations that required only 4,000 and 6,000 words and that were fed into working sessions evolving around four topics (i) bottom-up & participatory vision and scenario development, (ii) backcasting and pathway development, (iii) drivers for and barriers to transitions towards sustainable lifestyles and communities, (iv) potential of individual change and alternative consumption niches.

Results in a nutshell

Eventually, 28 abstracts were submitted that were evaluated on the criteria (i) scientific quality, (ii) originality, and (iii) relevance for the workshop theme and topics. Based on the evaluation 8 abstracts were accepted for full paper sessions and 9 abstracts were accepted as short or position papers, though it was possible to develop short or position papers into full papers. The full program can be found in Appendix 1. Around 30 people participated; they are listed in Appendix II.

The full papers were organised in 4 plenary sessions consisting of 10 minutes presentations on each paper and a 10 minutes discussion by a discussant, followed by 30 minutes plenary discussion. Contributions by discussants and reports of the discussions have been included in the proceedings. The first session (Session 1A) focussed on *visions & pathways methodologies for*

sustainable lifestyle." It consisted of a paper by Georgina Guilen and Marina Nicalau on the BIG2050 (Building Ideas Glocally for 2050) project and a paper by Jaco Quist *et al.* from the InContext project on the community arena methodology, in which transition management and backcasting were combined and applied in several communities across Europe. The second session (Session 1B) explored and discussed *different approaches to sustainable consumption pathways*. The paper by Yuliya Voytenko and Oksana Mont explored the potential of innovation value creation models, which reflect new modes of consumption, production and value creation. Clear examples are collaborative consumption and prosumers in decentralised electricity production. The second paper by Julia Backhaus and Harro van Lente explored how shared assumptions on issues on the problems at stake and on how to achieve desired changes can function as organising principles for sustainable consumption pathways, which was illustrated by several cases from the food domain. The third full paper session (Session 2A) focussed on *'individual and structural factors in pathways for sustainable consumption'*. The paper by Felix Rauschmayer *et al.* explored how transition management, practice theory, and the capability approach can complement each other in the governance of sustainability transitions. The paper by Ricardo Garcia-Mira *et al.* reported on part of the LOCAW project, focussing on how individual factors influence sustainable behaviour and sustainable practices at work. The fourth session (Session 2B) addressed *facilitated pathway development versus bottom-up self-organising initiatives*. The paper by Walter Wehrmeyer *et al.* reported on the transition pathways generated by teenagers and professionals in 6 EU countries as part of the CRISP project. By contrast, the paper by Flor Avelino *et al.* reported on self-organising bottom-up community energy initiatives building on cases from Scotland, the Netherlands, Belgium and Germany; they also addressed barriers and drivers for these initiatives from the perspective of the energy transition at large.

The other 9 papers were distributed across the four working sessions as inputs for discussions on the topic of the working session. The first working session (Session 3A) addressed *bottom-up participatory vision and scenario development methodologies*. It included a paper by Pesch and Mulder on stakeholder involvement in eco-district planning, and a paper by Wittmayer *et al.* on the transformative potential of communities. The discussion evolved around topics like visions versus scenarios, pros and cons of group think and the growing use of participatory vision and scenario development at the local level. The second working session (Session 3B) focussed on *backcasting and pathway development for sustainable consumption and communities*. Dumitru *et al.* reported on the backcasting part of the LOCAW project, whereas Kiraly *et al.* reported on using participatory system mapping within a backcasting framework. The discussion evolved around further experiences with backcasting and strengths and bottlenecks of how backcasting had been applied. The third working session (Session 4A) dealt with *drivers and barriers for pathways and transitions towards sustainable lifestyles and communities*. Marleen Lodder and Flor Avelino contributed a paper on how insights and methods from design thinking can empower citizens in sustainable infrastructures. Niko Schöpke *et al.* presented a paper on learning and empowerment building on results from the InContext project. The paper by Silvia Breukers and Ruth Mourik provided an input on barriers in decentralized energy generation in smart grids, which are due to mismatches between the expectations of end-users and expectations of developers of such systems. The discussion evolved around top-down management to support more sustainable lifestyles versus bottom-up approaches, the potential of games for moving towards more sustainable lifestyles, and the creation of value versus value change. The fourth working session (Session 4B) addressed *the potential of individual change and alternative consumption niches*. Marlyne Sahakian contributed a paper on what can be learnt from demonstration projects. Carmen Vercauteren *et al.* provided an input to the discussion with a paper on cases of community gardening in the city of Rotterdam and whether these can be seen as learning spaces for sustainable food practices. The discussion evolved around the usefulness and challenges of the social practices approach. It included topics, such as where to set boundaries of a practice, the role of budgets or subsidies to get initiatives started, leadership, time and the influence of the social context and how it can be related to social learning.

Conclusion and Outlook

The workshop brought together a range of multi-disciplinary contributions and perspectives on pathways, transitions and participatory methods for low-carbon and sustainable lifestyles and communities, involving researchers, action researchers and practitioners. It addressed multiple scales ranging from individual change and small local alternative practices to large-scale transitions, as well as a range of participatory methods and cases for creating visions, scenarios and pathways. It highlighted new approaches that may address some of the issues related to behavioural approaches, existing local approaches, and green innovation oriented approaches in sustainable consumption and local sustainability. In this way, it contributes to the path set by the SCORE! Project and the aims of the SCORAI network. The workshop not only included dissemination and exchange of state-of-the art academic thinking and results, but also facilitated both implementation-oriented and conceptual discussions.

Some remaining issues, such as dealing with multiple definitions of sustainability, recent developments on the value-behaviour gap (where it is shown that rationalising behaviour by individuals may change identity and self-image), the relevance of positive constraints (e.g. ban on smoking and separating garbage), the relevance of social innovation and grassroots innovation, and the potential of combining individual and structural approaches to sustainable consumption and transitions, as well as how to upscale and speed up sustainability transitions in consumption, lifestyles and communities can be further discussed on forthcoming conferences like the IAPS (People-Environment Studies) in June 2013 in Timisoara, Romania, IST (Sustainability Transitions) in August 2013 in Utrecht, The Netherlands, and the ERSCP in October 2013 in Slovenia.

These will be also be further explored in approved forthcoming FP7 research projects, such as

- GLAMURS – Green Lifestyles, Alternative Models and Up-scaling Regional Sustainability, coordinated by Prof. Ricardo García Mira, University of La Coruña, Spain
- DYNAMIX - Decoupling growth from resource use and its environmental impacts, coordinated by Katharina Umpfenbach, Ecologic Institute, Germany.
- ARTS – Accelerating and Rescaling Transitions to Sustainability, coordinated by Niki Frantzeskaki, DRIFT, Erasmus University Rotterdam, The Netherlands.
- TRANSIT – Transformative Social Innovation Theory, coordinated by Flor Avelino and Julia Wittmayer, DRIFT, Erasmus University Rotterdam, The Netherlands.

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I **Plenary Sessions**

1a

**Vision &
pathway
methodologies
for sustainable
lifestyles**

BIG 2050 – Because living sustainably today is possible!

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Abstract

In what ways could the transition to future sustainable lifestyles be started, communicated, understood and activated in different realities worldwide?

This is one of the many questions that the “Budding Ideas Glocally for 2050” (BIG2050) project aims to answer. Comprising a collection of over 150 promising practices (activities that enable living more sustainably) and addressing different impacts on/of lifestyles worldwide, the project seeks to identify critical environmental and social impacts associated with current consumer trends, consumption patterns and lifestyles, and encourage the transition to a resource efficient future by communicating and fostering innovation for more sustainable ways of living. It also brings together stakeholders to personally analyze their countries’ current reality, co-create a vision of how they would like lifestyles in their countries to be like by 2050 and what are they doing / could do to help them to get there. The countries where the project is taking place are: China, Colombia, Ghana, Germany and the Philippines.

During the “workstudios”, the multi-stakeholder events organized for the project, the participants apply backcasting as an experiential planning process through immersive tools that comprise the development and understanding of consumers of the future (personas), the creation of scenarios addressing 12 impacts on/of lifestyles that are directly linked to the Millennium Development Goals (education and skilling, employment and work conditions, nutrition, health, mobility, housing, energy generation, urban/rural development, governance, leisure and culture, use of resources and communication), and roundtable discussions to identify current activities, needs and offers, to support bridging the gap between the desired 2050 and today.

This paper aims to present the process and the preliminary insights of the project, after four workstudios (China: *From a low carbon living in 2050 to today*; Colombia: *Collaboration for sustainable lifestyles through innovation*; Philippines: *Innovation for competitiveness towards sustainable lifestyles*; and Ghana: *Collaboration and sustainability: a multi-sectoral path for growth*). The last workstudio will take place in Germany in November 2013. BIG2050 will conclude in early 2014, providing a comprehensive research on the current reality of the project’s countries, the development of conditions for sustainable living, an overview of the needs and offers that stakeholders in each country present, an action roadmap per country and recommendations to international donor organizations, businesses, policy makers, civil society, academia and media organizations to address the opportunities each country offers. The scenarios created reflect the aspirations of a majority of middle-income consumers in each of these countries and helps to create action roadmaps that participants commit to bring into reality, to identify the areas that citizens consider the most relevant to be addressed today and to assess the type of partnerships needed to support actions towards change.

Created as a partnership between the German Ministry for Economic Cooperation and

Development (BMZ) and the Collaborating Centre on Sustainable Consumption and Production (CSCP), BIG2050 applies some of the learnings from the EU-funded project SPREAD Sustainable Lifestyles, as it explores socio-environmental impacts, consumer trends and aspirations, and future visions of more sustainable lifestyles through backcasting in a smaller, local scale.

1. Introduction

“If we don’t change our direction we are likely to end up where we are headed.” Supposedly a Chinese proverb, this saying summarizes very wisely the critical decision that challenges modern societies today.

We are currently guided by the dominant vision of modernity¹, which is deeply entrenched in our society and whose main premise states that continuous economic growth is necessary and desirable. Such premise is one of the main drivers of increasing consumption levels (Mont et al. 2010: 13). The vision and its premises are strongly supported by established actors, rules and institutions in defence of existing economic interests.² Current behaviour, actions and policy decisions symbiotically interact with the dominant vision of success equals consumption, delineating a relationship of mutual dependence and reassurance that approaches a sacred nature, leaving little room for questioning.³

And yet, the ascendance of such dominant vision still goes largely unnoticed, which brings about serious concerns, for two main reasons. First, there is mounting evidence of negative environmental, social and even economic impacts that derive from the present development model (Millennium Ecosystem Assessment 2005a, BMU et al. 2008, Worldwatch Institute 2010, Schor 2004, Bauman 2008, just to mention a few studies among a vast literature on the subject), which suggests that the dominant vision is short-sighted, unsustainable and far from desirable. Second, it is only by means of a critically rethinking the dominant vision (which requires awareness in turn) that we will be able to change the course of development (Grin et al. 2000: 1) and build a new pathway towards sustainability.

Lifestyles constitute a key aspect of this transition to sustainable development, as they comprise a multitude of everyday activities deeply rooted in consumption and production patterns and are intricately interwoven with people’s irrational choices and practices (SPREAD Sustainable Lifestyles 2050 2011: 9). Fortunately, innovative activities that enable living more sustainably are emerging across different cultures, and they can play a fundamental role in the process of building a new vision of success based on sustainable lifestyles and paving the way towards such vision.

But what do sustainable lifestyles look like? In what ways could the transition to future societies that support sustainable lifestyles be activated, communicated, and understood in different cultures, geographies and contexts worldwide? The *Budding Ideas Glocally for 2050* (“BIG2050”) project was developed in order to address these questions.

¹ Bauman (2008: 28) describes the characteristics of modernity: “The society which enters the twenty-first century is no less ‘modern’ than the society which entered the twentieth [...]. What makes it as modern as it was a century or so ago is what sets modernity apart from all other historical forms of human cohabitation: the compulsive and obsessive, continuous, unstoppable, forever incomplete *modernization*; the overwhelming and ineradicable, unquenchable thirst for creative destruction (or of destructive creativity, as the case might be: of ‘clearing the site’ in the name of a ‘new and improved’ design; of ‘dismantling’, ‘cutting out’, ‘phasing out’, ‘merging’ or ‘downsizing’, all for the sake of a greater capacity for doing more of the same in the future – enhancing productivity or competitiveness).”

² When discussing the phenomenon of “competing visions”, Quist (2007: 68) characterizes the regular dominant vision as the one “supported by vested interests and established actors”.

³ Boada-Ortiz et al. (2010: 38), while addressing the culture of consumerism, assert that the simple exercise of considering to reduce consumption sounds like a “heresy” and usually causes “repulse” in our peers.

Using backcasting as its overall methodology, BIG2050 supports the process of critically re-thinking individual and social aspirations by means of co-creating visions of sustainable lifestyles and identifying solutions, current and potential ones, to make these visions come true.

This paper aims to present the process and the preliminary insights from the project.

2. Rationale of BIG2050

The project, funded the German Ministry for Economic Cooperation and Development (BMZ), is managed by the Collaborating Centre on Sustainable Consumption and Production (CSCP) and it was launched at the Rio+20 Conference in June, 2012.

With the core objectives of exploring lifestyles' impacts and aspirations and to develop a set of strategic conditions for living sustainably in the future, starting today, the project combines research-based activities and multi-stakeholder workshops called "workstudios". The process entails assessment of current consumption trends and patterns as well as the environmental and social impacts on/of lifestyles; co-creation of local sustainable scenarios for 2050 addressing such impacts; analysis of possible pathways and drivers of change to reach these scenarios; sharing existing promising practices and alternative consumption niches; and facilitating discussions among stakeholders to identify current actions, opportunities and challenges, as well as their needs and offers to support bridging the gap between the desired 2050 and today.

The following subsections will dive with detail into the project's theoretical background, overall methodology, and expected outcomes.

2.1. Theoretical background: satisfying needs and aspirations sustainably

Since the very first attempts of defining sustainable development, the concept of "needs" is considered to play a key role in the process. The well-known definition expressed in *Our common future* (WCED 1987: 41) is no exception, as follows: "Sustainable development is development that meets the needs of present without compromising the ability of future generations to meet their own needs."⁴ The question is: how to approach the concept of "needs" in a way to have its mandate fulfilled, which is, to enable quality of life in harmony with the environment and with others in the long term?

Under the imperatives of modernity, the concept of "needs" has been undergoing a process of increasing fluidity, comprising more and more supposed new needs that clearly forges a logic of "increased survival", aimed at enabling economic growth through increasing consumption and production levels of goods and services (Grupo Marcuse 2009: 73). There are many shortcomings in such logic, and Max-Neef elucidates the two prevalent ones: (i) it overlooks "the fundamental difference between *needs* and *satisfiers* of those needs" (1991: 16), as the former are finite and nearly constant, only being subject to changes, over time and across different cultures, how these needs are satisfied (1991: 18); (ii) it also neglects the fact that satisfiers comprise a large spectrum of possibilities of which economic goods are merely one of them, and may even be dispensable depending on the type of need and how it is being fulfilled (1991: 30-31).

As a consequence of this approach, needs are currently shaped in a way to support the dominant model of production and consumption of goods. In other words, the consumer culture has made the consumption of goods an end in itself, with no real connection to the satisfaction of needs (Harsch 1999: 556-557, Max-Neef 1991: 25). People's behavior, choices and everyday activities

⁴ The document itself, after providing this definition, expressly states the relevance of needs as one of the two "key concepts" within the concept of sustainable development, as follows: "It [the concept of sustainable development] contains within it two key concepts: the concept of 'needs', in particular the essential needs of the world's poor, to which overriding priority should be given; and the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs."

are encouraged to be directed mainly towards fulfilling needs through material possession, when actually most of these needs either cannot be fulfilled through material goods or don't even exist. Needs are kept unfulfilled⁵, while major environmental problems abound.⁶ This subverts the whole idea of sustainable development highlighted above, since the concept of "needs", once seen as a key factor for enabling sustainable ways of living, has been turned into the touchstone of clearly unsustainable lifestyles.

Nevertheless, BIG2050 has chosen to explore the notion of differing human needs through the consideration of new visions of success based on sustainable lifestyles. To accomplish this aim, the project developed an alternative conceptual framework for human needs relying on Max-Neef's Human Development Scale theory (1991) as its main starting point. The framework is presented in the following paragraphs.

To start with, human needs are understood as the "innate requirements that need to be satisfied in order for people to remain physically, mentally and socially healthy" (Robèrt et al. 2010: 108), going, then, far beyond mere survival (Max-Neef 1991: 23). These human needs (such as participation, creativity and freedom) are translated into aspirations that work as a compass to individual lifestyle choices.

Needs and aspirations cannot be singly analyzed, as they are all interrelated and interactive (Max-Neef 1991: 17), neither be dissociated from the context in which they are fulfilled, especially from the ecological attributes of such context, due to the fact that humanity pertains to the natural world (Ost 1998: 30-31)⁷ and, therefore, such world exerts great influence over human well-being (Millennium Ecosystem Assessment 2005b: 451, Bina 2011: 171). Realizing such dynamic nature of aspirations and human needs – systematically interacting among them, with others and with the environment – helps in really attaining the concept's ability to support the process of building a vision for sustainable living.

There is a fundamental difference between needs and satisfiers, the latter being the ways and means people attempt to fulfill their needs, which can vary over time, from person to person, and through cultures. Human needs and aspirations, on the other hand, are finite and nearly constant, being the same across different historical periods and cultures.⁸

Max-Neef (1991: 32-33) proposed nine categories of human needs and four dimensions of satisfiers which are essential to all people and intrinsically interrelated. These need categories are distinct and yet complementary; the satisfier dimensions cluster individual or collective forms of fulfilling one or more human needs. It's represented below:

⁵ As the preliminary findings of BIG2050 regarding impact assessment on/of lifestyles show, among other patterns, that unemployment rate has not improved or even increased during the last decade across the countries analyzed so far, despite of the considerable economic growth that these countries have experienced over the same time frame. Work, in turn, is a very relevant satisfier of different human needs, especially of the very basic need of subsistence.

⁶ The preliminary findings (check footnote 5) also show that increasing resource and energy use is a common pattern across the countries assessed so far.

⁷ Ost (1998) interestingly travels back in time to demonstrate the differences between the primitive and the modern men in relation to their attitudes towards nature. It's during modernity that man decides to break up with nature.

⁸ We agree with Max-Neef (1991: 27) when he ponders that the lack of empirical evidence, and so, of absolute certainty regarding the perennial nature of human needs should not prevent us from considering their socio-universal character as well as their patterns that have accompanied humans throughout history.

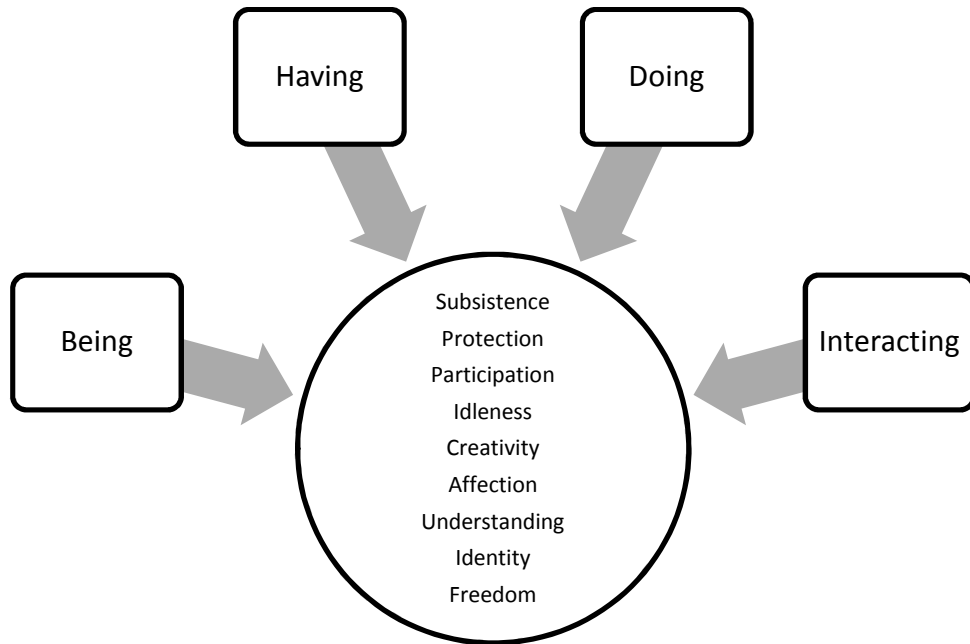


Figure 1: Matrix of human needs and satisfiers

The four dimensions of satisfiers are understood as follows: *Being* relates to personal or collective human qualities and attributes; *Having* relates to institutions, norms, mechanisms, laws and tools (not restricted to a material sense); *Doing* relates to individual or collective actions; and *Interacting* relates to settings where people live and make decisions.

Adding to this picture, BIG2050 selected twelve main lifestyle areas to which satisfiers and their impacts are related. Such areas are: education and skilling, employment and work conditions, nutrition, health, mobility, housing, energy generation, urban/rural development, governance, leisure and culture, use of resources and communication.

Under this perspective, we are able to affirm that it's actually need-oriented satisfiers, in all its diversity and dimensions – and not the chase for economic goods in favor of infinite “pseudo-needs” and unsuitable to meet most real needs – that should constitute the core building blocks of lifestyles, shaping people's behavior, choices and practices towards the world. Economic goods, in turn, are not devoid from relevance, quite the contrary: they are capable of affecting the efficiency of satisfiers, for the good or the bad. It's important, then, that the satisfying mechanisms established by society take the lead in defining the goods that are relevant for fulfilling human needs, and not the other way around.

At this point, we are able to draw two main conclusions. First: to reach sustainable lifestyles, it's necessary to set conditions for satisfiers to be sustainable. Such conditions should be related to each lifestyle area, in order to potentiate satisfiers' fulfillment mandate while setting limits to their impacts.

These are the so-called strategic conditions for living sustainably. Second: a wide range of opportunities unfolds before countries, cultures, businesses and organizations for developing creative and diverse solutions to fulfill human needs and, therefore, to shape sustainable lifestyles.

For this reason, BIG2050 conceives sustainable living as a *glocally* process, meaning a dialectic two-way road: on the one hand, global concepts, opportunities and cooperation forces are tailored into the different local realities and aspirations, with creativity and respect for diversity; on the other, local practices, learnings and models are shared and incorporated globally, in different levels of action, improving global opportunities and fostering a continuous learning process towards sustainable living.

The figure below summarizes the main stepping stones of BIG's conceptual framework for human needs. To reach its core objective, which is, to develop and support the fulfillment of the strategic conditions for living sustainably, altogether taken as the project's desirable vision for sustainable living in 2050 and beyond, BIG2050 relied on backcasting as its overall methodology, as discussed in the next subsection.

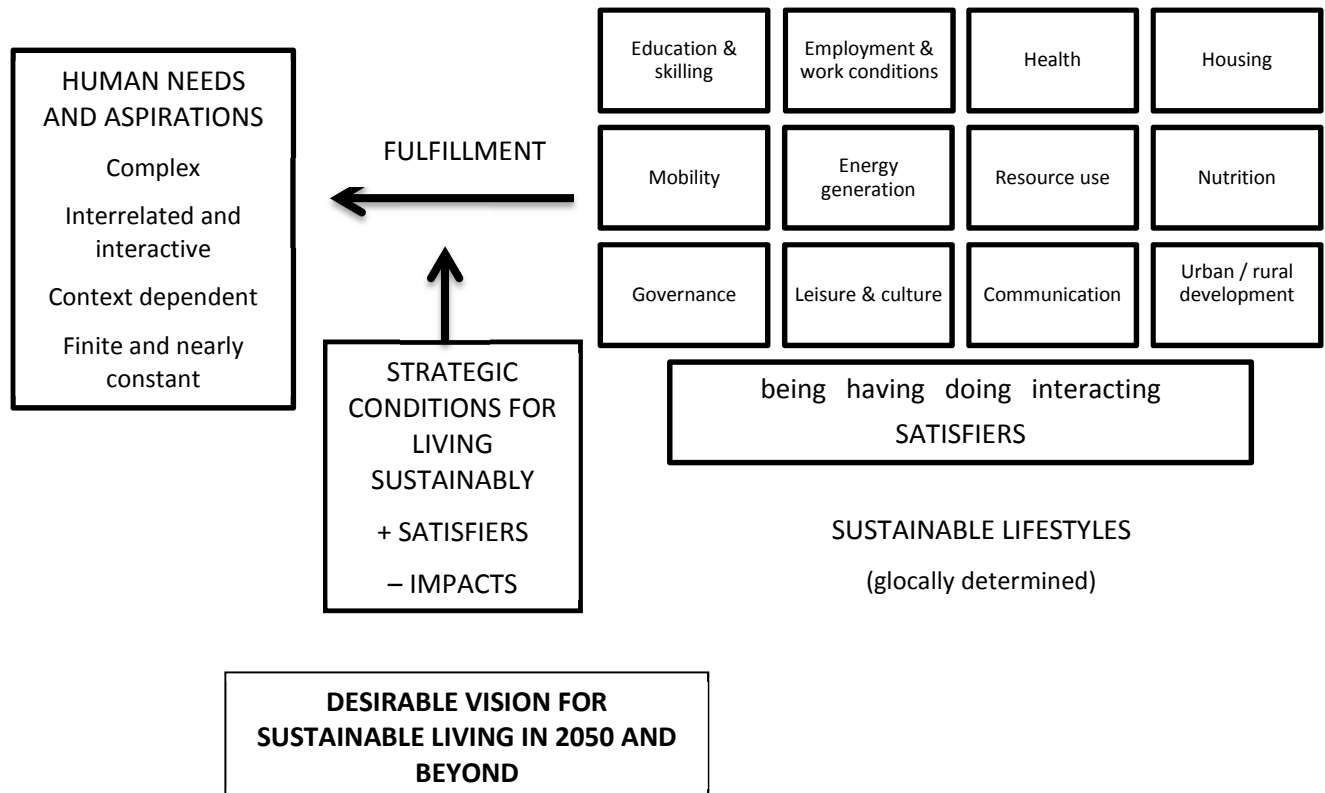


Figure 2: Conceptual framework for human needs

2.2. Backcasting: the overall methodology of BIG2050

Literally understood as “looking back from the future” (Quist 2007: 11), backcasting is about envisioning a desirable future first, a vision able to provide guidance and orientation for defining, in a second moment, which steps are needed to bring about that future (Quist 2007, 2011). Its normative nature stands out as one of the most fascinating features of backcasting, in a sense of focusing on the development of and adherence to normative goals that are to be attained in the future by means of actions designed and taken today with this very purpose (Dreborg 1996: 814, Quist 2007: 11).

Amidst existing obstacles to real change towards sustainable living, starting with our own limited perceptions of what is possible and reasonable (Dreborg 1996: 816), backcasting stands, thus, as a fundamental approach to allow a process of critically rethinking the dominant vision and using creativity to reach beyond existing mindsets and paradigms to build and realize a new (desirable) vision (Quist 2007: 20).

Based on the premises and normative goals discussed in the previous subsections⁹, BIG2050 applies a multi-level backcasting approach, combining participatory backcasting experiments at the *local* level with the development of a desirable vision for living sustainably for the *glocal* level.¹⁰ Both activities run in parallel and are mutually dependent and influential, although following different processes, as discussed below.

The participatory backcasting experiments consist of a series of multi-stakeholder workshops, called “workstudios”, taking place in five different countries: China, Colombia, the Philippines, Ghana and Germany. The workstudio process generally follows the five steps of Quist’s (2007, 2011) methodological framework for participatory backcasting¹¹, and its main outcomes are: creation of local scenarios for living sustainably in 2050, assessment and prioritization of impacts on/of lifestyles to be addressed today, and inputs for pathway development (country promising practices, opportunities and challenges, and offers and needs of stakeholder participants).

Based on these outcomes, the BIG2050 research team prepares a workstudio report after each event, whose main component is a country-specific action roadmap that coherently synthesizes current reality impact hotspots, the vision for 2050 and the different stages of actions needed to bridge the gap between today and the desired future. The action roadmaps serve as reference documents for action development, follow-up and further improvement of the vision and its implementation process.

BIG2050 participatory backcasting experiments are deeply rooted in two main building blocks: participation and learning. In relation to the first, each workstudio gathers around 40 stakeholders from various sectors and with different backgrounds, in order to bring together different contributions and perceptions for envisioning and attaining sustainable lifestyles. This way, it is possible to build an interdisciplinary and legitimate planning process towards sustainable living across different cultures.

A challenging aspect of participation is to extend stakeholder engagement beyond the workstudios. We will come back to this issue later in this subsection.

Regarding the learning building block, it is possible to identify at least two types of learning processes arising from the backcasting experiments. The first one, seen as an internal or local learning process, relates to the fact that the workstudios constitute unique opportunities to facilitate dialogue among different stakeholder sectors, giving participants the chance to learn about each other’s activities and to identify synergies among them for future cooperation for sustainable living. A second type of learning, considered an external learning process, is realized by means of communicating the workstudios’ results to participating countries, project partners, and the general public, which is currently done through the workstudio reports and the CSCP media platforms. Among the communicated results are the countries’ promising practices to enable living more sustainably, which already constitute relevant steps for bridging today’s reality with the desired vision for sustainable lifestyles in 2050.

Most importantly, however, is the integration of the workstudios’ inputs and learnings into the process of developing BIG2050’s strategic conditions for living sustainably, which altogether will

⁹ BIG2050’s premises bear similarities with the Dutch Sustainable Technology Development (STD) programme’s basic assumptions, highlighted by Quist (2007: 26), such as the focus on the sustainable fulfilment of societal needs (although the projects differ in relation to the conceptual framework behind such focus as well as regarding the approach of means and options to fulfil needs).

¹⁰ Kok et al. (2006) register the application of an approach based on multi-scale scenarios, which consists of a quite different methodology in relation to the one applied in BIG2050, although also addressing different context levels or scales.

¹¹ Quist’s methodological framework’s five steps (2007: 28-29) are: (1) Strategic problem orientation, (2) Develop future vision, (3) Backcasting analysis, (4) Elaborate future alternative and define follow-up agenda, and (5) Embed results and agenda and stimulate follow-up.

shape the project's desirable vision for the *glocal* level. That's our next focus of discussion in this subsection.

The development of a desirable vision for the *glocal* level, on the other hand, consists of a research-based activity that congregates literature review with the inputs and learnings from the five workstudios, with the aim of developing a set of strategic conditions for living sustainably in 2050 and beyond. As discussed previously, these are conditions for need-satisfiers to be sustainable and they will be related to each of the twelve lifestyle areas highlighted in BIG2050. Each strategic condition is expected to establish a two-fold prescription that potentiates satisfiers' fulfillment mandate while limiting satisfiers' negative impacts.

The inputs from the workstudio participants are mostly relevant for this process in order to achieve a more legitimate desirable vision, one that is the outcome of varied cultures, sources, perceptions and sector contributions. In this sense, the activity can be classified as standing in between a backcasting experiment and a backcasting study, as the results from the participative backcasting experiments contribute, albeit indirectly, to the final outcome (the vision) of the process.

Such set of strategic conditions constitute the key expected outcome of BIG2050, creating an universal framework for sustainable living that enables their application and tailoring worldwide, across small localities, countries and regions. This is why it has a *glocal* focus.

Looking back from this desirable vision, BIG2050 will identify the key steps towards the attainment of the vision, which will be communicated as recommendations to partners and different stakeholders. The workstudio countries will also be assessed in terms of the level of fulfillment of each strategic condition. To allow the assessment of progress in implementing recommendations and fulfilling the strategic conditions, the expected outcomes of BIG2050 also comprise a set of related indicators.

Although there is a need for local ownership to drive these recommendations and action roadmap implementation forward, BIG2050 also provides a key tool to support such process and encourage stakeholders to remain engaged with the commitments arising from the project. The tool is an online social media outlet called Global Network on Sustainable Lifestyles (www.vision2050.net), which is a platform hosted by the CSCP for communication, learning and cooperation among its members. These are some of the BIG2050 follow up elements supported by the Global Network: (i) facilitate discussions and cooperation, by means of physical or online discussion groups that focus on workstudio findings and allows match-making among workstudio participants; (ii) enable international connections, connecting stakeholders from workstudios with professionals from around the world to share experience and learning; (iii) support on an as needed basis, responding to specific queries and interests from stakeholders and cross-pollinating efforts with other sectors; (iv) capacity building, by providing insights into tools, international practice and experience, decision-making frameworks and other networks (online knowledge centres).

For a better overview specifically of the participatory backcasting experiments of BIG2050, the next section provides more details about the workstudio steps, tools and methods.

3. Workstudio structure, process and follow up

Having an European city as benchmark, each of the BIG2050 workstudios aim to uncap the burning issues in various aspects of lifestyles such as underlying values and motivations that communities and individuals must address to encourage sustainable lifestyles and what new capacities need to be developed to effect change in the ways they live.

The workstudio brings together between 30 to 40 stakeholders from diverse sectors. It seeks to engage policy-makers, business representatives (Multi-National Corporations and Small and Medium Enterprises), academia, and organized civil society into mainstreaming actions and

solutions towards social innovations, construct bridges between different activities and activate partnerships that strengthen practices of resilience, accountability, equity and citizenship for enabling the sustainable economy and lead sustainable lifestyles.

Prior to each workstudio, the BIG2050 research team develops a background research on the current lifestyles in each of the countries of the project, which covers each of the twelve lifestyles areas highlighted by BIG2050, and enables to create a series of assumptions about what the most relevant lifestyle areas for each country would be. Along the workstudio, it's possible to contrast the hypotheses derived from the background research with the participants' (citizens of the country) perceptions and opinions about the impacts on/of lifestyles currently taking place in their countries.

The target group of the workstudios comprises the above-mentioned stakeholders in five cities across the world, where the German Ministry of Economic Cooperation and Development (BMZ) has operations and that are presenting similar growth patterns in economical and consumption trends (predominantly from a growing middle-income class). The locations are:

- Africa: Accra, Ghana
- America: Bogota, Colombia
- Asia-Pacific / Oceania: Manila, the Philippines
- Asia: Wuxi, China
- Europe: Berlin, Germany

Each workstudio provides a series of action plans and potential partnerships that meet conditions for living sustainably which are included into the study of solutions for living sustainably today. All information is publicly available on the online platform launched to continue the dialogue of the workstudios and accrue knowledge: the Global Network on Sustainable Lifestyles (www.vision2050.net). More details about this online platform will be presented later on this paper.

Participants of the brainstorming process in the online platform can also sign up for the workstudios and contribute to the creation of recommendations to different stakeholders, promotion of innovative business ideas and awareness rising.

The agenda of the workstudio is designed with the support of a local partner and is meant to guide participants through a backcasting process during the entire event. It is structured in two main blocks: the morning program comprises the introduction to backcasting and the crafting of a vision based on the impacts on/of lifestyles; the afternoon program is devoted to the creation of pathways and the follow up process, thus bridging current reality with the vision of the future.

3.1. Visioning session

After the key note speeches provided by local experts, offering an overview of the country's current reality in terms of lifestyles and consumption trends, the participants split into different groups and engage in a visioning session that has the objectives to:

- Perform social research on impacts and drivers that lead to sustainable lifestyles;
- Engage different stakeholders in the co-creation of scenarios of a common future and find responsible new ways to be part of the solutions leading to that vision;
- Appeal to the emotional side as well as the rational understanding of the people in order to enable creative problem solving.

For the crafting of scenarios, participants use a tool known as "personas from the future", through which they get involved in a role-play activity portraying consumers of 2050.

Role-playing is the chosen approach as it engages people emotionally in what can be considered a "game", which is imagining how living in their cities by 2050 will be like. The rules are very simple and yet provide a rigid structure that allows participants to have a freedom of movement,

conveying an opportunity for emergent experience and personal expression (Fullerton et. al. 2008).













Game designers like Lankoski (2010) define the importance of a character as the vehicle to let emotions influence experience and behavior without the player being consciously aware of it. However, the preferences and skills of the players do play a role that defines the outcome of the game. Therefore, to craft the scenarios, participants of the workstudios get “in the shoes” of future consumers and they can understand the needs and lifestyles of people living in the future. With these characters, participants detach from their personal preferences and yet bear in mind that for these future characters to lead (or not) the lifestyle they present, today’s actions of the player are a determining factor.

In summary, the “personas from the future” are tools that provide an immersive experience into the common-vision crafting process as they:

- Engage participants in future thinking;
- Challenge assumptions about the future that participants want to be part of;
- Invite other stakeholders to the dialogue and action;
- Deepen the participants’ understanding of the evolving dynamics that will drive consumer behaviour over the coming several decades;
- Tap into potential social innovations.

The scenarios are crafted around the twelve lifestyles areas previously mentioned. The impacts are clearly identified by an icon (as presented in the table below) and, when needed, they have been translated into the language of the country where the workstudio is taking place. Sessions are facilitated to ensure the collection of outcomes, which are to be presented both in graphical and text formats.

Table 1. Lifestyle areas in which impacts on/of lifestyles are analysed and icons to identify them as used during the visioning sessions

 Urban-rural development	 Employment and work conditions
 Energy generation	 Education & skills development
 Use of resources (including natural resources like water)	 Governance
 Housing	 Leisure & culture
 Mobility	 Communication
 Nutrition (Food and drink)	 Health

The persona use and scenario creation session has four different sections and aims to take participants into a “time traveling” experience, presented in the figure 3.

During the first part of the session, participants receive a brief introduction of the backcasting process and how the workstudio sections fit into it. There is a recapitulation on what the keynote speakers presented as the current reality from which the participants will “travel” into 2050.

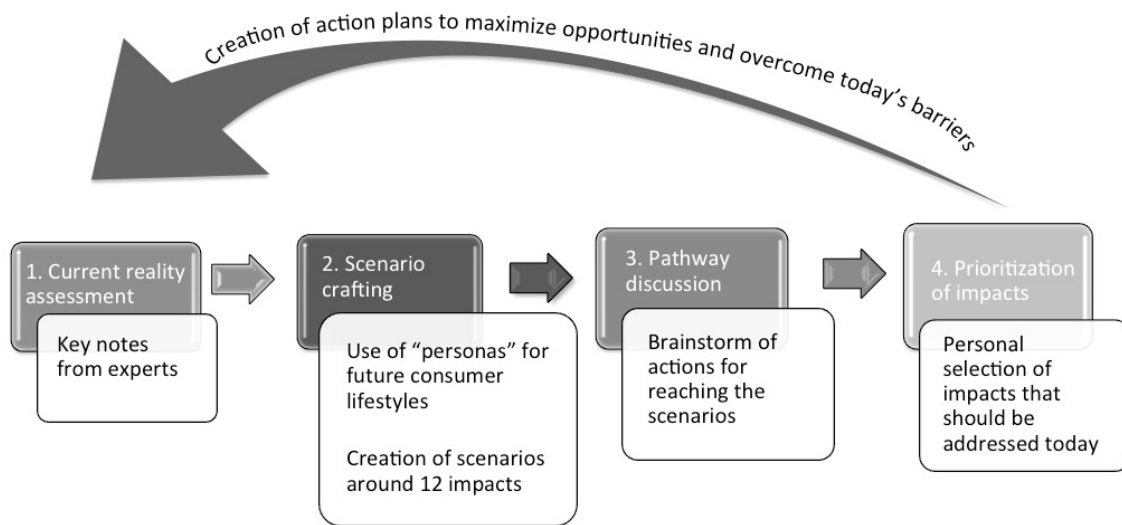


Figure 3. Diagram with all the sections of the visioning session as part of the backcasting process

The persona cards have personal information such as name, year of birth, occupation and a personal value statement that help participants to impersonate their character, voicing out their needs regarding the lifestyle area in discussion (i.e. housing – what kind of solutions for proper housing does the 80-old retired fisherman need?).


INFORMATION CHART	
NAME: Joyce	
DATE OF BIRTH: 2024	
OCCUPATION: Water Engineer -- specialized in collection and treatment of rainwater	
HOUSING	
<ul style="list-style-type: none"> - Lives with her partner in a small studio in a co-housing building in Cebu City - When traveling she uses shared locations or camping sites - Due to her profession, she is responsible of the house vegetable-garden facility - She's got a monitoring system in her house to keep track of all the tanks and locations who's responsible of 	
MOVING	
<ul style="list-style-type: none"> - owns a bike - uses public transport within the city, specially sun-powered jeepneys - drives an electric car for work trips (company owned) 	
CONSUMING (FOOD/DRINK, COMMUNICATION, LEISURE)	
<ul style="list-style-type: none"> - grows her own vegetables at home and likes cooking on the weekends - eats out almost every day, specially at the main water-monitoring center - likes creating music with her virtual composing tool 	
HEALTH	
<ul style="list-style-type: none"> - works out regularly - has inherited markers of heart disease so she's very cautious about it - is planning a pregnancy in five years 	
COMMUNITY LIFE	
<ul style="list-style-type: none"> - meets with the other housemates once a month - likes hanging out with her coworkers - goes out of the city "into nature" once a month if possible 	
PERSONAL VALUE STATEMENT	
<p>"I like to spend time in nature as much as going back to it, that is why I am so fascinated by the opportunities that science offers to help nature satisfying our needs. I believe that since the water collection and treatment through farm-libs have been in place, water and food scarcity became history"</p>	

Figure 4. Example of persona ID card used during the visioning session

During this debate, participants reach consensus as how each lifestyle impact area works/looks like in a way that they all can satisfy their needs and meet their aspirations.

Reporting back to the group normally happens in an environment of camaraderie and satisfaction with the work done. Each group presents the future scenario for the lifestyle area it was responsible for, by choosing its own presentation style, from solo presentations reading out the chart with their description neatly written in bullet points, to presentations of the entire group portraying their characters and engaging in a dialogue to the public.



Figure 5. Group presenting their scenario to the plenary

The third part of the session represents a return to today and the discussion of different pathways that, starting today, can lead to the vision of 2050. At this point, the workstudio participants take a qualitative step forward towards the definition of concrete pathways to enable change.

Such pathways consist of six different strategies for reaching the complete vision of sustainable lifestyles in 2050:

- (i) Sustainable business models;
- (ii) Policy tools;
- (iii) Behavioural change and social innovations;
- (iv) Efficient value chains;
- (v) Technological innovations; and
- (vi) Infrastructure.

In separate groups, the participants thoroughly analyse the main concepts of the strategies and instruments as well as any related barriers and opportunities, with the aim to clarify the content of strategies and their current level of development in the country the workstudio is taking place. They also discuss the measures yet to be taken, and the factors to be overcome or leveraged. Two main questions guide the discussion:

1. What concepts, instruments and frameworks are needed today and what role does each stakeholder play to make them work?
2. What barriers and opportunities exist that can be overcome or leveraged to reach the vision of sustainable lifestyles in 2050?

To close the visioning session, participants have a moment of self-reflection to identify the areas on which more efforts have to be made today, along with the required type of measures to bring these efforts into life (political, technological, economical or social).



Figure 6. Complete vision with prioritization of lifestyle areas and correlated needed measures– one of the outcomes of the visioning session

Figure 7 below shows a graph with the prioritization per lifestyle area for every country where the workstudios have taken place so far. It is important to highlight that these are the areas to be addressed in the short (most urgently – peaked on 3 in terms of relevance), mid (2 in relevance) and long (1 in relevance) terms, in order to reach the desired 2050 visions of each workstudio country.

Impacts on/of lifestyles by relevance - workstudio outcomes

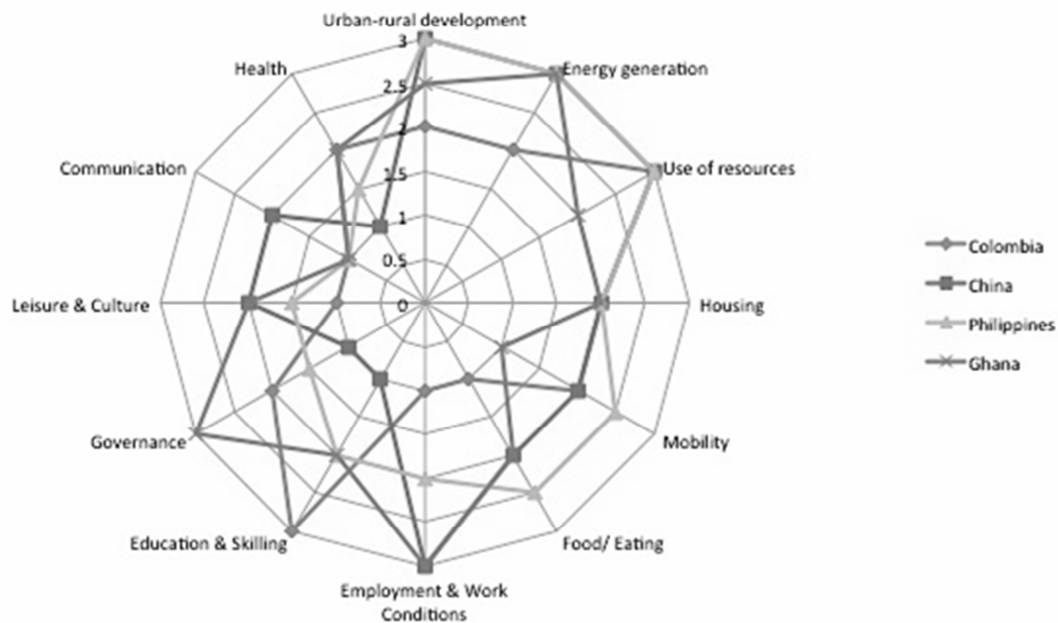


Figure 7. Impacts to be addressed in the short, mid and long terms to reach the 2050 vision – country overview

For the continuation of the workstudio, outputs from the visioning session serve as findings to create recommendations, enable targeted discussions on opportunities, challenges, needs and offers from the different stakeholders and create action roadmaps that participants can relate to for engaging into actions towards living more sustainably.

3.2. Key approach to pathway creation and follow-up of activities

Multi-sectorial engagement and collaboration are crucial elements to successfully address the negative impacts of current lifestyles and pave the way that leads to sustainable living. The pathways towards change, previously discussed as part of the visioning session, are dynamic strategies that require a collective action of various stakeholders to identify innovations for sustainability and to define and implement a common agenda for living sustainably.

Discussing business and social innovations as well as scale up strategies favorable to a sustainable future offers the opportunity to rethink the ways in which economic growth is being achieved and its related costs in terms of social development and environmental protection. Accordingly, the situation in most of the countries undergoing quick-paced economic growth demands the development of an entrepreneurial environment that can leverage innovation and lead to lifestyles that are coherent with the transition to a sustainable future.

What BIG2050 presents is that there are sustainable practices and promising partnerships that are already flourishing worldwide, and some of the best examples are known or even done by the workstudio participants. Nevertheless, in the larger picture, they still constitute comparatively isolated examples scattered over countries and, in most cases, they lack a national sustainable lifestyle agenda.

Our key approach to the creation of action roadmaps consists on assessing existing promising practices and alternative consumption niches across the workstudio countries, and bringing them together by matching stakeholders' needs and offers, expressed both during the workstudio and online through the Global Network. This way, it is possible to foster cooperation among stakeholders, and assess synergies and opportunities to both scale up innovations and initiate new ones, having the fulfillment of the conditions for living sustainably as the perceived

common goal. This process, as presented in figure 8 and explained below, is supported by the Global Network.

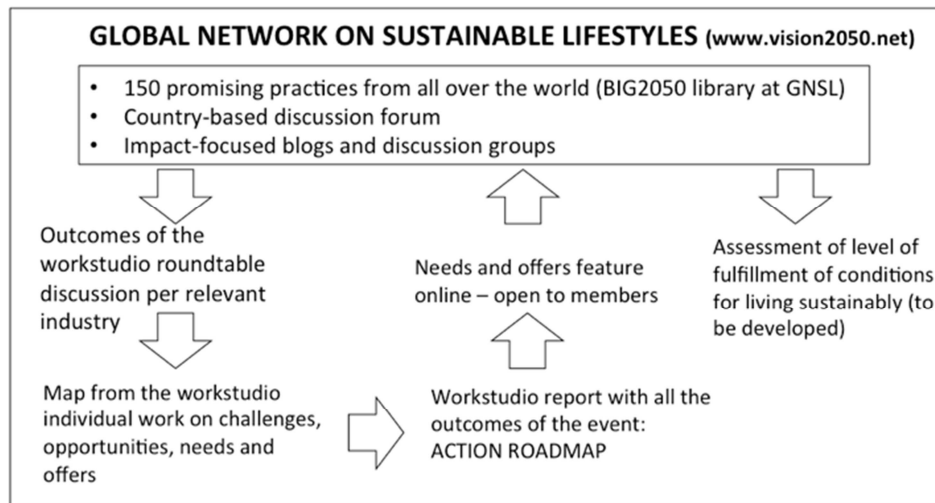


Figure 8. Roadmapping process. BIG2050 full process including input from workstudio and connection to the conditions for living sustainably.

In order to lay the “steppingstones” to create the agenda of priorities for each group of stakeholders and to shed light on potential synergies among different stakeholder groups for future collaboration, the second half of the workstudio, organized in close cooperation with local partners, starts with roundtable discussions. There are usually six different roundtable discussions taking place simultaneously. Each of them represents a different stakeholder sector (i.e. finance, R&D, social and technological innovations, business and entrepreneurship, natural resources management, and media) and is hosted by an expert of the topic.

The roundtable discussions are guided by three main questions:

1. Which success stories/examples around sustainable innovations and sustainable living happening in the country are you aware of?
2. Which of these examples have been scaled up or replicated or could be scaled up?
3. What kind of partnerships and success factors are needed to scale up the impacts on sustainable living?

After the discussions, the results from each group are presented to the plenary.

Following the roundtable discussions, the workstudio participants individually highlight the opportunities and challenges for the development and scaling up of sustainable innovations in their countries.

They also evaluate their own offerings and needs to support change, from the perspective of their personal projects/activities or generally of the sector they are part of. The result is a colourful matrix (figure 9) that is transcribed into a series of tables that enable opening the “match-making” feature at the Global Network on Sustainable Lifestyles (www.vision2050.net/your-match).



Figure 9. The analyses of opportunities, challenges, needs and offers on each workstudio. From right to left : China (activity done by working groups), Colombia, the Philippines and Ghana.

Bringing together the issues identified as trends on the background studies, the elements of the keynote speeches, the scenarios crafted during the visioning session and the analysis performed during the roundtable discussions and individual reflection, the workstudio outcomes are summarized in an action roadmap that is presented in the event's report and made available online.

After drafting the conditions for sustainable living, each country will be measured according to the indicators (still to be developed) and introduces into the country action roadmap to support the prioritization of actions and enable mechanisms for evaluation, reporting and follow up.

An example of an action roadmap is available in Annex 1.

4. Preliminary insights

4.1. The methodology

Thanks to the feedback received from each workstudio it was possible to hone the content of the session, thus enabling the participants to engage in more meaningful discussions and facilitating the cross-pollination of ideas and knowledge needed for elaborating the action roadmaps. The event seeks to have a balance between passive and active sessions. Passive sessions are the ones where the audience just listens and may have the opportunity to ask questions towards the end of the session, such as in a panel discussion or during the closing of keynote speeches. Active sessions are discussion groups with an open communication flow and aim to enable co-creation.

Some of the key findings for guiding a group of stakeholders from diverse backgrounds and ages through a backcasting experiment are the following:

- An introduction to backcasting process is needed at the beginning of the visioning session, which happening after the key note speeches at the beginning of the day. A slide with a visualization of backcasting serves as reference to explain participants what are they about to embark into;
- It is important to provide participants with a “me” time to engage them in a deeper level of understanding of the situation and appeal them to get involved in the creation of solutions towards living more sustainably today;
- Handouts with glossaries and templates are very welcomed for clarifying parts of the content and harvesting the information of discussion groups.
- A briefing of how the “personas from the future” are created, preferably with sources for some of the trends, is also very useful;

In general, each workstudio has provided enough material for the organizers to implement changes in the structure of the sessions. The methodology has proven to be flexible and appealing to participants up to the extent that it is possible to collect all the relevant information to be analyzed and translated into the results of the project.

Methodological shortcomings, such as impact analysis that reflects solely the opinion from the participants of the workstudio, are considered for the elaboration of the conditions. Using the

background research developed on the initial stages of the project, it is possible to map the priorities for each country as identified by researchers and various other institutions, and create a gap analysis to develop a more uniform scenario of areas of relevance and priorities.

4.2. BIG2050's content and goals

The country-related findings have been published in each of the workstudio reports and discussed through the Global Network on Sustainable Lifestyles.

As this is an ongoing project, the activities so far have provided an overview of the lifestyle aspirations and their related impacts across the workstudio countries. The conditions for sustainable living are in an early stage of development.

The action roadmaps generated in the workstudios are supporting the process of identifying common opportunities across countries, facilitating the process for drafting recommendations to the different stakeholders.

The increasing collection of promising practices showing that living sustainably today is possible, although not yet largely practiced, bring about some questions to be considered: how to make sustainable lifestyles desirable? How to turn sustainable living into common practice? Who is responsible of “architecting the choices”¹² for sustainable lifestyles?

To answer the later, at the current stage of the research it is possible to visualize the intention of the recommendations stemming from the research to draft the strategic conditions, as a support to different stakeholders to shape up their decision-making processes. A more detailed research can help providing indicators that will facilitate the measurement of the impact of the different decisions and actions undertaken.

5. Way forward

From the conceptual framework for human needs developed by BIG2050, in combination with the project's overall methodology, a wide range of opportunities unfolds before countries, cultures, businesses and organizations for developing creative and diverse solutions to fulfill human needs and aspirations, therefore, to shape sustainable lifestyles.

The *glocal* foundation of the strategic conditions for living sustainably in 2050 enables a dialectic two-way road that substantiates a process of mutual learning and improvement between the local and the global levels. This way, promising practices and alternative consumption niches are communicated and scaled up, helping to bridge the gap that separates current reality from the common desirable vision of sustainable lifestyles.

The strategic conditions for living sustainably are not meant to be an absolute truth about the coming transition towards more sustainable ways of living, but an starting point across different societal levels, to perceive a more balanced and long-termed relationship with the environment in which humans are equally and fairly treated. Changes in the conditions are already expected and more than desired, as the reflection of a dynamic process that pertains to a truly sustainable development.

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¹² Terminology coined by Thaler and Sunstein (2008).

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ANNEX 1 – Sample of Action Plan created at the workstudio in Ghana

Guillen Nicolau, Hicks (Reviewer)

PATHWAY TO CHANGE IN GHANA

CURRENT TRENDS

IMPACT HOT SPOTS:

- Fast demographic growth and urbanization;
- Poverty rate at 28.5%;
- High unemployment rate and large informal economy;
- Increased demand for imported food;
- Low access to health services;
- Threatened natural resources and productivity loss;
- Doing business is costly;
- Increasing energy consumption and scarce wood fuels;
- Transport emits half of Ghana's CO2 emissions;
- Poor housing and sanitary infrastructure.

ONGOING APPROACH:

- Unsustainable and centralized management of resources;
- Lack of governance to define a national agenda for sustainable lifestyles;
- Promising practices are isolated endeavors;
- Reported corruption;
- Poor networking among stakeholders;
- Lack of policy and financial support for entrepreneurship.

DRIVERS OF CHANGE:

- Social drivers are key tools for the overall process of bridging the gap today-2050;
- Political drivers are relevant to enable the transition towards good governance;
- Technological development is important for sustainable energy generation/resource use and fair employment conditions.

ACTIONS FOR SCALING UP INNOVATIONS AND ENABLING SUSTAINABLE LIFESTYLES

Ongoing actions:

- Research on social and economic sustainable innovations;
- Adherence to certification standards to make extraction/production more sustainable;
- Creation of alternative businesses to produce sustainable and innovative products and services;
- Improvement of banking and financial services.

Further action required to support started initiatives:

- Implement Ghana's SCP National Action Plan and other existing sustainability-related policies;
- Expand EPA's program for substitution of old energy-use products by efficient ones;
- Boost financial services and supporting technology, such as mobile money services.

Required but still not started strategic actions:

- Develop education and information systems directed towards sustainable living and entrepreneurship;
- Encourage bottom-up changes and use practical methods to communicate sustainable ways of living;
- Advance new policies to support SCP, innovative entrepreneurship and waste management;
- Boost entrepreneurship: expand tax breaks and support small, local social entrepreneurship;
- Scale-up microfinance opportunities;

OPPORTUNITIES

- Various business startup ideas and available expertise;
- Abundant natural resources and rapid technological development;
- Existing avenues for collaboration such as the Global Networks.

CHALLENGES

- Lack of commitment of stakeholders with SCP;
- Few investments in and high costs of doing business;
- Linking different interests into common endeavors;
- Poor democratic tools to influence political decisions.

VISIONS TO 2050

FUTURE SCENARIO:

- Reliance on renewable energy sources;
- Sustainable waste management and provision of clean water;
- Penalized excessive resource consumption;
- Fair working conditions and sustainable jobs;
- Sustainability-orientated education system;
- Universal and preventive health care;
- Rural communities with good social interaction, local food production and suitable job offer;
- Improved communication technology, decreasing travels;
- Revival of traditional art and eating habits;
- Innovative entrepreneurial environment.

KEY PILLARS:

- Public policies and infrastructure for sustainable living;
- Participatory decision making;
- SCP as a social goal;
- Sustainable and decentralized management of resources;
- Financial and educational support for entrepreneurship;
- Strong education and information systems.

Combining backcasting and transition management in the community arena

a bottom-up participatory method for visions & pathways for sustainable communities and consumption¹

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Abstract

This paper presents the theoretical basis and the methodological framework of the *community arena*, a co-creation tool for sustainable behaviour by local communities and consumers. The community arena focuses on articulating, confronting and connecting individual inner contexts in a participatory process so as to influence both how individuals think as well as how they behave. The premise is that by raising awareness and sensitivity amongst engaged citizens about other ways to look at reality, they open up to new possibilities to think about their individual behaviour in the broader societal context.

After comparing backcasting and transition management, the community arena methodology is described building on elements of transition management, backcasting, as well as adding elements from learning, and needs & capability approaches. As part of an EU funded InContext project the methodology has been tested in three pilot areas in the Netherlands, Austria and Germany; some illustrations from the Dutch pilot in the deprived neighbourhood of Carnisse in the city of Rotterdam are presented, before drawing conclusions and addressing broader relevance of the outcomes.

Keywords; backcasting; transition management; community arena; sustainable living

¹ This paper is part of the FP7 funded InContext ‘Individuals in Context: Supportive environments for sustainable living’ project, ENV. 2010.4.2.3-1: Foresight to enhance behavioural and societal changes enabling the transition towards sustainable paths in Europe, Grant Agreement number: 265191. More information and downloads can be found at www.incontext-fp7.eu.

1 Introduction

Sustainable development initiated at and supported by the local level was made a key policy issue at the 1992 United Nations Conference on Environment and Development in Rio de Janeiro. One of its main policy documents, the Agenda 21, gives a prominent role to local authorities “because so many of the problems and solutions being addressed by Agenda 21 have their roots in local activities” (UN 1993). The leading role of local authorities was reconfirmed at the 2002 Johannesburg World Summit on Sustainable Development and over the last decades multiple Local Agenda 21 processes have been taken place all over the world. They were adopted and conducted by numerous municipalities in many countries and range from generic vision statements to formal action planning procedures (Selman 2000).

During these years, the merits and shortcomings of the Local Agenda 21 processes have become clearer. Though having lead to previously unknown levels of engagement of citizens, policy makers and stakeholders, LA21 processes did not succeed in getting beyond flagship projects. As a consequence, it has been argued that “widespread citizen engagement is unlikely to continue, unless opportunities for practical involvement are created, products are forthcoming, and encouraging feedback is received” (Selman 2000: 49). This may even lead to citizens getting worn out about participating in local bottom-up sustainability processes. The involvement methods used may raise awareness and participation by focusing on quickly reaching social consensus whilst avoiding areas of possible disagreement, but do not seem to have produced “widespread, deep-seated and long-lasting transformations” (Selman 2000: 49). Explanations include the political marginalization of the processes with no formal political decision power (Geissel 2009), the failure to produce fundamental behavioural changes (Selman 1998) and the focus on environmental issues not taking the business sector into account (Selman 1998, Gibbs et al. 1998). A major issue 30 years after the formulation of the Agenda 21 in Rio is still the start and acceleration of a paradigm shift towards sustainability at the local level.

Developments in transition management en backcasting

Next to Local Agenda 21 processes, other participatory approaches for initiating and supporting stakeholder action on sustainable development have been developed in the last decades. In the Netherlands, Canada, UK, Sweden and Belgium, significant efforts have been and are being undertaken with two participatory approaches, transition management and participatory backcasting in areas such as energy, building, health care, food, mobility and water management.

Transition management has rapidly emerged over the past decade as a new approach addressing complex societal problems and the governance of these problems towards sustainability. It is a participatory learning and experimenting process aiming at creating societal movement that can put pressure on dominant policy (Loorbach 2007, 2010). Backcasting has been defined as “generating a desirable future, and then looking backwards from that future to the present in order to strategize and to plan how it could be achieved” (Vergragt & Quist 2011: 747); over the last decades a participatory variety has strongly emerged. Both transition management and backcasting have mainly involved professional stakeholders. Recently, transition management was applied on the local level with citizens (Spekkink et al. forthcoming), while participatory backcasting has also been applied to consumption involving both citizens and consumers since a decade (e.g. Quist et al 2001, Green & Vergragt 2002, Carlsson-Kanyama et al 2007, Kok et al 2006).

The shift towards the local level and consumption and the potential of both approaches for addressing sustainability issues on these topics obviously deserves further exploration, while the interlinkages between transition management and participatory backcasting have also been neglected (Quist et al 2011, Wittmayer et al 2012). To address these interlinkages and the potential of both approaches to contribute to fundamental change towards sustainability at the local level is one of the aims of the EU funded InContext ‘Individuals in Context: Supportive environments for sustainable living’ project. Another key issue in the InContext project is to

support the transition to sustainable behaviour in local urban communities by aiming for a better understanding of how the inner and outer context on individual and group level interrelate with individual and collective strategies and/or practices. The objectives of the InContext project are (1) to facilitate pathways towards alternative, more sustainable behaviours of individuals and (2) to foster collective activities towards more sustainable communities (Schäpke & Rauschmayer 2012a, 2012b, Piotrowski et al 2012).

This paper presents part of the InContext project and presents the community arena, a new methodology building on transition management, participatory backcasting and social & environmental psychological literature, which has been applied in local communities in three pilot areas in the Netherlands, Austria and Germany by action research teams. The developed methodology is designed in compliance with the conceptual propositions of transition management (Loorbach 2010, Loorbach & Rotmans 2010) and participatory backcasting (Quist 2007, Vergragt & Quist 2011, Quist et al 2011), while insights from learning theories and inspirations from the needs & capabilities approach have been added.

The objectives of this paper are (1) to describe similarities and differences of the transition management and participatory backcasting, and (2) to describe the community arena methodology based on the interlinking transition management and backcasting while it has also been inspired by the needs & capability approach.

This paper unfolds in five sections following this introduction. In sections 2-3 transition management and backcasting are introduced, respectively. In section 4, both approaches are compared while focusing on elements of second order and social learning. In section 5 we describe the community arena methodology, while section 6 presents illustrates the methodology with some results from the pilot in the Netherlands. The final section provides conclusions and discussion.

2 Transition management

Overview

The last years have seen the development of transition research as an interdisciplinary field of study in which innovation studies, history, ecology and modelling are combined with sociology, political and governance studies and psychology. The transitions approach proposes that wicked problems that persist over time require a fundamental change in the structures, cultures and practices of the societal system for the system to become sustainable. The transformative processes of change are called sustainability transitions and take a long-time period (over 25 years) to materialize (Grin et al. 2010, Frantzeskaki & De Haan 2009). Because of the focus on integrated sustainability problems and the applied nature of transition research, the natural interaction between science and policy has led to a continuously co-evolving theory and practice of transition management, following the tradition of post-normal (Funtowicz & Ravetz 1994) and sustainability science (Kates et al. 2001, Kasemir et al. 2003). Transition Management builds on transition theory (e.g. Rotmans et al 2001), which includes the Multi-Level Perspective (MLP) and transitions. The MLP consists of (i) the micro-level of niches in which novelty emerges and grows, (ii) the meso-level of socio-technical regimes which reflect the dominant ways of consumption and production and contain major sustainability problems, and (iii) the macro-level of the socio-technical landscape, consisting of trends and events in the context of specific socio-technical regimes and its niches and can influence theses. Transitions are then the structural changes, societal process and mechanisms through which novelty in niches matures and becomes mainstream, heavily influencing the dominant practices of consumption and production at the meso-level. Furthermore, Transition Management should be seen as a reflexive governance approach aiming at exploring, initiating and facilitating sustainability transitions, while taking into account system thinking, complexity and uncertainty (Loorbach 2010).

Since its introduction in the Netherlands in 2000 (Rotmans et al 2001), transition management has been widely debated, challenged, tested, and because of this further developed, enriched and embedded in the academic literature. The scientific debate has primarily focused on the theoretical side (Rotmans 2005, Loorbach 2010, Grin et al. 2010, Loorbach 2007; Loorbach & Kemp 2007, Kern & Smith 2007, Sondejker 2009, Van der Brugge 2009, Van den Bosch 2010, Loorbach & Rotmans 2010).

Some of the main principles of transition management are as follows (Loorbach 2010):

- long-term thinking as the basis for short term policy
- thinking in terms of multiple domains (multi-domain), different actors (multi-actor), different levels (multi-level)
- (social) learning as an important aim for policy ('learning-by-doing' & 'doing-by-learning')
- direct governance towards system innovation besides system improvement
- keeping options open, exploring multiple pathways
- selective participation of so-called frontrunners

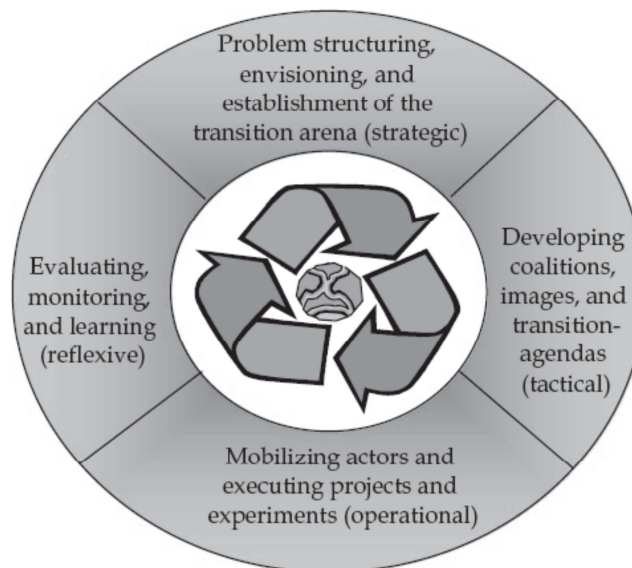


Figure 1: Transition management cycle (Loorbach 2010: 173)

For the implementation of the approach these principles have been translated in an operational model, the so-called transition management cycle (see figure 1). The four components, which correspond to activities on four dimensions: the strategic, tactical, operational and reflexive dimension, are as follows: (i) organize & establish the transition arena and structure the problem under study (ii) develop a transition agenda, images of sustainability and define transition paths; (iii) establish and carry out transition experiments and mobilize the resulting transition networks; (iv) monitor, evaluate and learn lessons from the transition experiments and, based on these, make adjustments in the vision, agenda and coalitions.

These components exhibit specific characteristics (in terms of the type of actors involved, the type of process they are associated with and the type of product they deliver) which makes it possible to (experimentally and exploratory) develop specific 'systemic instruments' and process strategies (such as participant selection, use of different types of policy and process instruments). The idea behind transition management is to create a societal movement through new coalitions, partnerships and networks around arenas that allow for building up continuous

pressure on the political and market arena to safeguard the long-term orientation and goals of the transition process (Loorbach 2007, Buuren & Loorbach 2009, Grin et al. 2010).

The starting point in a transition management process is to structure or reframe an existing societal issue in terms of the underlying problems to go beyond obvious and partial problems. The premise is that sustainability transitions require new ways of thinking and acting, which are intertwined.

Transition arena

The transition arena is a small network of frontrunners (10-15 people) that are identified and selected based on competencies, interests, backgrounds and perspectives. Participation is on a personal basis and not as a representative of an institution or based on an organizational background. These frontrunners can be experts, networkers or opinion leaders and should be prepared to commit and invest time and energy. Within the arena group there should be an equal number of frontrunners from the societal pentagon of the government, companies, non-governmental organizations, knowledge institutes and intermediaries (consulting organizations, project organizations and mediators). It is crucial that participants have innovative power (the power of new ideas), transformative power (the capacity to mobilize others for change) and to a lesser extent reinforcing power (a position within dominant hierarchy) (see Avelino 2011). The latter can be advantageous with an eye on legitimacy and financing of the process of innovation. A transition arena is a societal network of innovation, rather than an administrative platform or a consultative body (Van Buuren & Loorbach 2009). A transition arena demands a critical selection of frontrunners by a transition team, responsible for process and structure of the arena, in which experts on the process and on the transition subject are involved. As an open, evolving process of innovation a transition arena process implies variation and selection: after a certain period of time some people may drop out and others may join in the transition arena.

When such a group of frontrunners has been brought together to focus on a certain transition issue, an attempt is made to reach a joint problem definition on a system level. The core idea is that by making individual perspectives and paradigms explicit and confronting these with each other in a creative strongly interactive process, individual's inner contexts are influenced. It leads to new insights into the nature of the problem(s) and the underlying causal mechanisms which form the prelude to a change in perspective, which is a necessary but insufficient precondition to realizing a transition. Based on this new perspective and through discussion and interaction, sustainability visions are generated which primarily include the shared basic principles for long-term sustainable development, leaving room for dissent upon short- and mid-term solutions, goals and strategies. While there is an emphasis on consensus or at least a willingness to cooperate within a common framework, this consensus is only valid within the context of the transition network. Generally, the transition vision will oppose expectations and visions of dominant external actors, and in this sense transition visions are explicitly seeking conflict with vested interests and powers to establish a fundamental debate upon future development, the necessity of fundamental change, and the possibilities of an envisaged transition.

Transition agenda

Visions are an important governance instrument for achieving new insights and starting points, and therefore a change of attractor. The visions created evolve and are instrumental: the process of envisioning is just as important as the ultimate visions themselves. Envisioning processes are very labour-intensive and time-consuming, but are crucial to achieving development in the desired direction. This direction, as long as a sufficiently large group of interested and engaged citizens and other actors supports it, provides a focus and creates the constraints, which determine the room for manoeuvre within which the future transition activities can take place. Based on the sustainability vision, a backcasting tool (in the narrow interpretation) can be applied in which transition paths are developed and a common transition agenda is drawn up. A

common transition agenda contains a number of joint objectives, action points, projects, and instruments to realize these objectives. It should be clear who is responsible for which type of activity, project or instrument that is being developed or applied. Where the sustainability visions and the accompanying final transition images and transition objectives form the guidelines for the transition agenda which is to be developed, the transition agenda itself forms the compass for the frontrunners which they can refer to during their research and learning process.

Transition experiments

Transition experiments form the operational aspect of transition management and are innovation projects with a societal challenge as a starting point for learning aimed at contributing to a transition (Van den Bosch 2010). Putting the transition agenda into practice, transition experiments are by definition focused on experimenting and learning about different options and possibilities in the light of the long-term ambition and vision (Loorbach 2007). The strategies and activities in these experiments relate to short-term and everyday behaviour, decisions and action. At this level actors either reinforce dominating structures, cultures and practices or they choose to restructure or change them. These experiments have a high level of uncertainty and are focused on new combinations and insights. They are searching and learning processes (doing by learning and learning by doing). Ideally, transition experiments offer room for experiment and creativity and are managed in terms of conditions (deepening, niche management) and in terms of diffusion (broadening and scaling-up) (Kemp & Van den Bosch 2006, Van den Bosch & Rotmans 2008). Hence, a transition experiment is not a goal in itself, but an instrument to explore and learn about sustainability and radically different ways of meeting societal needs, now and in the future (Van den Bosch 2010).

Transition monitoring

Transition monitoring & evaluation is the reflective activity of the transition management cycle (Loorbach 2007, 2010). Due to the nature of wicked problems that are tackled with transition management processes, the emphasis of this activity is not on assessment and judgement but on learning. The activities within the transition arena and the transition experiments as well as within transition programmes (which include several transition experiments) are monitored. This is not a one-off activity but a constant flexible engagement with the dynamics at hand and requires reflexive monitoring, which is “the human capacity to routinely observe and understand what you are doing while you are doing it” (Taanman, forthcoming). It is learning in action. Transition monitoring is a cyclical and constant process supporting the learning experiences of the individual and the group who works on initiatives towards more sustainable futures. Also other stakeholders such as sponsors or target group benefit from monitoring. The results of transition monitoring processes help in (better) communicating about the initiative improving it and accounting for it.

3 Backcasting

Overview

Backcasting was proposed in the 1970s in energy studies (e.g. Lovins 1977, Robinson 1990) and later also applied to sustainability planning (e.g. Robinson 1990) and to sustainable organisations (Holmberg 1998). Several types of backcasting can be distinguished (Wangel 2011; see also Höjer et al 2011): (i) target-oriented backcasting, which focuses on developing and analysing target-fulfilling images in which the target is usually expressed as a quantitative manner; (ii) pathway-oriented backcasting in which setting strict goals is considered less important, the focus is on how change can take place and the measures that support the changes like policies, taxes, or behavioural changes; (iii) action-oriented backcasting in which the main objective is to develop an action agenda, strategy or action plan, the focus is on who could bring

about the changes and realising buy-in and commitment among stakeholders; (iv) participation-oriented backcasting (pBC) in which backcasting is used as a creative workshop tool. It must be realised that several types can be combined within a single backcasting study, though in a particular study the emphasis is usually on one or two types. In addition, the variety is even larger, as the term backcasting is both used for an overall approach (e.g. Quist et al 2011, Quist and Vergragt 2006) or for a specific backwards-looking step or tool within a methodology (e.g. Rotmans et al 2001, Van de Kerkhof et al 2003, Van de Kerkhof 2004).

Since the early 1990s it has developed into a participatory approach, especially in the Netherlands² (Vergragt & Jansen 1993, Weaver et al 2000, Quist & Vergragt 2006), Canada (Robinson 2003) and also Sweden (Holmberg 1998, Drehborg 1996, Carlsson-Kanyama et al 2007). Other examples of participatory backcasting can be found in various European collaborative research projects (e.g. Kok et al 2006, Kok et al 2011), while related participatory vision development and assessment projects can be found in several countries (e.g. Eames & Egmosen 2011; Sondejker 2009). Though most participatory backcasting studies involve (expert) stakeholders, examples involving citizen, consumers or end-users can also be found. Citizens were involved in vision development and backcasting workshops in sustainable urban planning (Carlsson-Kanyama et al 2007) and in developing and evaluating local and regional energy futures in Canada (Robinson 2003, Robinson et al 2011). Strong citizen involvement was also part of local vision development (Kok et al 2006) and defining sustainability research agendas in the UK (Eames & Egmosen 2011). In addition, the 'Strategies towards the Sustainable Household' (SusHouse) project involved societal stakeholders like consumer associations and environmental organisation as well as consumers/citizens (Quist et al 2001, Green & Vergragt 2002, Klapwijk et al 2006, Quist 2007). Experts and stakeholders were involved in visioning and backcasting workshops, whereas three kinds of consumers were involved in focus groups in which visions were assessed and complemented.

Backcasting literally means looking back from the future. It can be defined as "generating a desirable future, and then looking backwards from that future to the present in order to strategize and to plan how it could be achieved" (Vergragt & Quist 2011: 747). It may but does not always include a focus on implementing and generating follow-up activities contributing to bringing about the desirable sustainable futures. It is a normative approach to foresight using desirable or so-called alternative futures, instead of likely or possible futures (Quist 2007). As a consequence, it is very different from regular forecasting, which looks to the future from the present and is not (or only to a very limited extent) normative. Backcasting is particularly useful in the case of complex problems, where there is a need for major change, where dominant trends are part of the problem, where there are side-effects or externalities that cannot be satisfactorily solved in markets, and where long time horizons allow for future alternatives that need time to develop (Drehborg 1996). Moreover, Giddens (2009) has proposed to use backcasting as a sustainable alternative to traditional planning, and as a tool for moving toward alternative futures when dealing with climate change. However, it should be mentioned that several authors only refer to backcasting as the backwards looking step/analysis, while they use other names for the entire approach (e.g. Van de Kerkhof 2004).

More detailed overviews of the development and types of backcasting have been provided elsewhere (Quist & Vergragt 2006, Quist 2007, Wangel 2011). These reviews show a considerable variety in backcasting approaches and the way they are turned into methodologies. Variety can be found in the degree and way stakeholder participation is organised, the kind of methods that have been applied within a backcasting framework, the topics and the scale addressed (e.g. local, regional, national, consumption systems, or societal domains), and whether

² In the Netherlands participatory backcasting was for instance applied at the 'Sustainable Technology Development Programme' (Weaver et al. 2000), the 'Strategies towards the Sustainable Household (SusHouse)' (Quist et al. 2001, Green & Vergragt 2002), the COOL project dealing with options preventing climate change (Van de Kerkhof 2004), biomass dialogue (Cuppen 2010) livestock breeding research (Grin et al. 2004) and in education (Quist et al. 2006).

the focus is on impact (e.g. Quist et al 2011) or diversity (Cuppen 2010 & 2012). These reviews also show that the key to backcasting is the generation and assessment of normative or desirable future visions or future images. In this way backcasting including all its varieties can be seen as part of a family of foresight approaches that share the development of normative or desirable future images. Literature on backcasting in general neglects aspects of governance and implementation (e.g. Wangel 2011), though this has been addressed in participatory backcasting studies in the Netherlands (Weaver et al. 2000, Quist et al. 2001, Green & Vergragt 2002, Grin et al. 2004, Vergragt 2005, Quist et al 2011).

Methodological framework for backcasting

Key elements of participatory backcasting are (1) stakeholder involvement and dialogue, (2) participatory generation of desirable future visions, and (3) stakeholder learning through involvement, interaction, vision development and vision assessment (Quist & Vergragt 2006, Quist 2007). Backcasting is also characterised by being problem- and system-oriented and by turning visions into immediate actions. It is as an overall approach for which a methodological framework has been developed, consisting of five steps, four types of methods and three kinds of demands (see figure 2).

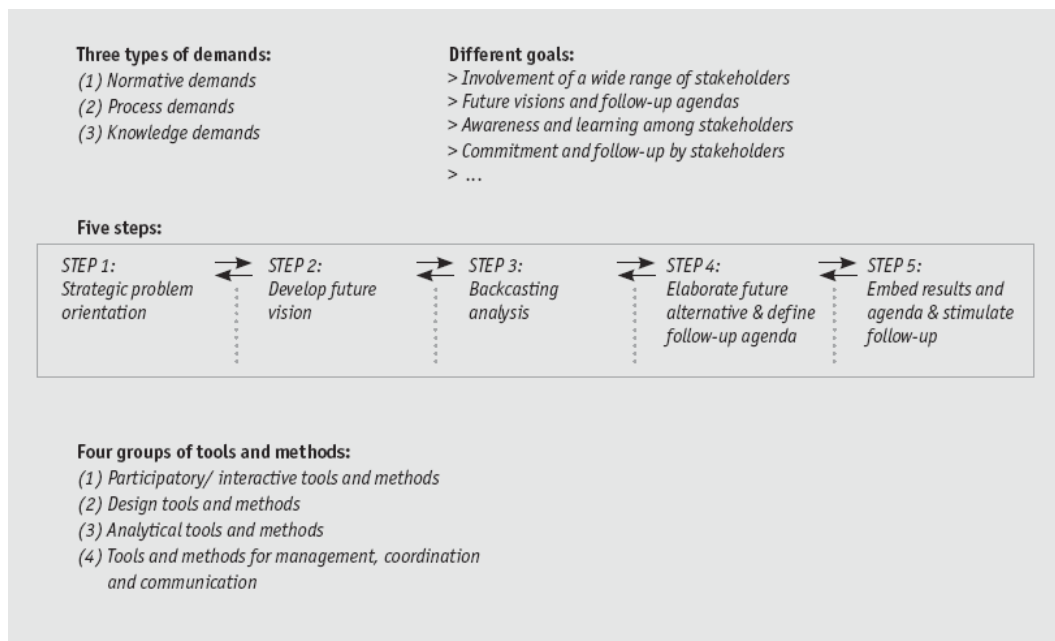


Figure 2: The methodological framework for participatory backcasting (Quist 2007: 232)

The backcasting approach reflected by the framework is not only interdisciplinary (combining and integrating tools, methods and results from different disciplines), but also transdisciplinary in nature, in the sense that it involves stakeholders, stakeholder knowledge and stakeholder values. The framework also distinguishes three types of demands: normative demands, process demands and knowledge demands. Normative demands reflect the goal-related requirements for the future vision, process demands are requirements regarding stakeholder involvement and their level of influence in the way issues, problems and potential solutions are framed and resolved in the backcasting study. Knowledge demands are needed to set requirements for the scientific and non-scientific knowledge strived for and how these are valued one to another. In addition, different goals can be distinguished in backcasting studies, which can not only refer to process-related variables, but also to content-related variables, or to a range of other variables like knowledge and methodology development. Generally speaking, stakeholder heterogeneity is high in participatory backcasting, usually because stakeholders from different societal domains

like business, research, government and society are involved, with the latter including both the wider public and public interest groups. Despite the fact that the steps are presented in a linear fashion in Figure 2 iteration and moving forward and backward between steps is likely to occur.

4 Comparing Transition Management & participatory Backcasting

From the above descriptions of the two approaches it becomes clear that transition management and participatory backcasting are closely related approaches. Participatory backcasting work of the 1990's was one of the sources for the development of transition management. In transition management practice, backcasting is understood as a single step in the transition management process (the step linking transition vision and the problem definition in the transition agenda building phase) and not as a fully fledged methodological approach (Rotmans et al 2001). Unlike in backcasting, transition management pays more attention to implementation and follow up activities, i.e. by developing coalitions and shared strategies to accelerate and guide changes within the daily context of involved actors and to govern and facilitate the implementation (Loorbach 2007, Loorbach 2010). Backcasting on the other hand has a larger diversity of practices including non-participatory studies and focuses more on the development and evaluation of desirable (alternative) images of the future (Quist 2007, Vergragt and Quist 2011, Wangel 2011; Höjer et al 2011).

In the following we will describe more similarities and differences between participatory backcasting and transition management focusing on elements of learning (i.e. second order learning processes) as this bridges the individual and group level in a participatory process. Table 1 summarises similarities and differences between transition management and participatory backcasting.

Similarities of TM & participatory BC

Both approaches share a strong focus on stakeholder involvement, stakeholder learning and the development and assessment of desirable future visions, including turning long-term visions into actions and action agendas. First and second order learning can be distinguished. In the group setting, first order learning takes place through the introduction of new knowledge whereas second order learning is conceptualised to take place through consciously confronting, questioning and thereby shifting different worldviews and perspectives and their underlying values and beliefs (i.e. interpretive frames; see also Grin and Loeber 2009, Quist 2007). All this happens in a social setting and through interaction, which links to concepts of social learning (see Garmendia & Stagl 2010 for a discussion on social learning, and & Quist and Tukker for an overview of higher order learning in innovation and consumption). In addition, diffusion of learning is important, which takes place through individuals who are able to disseminate and embed it within their organisation or network. This calls for involving, what is in TM being referred to as, frontrunners who have the ability to become such change agents.

Both approaches share the same understanding of societal change as non-linear and uncertain process. A shared activity is the development of normative or desirable future images. Both approaches see the need for iteration between future and present for developing ideas and raising sensitivity to the possibilities of multiple future pathways. Through this visioning process actors are motivated and inspired to develop further action. The vision and learning process aims also to create endorsement for the outcomes of back- and forecasting. At group level it may lead to shared ideas/beliefs, consensus (agreement or win-win) or congruence (win-win in the sense that there is no conflict in interest or values) and lateral change / shifts (moving of actors/persons toward another viewpoint). In higher order learning, indeed a distinction has been made between learning at the individual level and at the group level. It is indeed learning at the group level (Brown et al 2003), which is the seed for change and agency. Here, of course, diffusion of learning is essential, but not easy to achieve (e.g. Brown et al 2003).

A final similarity between transition management and backcasting is the focus on actors or stakeholders, whereas the changes at the actor or stakeholder level are based on changes at the individual level, which will be further discussed in Section 4.3

Table 1: Similarities and differences between transition management and participatory backcasting

<i>Similarities</i>	<i>Differences</i>
<ul style="list-style-type: none"> - Stakeholder participation, focus on actor/stakeholder level - Shared vision development - Higher order learning by involved stakeholders - Turning long-term visions into short-term actions & agendas - Stakeholder commitment to results & agendas 	<ul style="list-style-type: none"> - TM is rooted in transition theory building on the Multi-Level Perspective, BC is agnostic about system innovation theory and niches - TM has a stronger focus on developing a shared problem definition - In TM implementation and follow-up is key, whereas in BC it is more an add-on - BC has larger methodological diversity, TM has a more focussed profile

Differences

There are several differences too. First of all transition management is rooted in transition theory building amongst others on the multi-level perspective which outlines that novelty starts in niches and may replace or adjust the dominant regime (Grin et al. 2010, Grin et al. 2011). By contrast, backcasting is not rooted in a particular social system theory and is agnostic if novelty starts in a niche or in the regime itself (Vergragt & Quist 2011). Secondly, in transition management the group process of developing the sustainability narrative including problem description, transition vision and pathways are as important as the narrative itself – being part of the learning process of the transition arena participants. Backcasting primarily focuses on the process of delivering and analysing an inspiring vision linked to certain pathways and not so much on the process and the other components of the sustainability narrative. Thirdly, the focus on experimentation and generation of follow-up activities is one of the key aspects of transition management, while within backcasting diffusion activities contributing to bringing about the generated desirable sustainable futures are still an add-on. And finally, backcasting shows a larger methodological diversity, whereas transition management has a stronger and more focused profile.

The individual level in TM & participatory BC

Interestingly, participatory backcasting, as well as transition management assume higher order learning at both the actor and group level (Quist 2007, Van de Kerkhof 2004, Loorbach 2007, Loorbach 2010). Also diffusion of learning and learning outcomes through actors and individuals present in the backcasting or visioning processes is crucial for implementation and spin-off (e.g. Quist et al 2011, Brown et al 2003), whereas in TM this has been defined as empowerment of frontrunners (Avelino 2011). In fact, TM and pBC are both supporting the exploration of individual inner contexts (values, norms, motivations, problem definitions, expectations, ambitions and preferred solutions) in a group setting, while relating this process to the broader societal context. However, the individual inner context, empowerment and the (individual) learning processes are underexplored in TM and pBC

It is the absence of these aspects within TM & pBC that is addressed in the InContext project, which explicitly aims to enrich usual approaches of transition management and participatory backcasting with the inner context of behaviour, i.e. the needs, values, beliefs of individuals in case of sustainability transitions in general and sustainable ways of behaviour and living in particular (Schäpke & Rauschmayer 2012a, 2012b).

Building on Max-Neef (1991), Schöpke & Rauschmayer³ (2012a, 2012b) distinguish between fundamental human needs that are abstract, few, and finite in number (such as freedom, affection, or subsistence, e.g. food, water, shelter) and strategies to satisfy needs (such as: having a car, caring for kids, eating a sandwich). This differentiation allows for the hypothesis underlying InContext that people can change their strategies in a more sustainable direction once they are aware of their needs and can themselves differentiate between their needs and their strategies used to fulfil these needs.

Schöpke and Rauschmayer (2012b) have proposed a circular model based on the capability approach (Sen 1985, Nussbaum 2000, Pick and Sirkin 2010) and the norm-activation model of Schwartz & Howard (1981) (see Figure 3). The capability set of a person describes the behavioural alternatives a person can choose from. It can be considered as the behavioural strategies available to a person to meet his or her needs. When deciding on which behaviour to carry out, the proposed model highlights the role of for instance awareness, attitudes and norms in the personal decision process.

Two types of feedback processes are proposed (see Figure 3). First, experiences with behavioural strategies affect individual perceptions of achievable behaviour (perceived self-efficacy), desirable and expected behaviour (attitudes, norms), perceived opportunities and skills, and also leads to learning, experiences and knowledge. Learning may not only contribute to intrinsic empowerment of participating individuals, but also to an increased capability set. Second, behavioural strategies affect the outer context aspects, e.g. by maintaining or questioning social or political institutions and policies or by changing the impacts of consumption on natural resources. As Schöpke and Rauschmayer (2012a) argue, this second feedback loop leaves room for the idea of co-evolution and joint development of inner individual and outer context aspects and behavioural strategies. In general, the impacts of individual behaviour changes on the outer collective context is rather low, but at the collective level the outcome of transition arena processes may include such feedback.

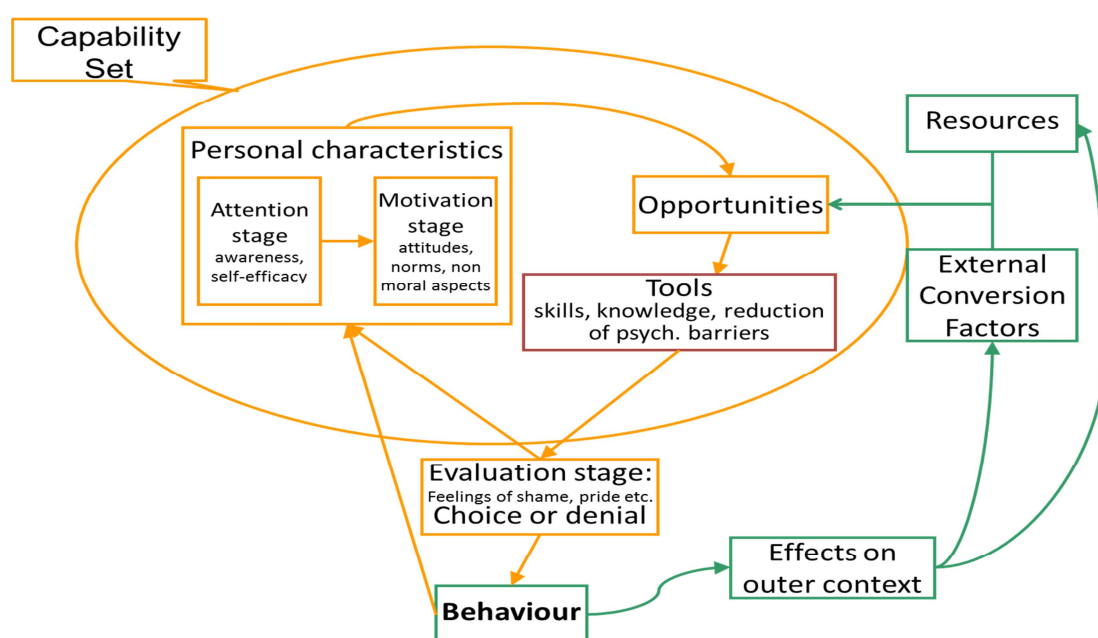


Figure 3: Dynamic norm activation capability and feedback model (source: Schöpke and Rauschmayer 2012b) Caption: inner context: orange, outer context: green

³ The current and next paragraphs build on Schöpke and Rauschmayer (2012a, 2012b), Rauschmayer et al. 2013 and Schöpke et al. 2013; we would like to acknowledge their thinking and writing.

Saying it differently, the community arena focuses on articulating, confronting and connecting individual inner contexts in a participatory process so as to collectively reflect on (un-) sustainable perceptions and behaviour, as well as the outer context. The premise is that by raising awareness and sensitivity amongst engaged citizens about other ways to look at reality, they open up to new possibilities to think about their individual behaviour in the broader societal context and to enhance opportunities for changing the inner and outer context in pursuit of sustainability through individual and collective processes of learning and empowerment. Whereas the model of Figure 3 offers an opportunity to connect concepts like capabilities, opportunities, behavioural strategies and attitudes and norms to concepts of learning and empowerment at the actor and group level, it still needs further development and conceptualisation as well as further integration into the community arena methodology.

5 The community arena methodology

While other processes such as the Local Agenda 21 were not producing “widespread, deep-seated and long-lasting transformations” (Selman 2000: 49) this is what the community arena is aiming for by making space for individuals to reflect on their inner context in relation to broader societal changes to sustainability. As a co-creation tool for sustainable behaviour by local communities the community arena builds upon insights of transition management, backcasting and social and environmental psychology, and it has been inspired by the feedback model shown in Figure 3. The community arena focuses on articulating, confronting and connecting individual inner contexts in a participatory process so as to influence both how individuals think as well as how they behave. The premise is that by raising awareness and sensitivity amongst engaged actors (i.e. citizens, professionals and business) about their own and other people’s needs as well as other ways to look at reality, they open up to new ways of thinking about their individual behaviour in the broader societal context (i.e. higher order learning). This should result into processes of reflection on individual and group level allowing for new behavioural strategies to emerge on how individual and groups needs are met and also into experiments with innovative practices as alternatives to established ones.

Within the community arena approach we distinguish five phases, preceded by a pre-preparation phase. Each of these phases has a different objective in the process; they consist of transition management and backcasting exercises as well as methods addressing the inner context and include a minimum of five participatory meetings (for an elaborate description see Wittmayer et al. 2011).

Phases of the Community Arena		
	Key activities	Key output
0. Pre-preparation	A. Case orientation B. Transition team formation	A. Initial case description B. Transition team
1. Preparation & Exploration	A. Process design B. System analysis C. Actor analysis (long-list and short-list of relevant actors) incl. interviews D Set up Monitoring framework	A. Community Arena process plan B. Insightful overview of major issues/tensions to focus on C. Actor identification and categorisation + insight inner context D Monitoring framework
2. Problem structuring & Envisioning	A. Community arena formation B. Participatory problem structuring*	A. Frontrunner network B. Individual and shared problem perceptions & change topics

	C. Selection of key priorities D. Participatory vision building*	C. Guiding sustainability principles D. Individual and shared visions
3. Backcasting, Pathways & Agenda Building	A. Participatory backcasting* & definition of transition paths B. Formulation agenda and specific activities* C. Monitoring interviews	A. Backcasting analysis & transition paths B. Transition agenda and formation of possible sub-groups C. Learning & process feedback
4. Experimenting & Implementing	A. Dissemination of visions, pathways and agenda B. Coalition forming & broadening the network C. Conducting experiments	A. Broader public awareness & extended involvement B. Change agents network & experiment portfolio C. Learning & implementation
5. Monitoring & Evaluation	A. Participatory evaluation of method, content and process* B. Monitoring interviews	A. Adapted methodological framework, strategy and lessons learned for local and EU-level governance B. Insight in drivers and barriers for sustainable behaviour

Figure 3: Phases of the Community Arena; * meeting

Phase 0: Pre-preparation

Part of this phase are two activities, case orientation and the formation of the team initiating and leading the team, the so-called transition team. The case orientation is a first exploration of the context within which a community arena is to take place which includes social, ecological and economic features of the context as well as active involvement of actors in the context. The transition team is the core driver of the process and should consist of 3-5 members, a strategic and content based mix of employees of the initiating organization, experts in the field under study, transition management experts, change-oriented representatives from the local government and process facilitator. The tasks of the transition team are quite demanding and time-consuming; the team not only prepares, documents, analyses, monitors, co-ordinates, manages, facilitates and evaluates the whole process, but also chooses the participants and feeds them with background information and detailed knowledge. It brings together the various parties, is responsible for the internal and external communication, acts as intermediary in discordant situations and has an overview of all the activities in and between arena meetings.

Phase 1: Preparation and Exploration

In the crucial phase of preparing the stage for the frontrunners, several activities can be distinguished, process design, system analysis and actor analysis as well as setting up a monitoring framework. The transition team is getting together to determine the process design written up in a community arena process plan (output 1A) which includes the basic set up of the community arena (amount of meetings, methods used, mode and level of documentation), the time planning (amount of meetings), the communication, and other topics such as relating the arena process to relevant ongoing (policy) processes.

Both, the system and the actor analysis serve as giving insight into the local context by describing it as a system. The transition team delimits system boundaries and selects relevant stocks of the system (social, environmental and economic capital e.g. labour force, infrastructure, air quality, housing stock) along which the system is described also in time. In combination with the actor analyses this first phase is the foundation of the process and serves

as a starting point for monitoring the behaviour and input for the arena meetings. The main function of the actor analysis in this phase is to prepare the selection of participants for the transition arena. Ideally, the group is a mix of 'frontrunners' who combine creativity and imagination with the openness to evaluate and appreciate other perspectives and 'enlightened' regime actors (resource holders). It should include a diversity of competences, types of power and backgrounds.

A last activity includes the setting up of the monitoring activities. The monitoring & evaluation framework helps to adjust and improve the community arena process, to communicate with stakeholders, to justify investments to investors and to learn (participants and transition team).

Phase 2: Problem structuring and envisioning

This phase starts after the arena participants are selected (based on the actor analysis) and invited to join. In a first step the community arena is formed, and thereby a frontrunner network created (output 2A). This frontrunner group meets twice in phase two, once for a participatory problem structuring and once for the selection of key priorities and the participatory vision building.

Through a strongly interactive process a joint perception of the problem and a joint definition of the main change topics are reached in the first meeting (output 2B). The open discussion is based on the system analysis and the formulation of the main transition challenges. A secondary objective is to create commonality between participants. The selection of key priorities is one of the key activities of the second meeting which focuses on the formulation and discussion of a shared vision. In the meeting, all kinds of ideas for the future emerge. Some will be embraced and elaborated in a lively discussion; others won't be picked up (yet) by the group. A good starting point for selecting key priorities is the shared problem perception, which is translated into guiding sustainability principles (output 2C). These are the general principles formulated by the frontrunner network for a sustainable community and individual behaviour (e.g. self-responsibility, rewards for sustainable behaviour, individualized sustainability behaviour).

During the second meeting the focus is on the formulation and discussion of a shared vision. The vision is based on the consolidated problem perception and change topics as well as the guiding sustainability principles. During the meeting there are several moments for (critical) self-reflection. Facilitated by appropriate methods, frontrunners can reflect on their own needs, become aware of their strategies and their capability to influence their local environment and what this means for the vision. This way the inner context can be analyzed as well, resulting in both a shared and individual vision (output 2D).

Phase 3: Backcasting, Pathways and Agenda Building

In the next phase the arena builds upon its problem definition and its shared vision to develop actions and targets. During this phase, the interests, motives, and policies of the participants come out into the open; there are negotiations about investments, and individual plans and strategies are fine-tuned (Loorbach 2010). This is done in two participatory meetings, with the first focusing on participatory backcasting and the definition of transition paths.

Based on the sustainability vision developed, a process is initiated in which a backcasting analysis is conducted for each of the visionary images, and one or several transition paths are developed (including questions such as what needs to change, who is necessary for this change). The output is a backcasting analysis and transition paths (output 3A). Transition paths are possible routes from the present towards sustainable images and behaviour and have the same timeframe as the vision, i.e. 2030. They connect the long-term vision to the short-term action.

During a fourth meeting feedback on the final drafts of the backcasting analysis is received as well as a common agenda defined. The different perspectives on how to reach the vision and images can not only be elaborated into transition paths, but also into more short-term specific

activities, i.e. a transition agenda (output 3A). The members of the community arena are divided into different sub-groups (e.g. on visionary images, transition paths, activity-related). Step-by-step, the sub-groups will organize their work themselves. Based on the outcome of the backcasting, the sub-groups formulate an agenda, elaborate on transition paths and finally translate the agenda into activities. The agenda forms the long-term context for short-term activities and policy. The transition team and the frontrunners can choose to involve a broader group of people in this meeting, by inviting relevant parties and asking the arena-participants to invite people from their networks.

The outcome of this phase functions as a compass for future actions and experiments. By building coalitions and networks in the next phase the conditions for desired experiments are designed. Ultimately this leads to influencing behavior, policy making and lobbying. During this phase the second interview, leading to new insights on changes in the inner context of the individual participants are conducted (output 3C).

Phase 4: Experimenting and implementing

In this phase the process opens up to the public through e.g. the dissemination of visions, pathways and agenda in order to keep arena participants from abandoning the process and to create and maintain support from external actors such as general public, policy makers, interested stakeholders (output 4A). Also in this phase, strategic coalitions should be created around the subgroups established in phase 3. This change agent's network (output 4B) broadens the overall network. Specific activities as well as transition experiments should be performed through the existing networks of arena participants. This ensures on the one hand direct involvement of these frontrunners and on the other that experiments based on input from previous phases (visions, agenda, etc.). Efforts focus on creating a portfolio of related experiments which complement and strengthen each other as much as possible (output 4B). Support by policy makers can be guaranteed via an external steering group or a supportive policy arena.

A third activity relates to the operational level of transition management, the carrying out of transition experiments and actions (output 4C) aimed at deepening, broadening, and scaling up existing and planned initiatives and actions (Kemp & Van den Bosch 2006, Raven et al. 2007; Van den Bosch & Rotmans 2009, Van den Bosch 2010). The importance of short-term activities is of great importance for commitment and enthusiasm towards an arena process. The experiments have a high level of uncertainty and are focused on new combinations and insights as answers to societal challenges. They are searching and learning processes (doing by learning and learning by doing). During this phase the behaviour of the participants is monitored also. In how far are their strategies changing? Which side experiments and actions do participants undertake next to the arena-process?

Phase 5: Monitoring and evaluation

Monitoring and evaluation (of process and content) are key elements in this methodology with its focus on learning. This last phase is not sequential as the others, as monitoring is a cyclical and constant process and is performed throughout the process. Monitoring supports in communicating results to the public, in justifying investments to stakeholders and investors, in learning (participants, transition team), and importantly in adjusting the process if necessary (process design and substance of e.g. meetings, paths and experiments can be adjusted when needed).

6 Pilot projects: the Dutch district of Carnisse

Introduction

The community arena methodology is currently being applied through an action research approach in three local communities in Austria, Germany, and the Netherlands respectively. In selecting these pilots, a strategy of diversity and variety has been employed, as can be seen from the characteristics shown in Table 5. This exploratory approach allows for learning from the differences in the pilots, thereby increasing the range of learning.

Table 5: Some characteristics of the three pilots

	Finkenstein (A)	Wolfshagen (D)	Carnisse (NL)
Inhabitants	8.509	13.840	10.533
Type of community	Market town consisting of a conglomerate of twenty-eight villages of which six are dominant, situated on the border of Austria with Slovenia	Rural town (with a core city and eleven rural districts), situated in the centre of Germany	Urban neighbourhood of Rotterdam, situated in the West of the Netherlands
Characteristics	Decentralised structure, conflict of interest between tourism, population and industry, hardly any community meeting facilities, two language groups	High percentage of commuters, population decline, frontrunner in renewable energy, fading city centre	Deprived neighborhood, high turnaround of inhabitants, severe budget cuts threaten the continuation of major community facilities, around 170 nationalities, lots of considerable moving

Overview community arena process in Carnisse

This part is based on Wittmayer et al (2012, 2013a). Rotterdam is the second city of the Netherlands, counting almost 600,000 inhabitants, 127 nationalities, and until recently was the world's largest port. It is a heavily industrialized area. The city is divided by the river Maas (and the old harbour area) into a South and North part. Neighbourhoods on the south bank were historically and still are the place where immigrants move into the city. Instead of an aging population, Rotterdam has a very young population which has a relatively low level of education and a high level of unemployment.

The pilot project area is one of the neighbourhoods of Rotterdam called Carnisse. Carnisse became a city neighbourhood with the extension of the city and the harbour on the left bank of the Maas around 1900. Houses were built until roundabout 1950. Carnisse (as part of Rotterdam South) is listed in 2007 as one of the 40 neighbourhoods that the national government in the Netherlands labelled 'neighbourhoods of extra interest' ('aandachtswijken'). These neighbourhoods are all seen as having problems in multiple domains (social, physical and economical). The neighbourhood, together with seven other neighbourhoods in Rotterdam South, is still labelled as such and receives special attention and funds from the national government.

The context of Carnisse in 2011 is characterized by recent cost reductions and government cuts and a withdrawal of the welfare-state. Although old welfare structures are dismantled there is still a high level of (non-) governmental activity as well as a long history of participatory processes and interventions by professionals and/or researchers. The inhabitants of Carnisse who took part in the process (either through interviews or as arena participant) expressed their frustration on these phenomena, but were also eager to relativize the picture of a deprived

neighbourhood by pointing to the many initiatives that are arising from within the community. When looking at sustainability in terms of social, ecological and economic sustainability, the emphasis in Carnisse is on the social aspect of this triangle. For the selection of potential arena candidates the focus was on frontrunners within Carnisse, which are individuals who are passionate about their neighbourhood, who are active in the neighbourhood, those with new ideas and creative actions. This group consists of a diverse set of people (inhabitants, artists, local entrepreneurs, public officials, etc).

The Community Arena process started in August 2011. The period until February 2012 was marked by a high level of activity of the transition team in the neighborhood, doing interviews, attending meetings and getting acquainted with the locality. As of February 2012 the arena meetings took place and until May 2012 a problem description, a vision and first ideas for pathways and measures had been formulated. This vision was presented to a broader audience in the neighborhood in November 2012. During the same time a first experiment had been start, the preservation and re-opening of the local community center. In February 2013, an evaluation meeting took place where the participants evaluated the process and the outcomes and formulated future ambitions. Below focus is put on vision development and backcasting pathway meetings.

Problem Structuring & Envisioning

During the first meeting held in February 2012, the problem analysis (i.e. system analysis) was presented and the main topics of interests were identified through a group discussion. Each of the topics had multiple meanings and they were as follows: powerful/-less policy, rich and turbulent history, government cuts, diversity, connections, and maintenance of housing. In the two following meetings in March and April 2012, the participants explored their needs with regard to the community center (the focus of the action arena trajectory) as well as drew up a vision for the neighborhood for 2030 in which the community center plays an important role. The vision is called 'Blossoming Carnisse' and includes the following topics: 1) ...to living with each other, 2) ...to a green sustainable oasis, 3) ...to diverse housing styles, 4) ...to places for everybody, and 5) ...to working together for blossoming.

Backcasting & Agenda Building

In May 2012, a forth Community Arena meeting was held with a focus on backcasting and developing pathways from the future vision back to the present. After having discussed and reached an agreement on the vision, three small groups worked on exploring pathways for the six topics of the vision. Under guidance of a facilitator, their task was to come up with change elements, specific activities and key actors, which were written down in a scheme. Towards the end, the transition team asked the frontrunners what they would like to do with the presented and developed ideas, vision and pathways. The idea of a neighborhood conference emerged in a group discussion. All initiatives, residents, entrepreneurs and professionals of the neighborhood were to be invited to discuss and extend on the vision and the pathways developed so far and to collaboratively come up with a neighborhood agenda.

7 Conclusions & discussion

This paper has systematically compared Transition Management and backcasting and it can be concluded that there are many shared elements, as well as differences. It became clear that both approaches have a lot in common such as e.g. the focus on vision building as a guideline for short term action and the understanding of social change as complex and non-linear. The synthesis showed that both approaches are also complementary in certain aspects, e.g. the methodological diversity of backcasting and the focus on follow-up activities and network broadening of transition management.

By adding individual aspects from capability approach & needs-opportunities approaches, the more sophisticated Community Arena methodology could be developed enabling to address local communities and consumers better for addressing sustainability issues by enhance participation at the local level and in transitions to sustainable lifestyles and sustainable consumption. The community arena is meant as a co-creation tool for sustainable behaviour by local communities. It assumes a reflexive learning and experimenting process, through which frontrunners develop a shared sustainability vision of their community and initiate actions towards its fulfilment. This process includes reflections on individual inner contexts in a group setting so as to influence both how individuals think as well as how they behave. These learning processes, achieved through consciously confronting, reflecting and questioning different worldviews and perspectives and their underlying values, attitudes and beliefs (interpretive frames) of individuals, may lead to changes in individual inner context and individual as well as collective behaviour.

The community arena has been tested in three local communities in Austria, Germany, and the Netherlands. The Dutch case is a deprived neighbourhood in Rotterdam from which some results have been presented. Further methodological and conceptual evaluation is partly available, but further substantiation is needed. Interesting points are to what implementation has been achieved and can it can be stimulated and embedded. Also, further connecting the community arena methodology to the needs & capabilities feedback model on aspects influencing individual behaviour has been done and will be reported on in other papers at this workshop.

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Discussant Contribution

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The first paper was by Georgina Guillen and Mariana Nicolaul (BIG2050: Because living sustainably today is possible!). It largely reports on a German Government-funded initiative (BIG2050) to explore individuals' lifestyles and aspirations towards the development and subsequent promotion of conditions towards sustainable living in the future. It usefully and thoughtfully starts by reviewing the role of humans needs and satisfiers by using Max-Neef's model, followed by a refreshingly participatory methodology pursuing the way in which strategic conditions to live sustainably can, in the form of reinforcing satisfiers and attenuating impacts, influence the fulfillment of human needs as described by Max-Neef.

The second paper (Combining backcasting and transition management in the community arenas: towards a participatory vision and pathway methodology for sustainable communities and consumption) was by design less empirical and more conceptual. It tried to integrate the fields of Backcasting and Transition Management by evaluating their respective roles, methods and functions in developing, and subsequently promoting, vision-specific pathways. In doing so, it highlights usefully the growing convergence between backcasting and transition management, which is helpful as both supplement each other, and does so in the context of the primary goal of either practice – what is it we are actually trying to achieve is a precondition of any deliberative (or practiced) process on how to get there.

Both papers address a very similar question from very different angles – how can we conceptualise and subsequently attain (or at least approximate) sustainable lifestyles in a process that relies upon, and thus fosters, social inclusion? In doing so, both papers call, with varying urgency and extent, for innovation as a driver towards low-carbon and sustainable lifestyles. However, it is curious to note that both papers omit 2 notions that underpin and overlap either paper, one is the conceptualisation of innovation by Schumpeter, the other is the much earlier concept of reference groups, as first espoused by Merton.

Schumpeter was arguing that the key to success and, ipso facto in this context of Transition Management, of change, is the entrepreneur, who in a process of “creative destruction” is pursuing new ideas the success of which then allows existing technologies to fall back and behind. In this sense, path dependency can be overcome in a Schumpeterian sense by success in innovation, either in adjacent or mainstream technologies. This matters for both papers as it is one of the ways in which Guillen's visions can be realised (albeit the market-dependence Schumpeter assumes may provide a reinforcement towards the (social) market not all sustainability pathway proponents may like to support) and provide a way in which Quist's Transition Management ideas can break out of path dependency – or of entrenched pathways generally.

In addition, both papers can rely on Schumpeter's ideas of innovation a little more, as both seek to assure the reader that low-carbon, sustainability visions are feasible – which Guillen does directly, and that they are attainable – which is the core of Quist's promotion of backcasting as an inclusive tool for the promotion of said visions. Where they, in a way, differ is the basic tenet of their approach: Guillen focuses in the endpoint and how to define it, Quist emphasises much more the process that gets us towards the endpoint.

The second strand that is underpinning both but are discussed only implicitly is the idea of reference groups, first raised by Robert Merton in the 1950s, broadly defined as any group that individuals refer to in their behaviour. The concept has found its way into Transition

Management theory and into the discussion about change and its logic in the form of “Leitmotifs” or of charismatic individuals (or groups) that are in a position to influence others by virtue of their behaviour, espousal of beliefs, or assertion of ideas. Guillen argues that such individuals are important for the development of the vision as well as its promotion. Quist would agree with this, highlighting the role of (reference groups) for the development of pathways which, found in application of backcasting and enshrined in a Transition Management plan, would make implementation much more socially inclusive, and thus acceptable and somewhat easier.

Methodologically, the papers are very different by design, though. Guillen produces a very persuasive set of ideas for the development of visions, and their evaluating. It falls a little short in the continuation of, for instance, Max-Neef’s ideas of human needs, as they could be used for the interpretation and subsequent evaluation of the visions – how would individuals meet their needs in 2050? By contrast, Quist is trying hard to gel the overlapping methodologies of backcasting and Transition Management by arguing that empirically, they are used more and more in an integrated manner anyway, and arguing conceptually, that they are two different aspects of the same vexing problem of how to develop viable pathways towards a more sustainable future. Backcasting is then a tool that works best in the assessment of what is and what could be. This “Gap Analysis” could function at many different levels, and at the level of the individual or the household, Max-Neef’s ideas build the link to the backcasting activities in Guillen’s paper as well. By contrast, Transition Management is concerned with the development of suitable pathways, so that, at the nexus of “how to do what and when”, backcasting and transition Management meet and overlap. Both are concerned with the Anatomy of Change, and can be applied to the Multi-level Perspective with some ease. In this, Innovation is a central tool, Transition Management is the process and backcasting is the method to develop such futures.

Discussion Report

Freija van Duijne

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Main points from the discussion are as follows.

One interesting question is how does the Transition Management framework fits in with the Back casting framework. Both are a generic process strategy, thus not prescriptive, and having strong similarities.

Transition communities globally are facing similar issues. There is a lot outside of Europe that we are not aware off, but with similar aspirations, and from which a lot can be learnt in Europe

Role playing reveals opportunities for learning. This playful technique could be further elaborated to benefit from it in transition studies.

Data reduction can be a problem of data analysis. The richness of the underlying data disappears in the analysis. The richness of the material is often interesting as inspiration for similar session and it can provides meaningful insights.

In order to transfer the results from one specific setting to a more general level it is also very important to clarify on what basis the participants were selected, as this influences the outcomes.

We are focussing on sustainable practices on a very small scale. However, diffusion to a larger scale is needed, which raises questions like 'What are the similarities and differences between small scale practices and large scale? What is needed to initiate and facilitate large scale practices?'

Going beyond niches, can also means going beyond sectors and regimes. Are these levels sufficient in the Multi-Level Perspective? The level of the niche-regime containing new institutions and structures can be a relevant additional level, also enabling the niche to grow independent of the regime in some cases. It is also interesting to learn from alternative counter-movements. This is where social change starts too. Then it is important to develop networks, your own niche-regime-integration from such subcultural context.

Participants in studies tend to make great visions of desired and glorious futures. But what is then a sustainable future? And who decides what sustainability is? There are different perspectives on this, so it needs at least to be transparent.

Although we are action researchers with a clear aim and focus for the future, it is not fighting regimes, but to look for more sustainable alternatives beyond the regimes. Looking back on how societies got rid of unsustainable practices (for instance through choice editing and regulation) shows interesting examples like the ban on smoking and recycling becoming normal. Even though strategies like choice editing and regulation may no longer work in the current or future zeitgeist, these can still be helpful in setting conditions.

1b

**Principles and
innovative
value creation
for sustainable
consumption
pathways**

Organising principles of pathways towards sustainable consumption

Actions, assumptions, and appropriations

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Abstract

Whether a transition occurred and how a given project or initiative contributed to it can only be studied in hindsight. However, talk about “transitions towards sustainability” and claims to contribute to said transitions abound. In this paper, activities that are thought of as contributing to sustainability transitions are conceptualised as “transition efforts” and the focus is on the question how transition efforts become organised along particular pathways.

The central analytical concepts are the *institutional entrepreneur* (DiMaggio), an individual or organisation aiming to institutionalise different, possibly novel institutions, and *sensemaking* (Weick), the process of comprehending circumstances and deciding on actions based on these interpretations. Thus, this paper (i) catalogues actions taken by actors engaged in transition efforts, (ii) explores their written and spoken narratives regarding assumptions about what is at state and why their responding strategies should work and (iii) examines the appropriation of common narratives and assumptions. In addition, we interrogate what these assumptions imply for the transition efforts they help rationalising or legitimising and how these efforts may suffer shortcomings due to unfounded or disregarded assumptions about their effectiveness.

This paper analyses four exemplary cases in the domain of sustainable food consumption in Germany and finds that each initiative is structured by a set of assumptions that is often present as more or less coherent narrative, which is shared and can be referred to as a resource. Due to their action and actor coordinating power we labelled the found sets of assumptions “organising principles” and distinguish the principles of green consumption, sufficiency and collective experimentation.

Introduction and rationale

Numerous efforts try to contribute to a transition towards more sustainable societies. Transition research has delivered relevant insights into the multi-actor and multi-level developments involved in regime shifts towards sustainable development. Much thinking and research has also been dedicated to the notion of managing and steering transitions or to developing pathways towards sustainability. This raises further questions how the various transformational activities and decisions that form part of a transition interrelate and become organised amidst its occurrence.

In this paper we address the broad question how transition efforts are organised. Clearly, there is no single, ruling entity directing efforts within and across levels. There are, however, *shared assumptions* that govern actions and mould ongoing transition efforts. *In this paper we label these assumptions about what is at stake and why it should work as 'organising principles'.* Thereby, this research aims to trace such assumptions in current transition efforts towards more sustainable ways of living, to answer the question how *organising principles* in sustainability transitions can be characterised. What are the schemes that inspire sustainability interventions? What are the forces that pathway constructors or transition contributors expect to be at work? We investigate four policy-initiatives in the German food domain that aim to render food production and consumption practices more sustainable. The rationale of this research is that transition efforts may suffer from unacknowledged assumptions about their efficacy.

Conceptual underpinnings

One question is what motivates people in trying to make a difference for themselves, their city and their fellow citizens – and the answers to this question are likely to be as manifold as people are. Another question is what it is that ties engaged citizens, entrepreneurs or policymakers together and towards particular goals. A likely partial answer is a shared (and possibly growing) feeling of responsibility and urge to take action. Another answer may be the enjoyment of being allowed to take decisions, to try and test, to learn and discard – and in so doing to implement changes, observe their effects and move on from there. At the same time, an appreciation of sharing and developing knowledge, experience and skills, presumably, also plays a role. These observations resonate with findings from creativity research that tries to understand under what conditions opportunities to be curious and explore unfold and where, hence, creativity can come to the fore ([Mumford, 2003](#)).

Traditionally, transition research concerns itself with the intricate interplay of technological, political, environmental, social, cultural, etc. processes and the actors and networks involved in those within and across three analytical levels, the niche, regime and landscape level. Further, it seeks to identify patterns in the trajectories an unfolding transition follows, impacted by particular phenomena ([Lachman, 2013](#)). Thereby, transition research has drawn attention to the necessity and yet, impossibility to steer, direct or even manage transitions. A question that, so far, received little to no regard is how various actors make sense of ongoing developments and find strategies to respond to or become involved in transition efforts.

In addition to the transition literature, this research, therefore, draws on work in organisational science, in particular on *sensemaking* ([Weick, Sutcliffe, & Obstfeld, 2005](#)). The basic idea is that in their interpretations and decisions, actors follow particular logics and search heuristics. By putting these notions central, we also relate to the conceptual work of Grin and van Staveren ([2007](#)) who stressed the so-called “system-innovating core idea” in transition processes to foster support among important stakeholders and to ensure lasting system-innovating changes. Just like others before them ([Hoppe, 2010](#)), Grin and van Staveren emphasise that to achieve system change, also the definition of problems, the search for solutions and the production of knowledge need to change. A system-innovating core idea can potentially support such innovations in the framing of problems and in guiding the search for solutions.

In his famous book on *Sensemaking in Organizations*, Karl Weick ([1995](#)) identified key aspects of sensemaking processes; the starting point being that the social world does not simply appear to people but is continuously constructed through labels and narratives. Weick presents and develops his ideas on the role and functioning in the following seven aspects:

1. Identity: it is constructed who the “I” or “we” is;
2. Retrospective: looking backward to make sense of what happened;
3. Enactive: people simultaneously interpret and create their world;

4. Social: it is never an individual achievement, but deeply social;
5. Ongoing: sensemaking never starts and never stops;
6. Extracting cues: people use 'cues', or points of reference, that enable sensemaking;
7. Plausibility over accuracy: plausible representations matter more than accurate ones.

Organisational science dealing with institutions in the form of shared cognitive frames has traditionally concerned itself with continuity and stability. Only in the past years, increased attention has been paid to institutional change with scholars tracing the workings of novel cognitive frames that are involved in the divergence from the mainstream in "thought or deed" (Garud, Hardy, & Maguire, 2007, p. 959). The challenge this divergence connotes is known in the field as the paradox of "embedded agency" and prompts the question how a group or an individual can swerve from the assumed strong conditioning of its institutional framework and institutionalise new frames and practices (Mutch, 2007). This resumption of the classic structure-agency dilemma in relation to institutional change has triggered the development of the notion of institutional entrepreneurs who

'deploy the resources at their disposal to create and empower institutions. Institutional entrepreneurs serve as agents of legitimacy supporting the creation of institutions that they deem to be appropriate and aligned with their interests' (DiMaggio in: Dacin, Goodstein, & Scott, 2002, p. 47).

Since sensemaking involves the explicit comprehension of circumstances and, in this understanding, action follows from interpretation, one approach to gain insight into how institutional entrepreneurs deflect from commonly held frames of reference is the study of words and texts (Weick, et al., 2005). Thus, this paper explores written and spoken assumptions of actors involved in transition efforts about (i) what is at stake and (ii) why their responding strategies should work to shed light on the question how transition efforts become organised along particular pathways amidst their occurrence (see Figure 1). In other words, in this study we focus on institutional entrepreneurs who engage in sustainable consumption projects, i.e. transition efforts, that seek to bring about fundamental changes, and consider the notions of sensemaking and legitimation useful to study how these transition efforts are organised.

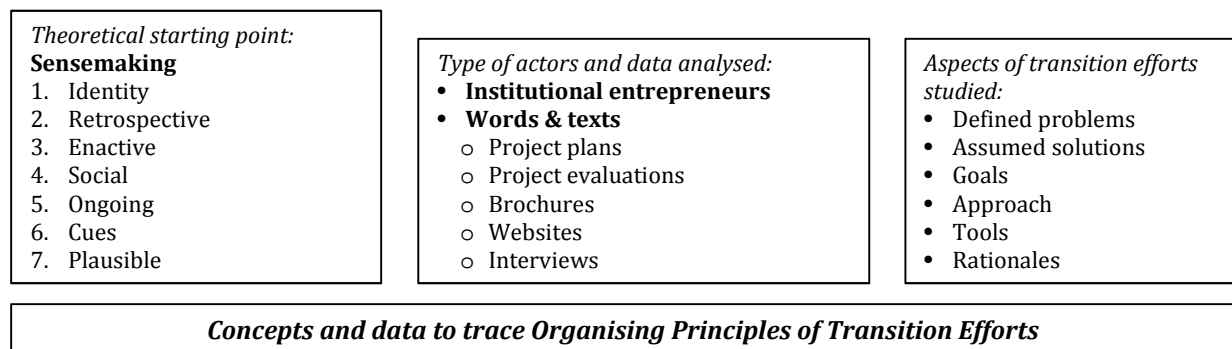


Figure 1: Conceptual underpinnings and empirical approach

We have selected four policy initiatives that aim to support more sustainable food production and consumption practices in Germany as example cases. In the discussion, we focus on the narratives actors evoke with respect to their views on human beings, their choices and behaviours as well as on societal challenges and their possible solutions. In addition, we interrogate what these views imply for the transition efforts they help rationalising or legitimising and how these efforts may suffer shortcomings due to unfounded or disregarded assumptions of their effectiveness.

Methods

Strictly speaking, it can only be decided in hindsight whether a transition occurred at all and how a given project or initiative contributed to it. Yet, many actors partake and give shape to changes underway and engage in various activities that are inspired by an envisioned transition. In this paper, these activities are conceptualised as “transition efforts”.

We examined four policy initiatives aimed at supporting more sustainable practices with respect to food consumption routines. The cases chosen are all based in Germany and include the *Bio-Siegel*, the label marking organic produce that was introduced in Germany in 2001, the *aid-Ernährungsführerschein* (food licence) for primary school children, the *Zu gut für die Tonne* (Too Good for the Bin) initiative that aims to reduce food waste and *Die Essbare Stadt* (The Edible City), an urban farming initiative in the city of Andernach. This selection of cases is motivated by the attempt to cover a range of approaches and instruments across which organising principles are traced in the analysis. Table 1 provides an overview to capture the variety covered in terms of the implementing policy levels and the employed instruments.

Table 1 Overview of selected cases

Case	Implementing policy levels			Policy instruments				
	federal	state	municipal	regulatory	economic	informa- tional	infra- structural	institu- tional
Organic Label	x			x		x		x
Food waste initiative	x		x			x	x	x
Food Licence	x	x	x		x	x		x
The Edible City			x		x	x	x	x

For each case, web-based information was collected in a template for structured comparison and analysis. We focused on the actors involved in the initiative, the targets pursued, the theoretical framework used (if mentioned explicitly), the instruments employed, the projects, products or activities implemented as part of the initiative as well as its direct and indirect effects. For two cases, information from the Internet was supplemented by interviews to enrich the empirical basis for analysis. For the Food Licence initiative, the project manager, and for The Edible City initiative, one of the project developers and a landscape architect involved as project evaluator, were questioned in the form of semi-structured interviews. Based on the narratives we encountered in written or spoken word, an analysis was conducted of the (frequently implicit) assumptions and logics underlying each initiative. In the following, we will first present the four cases and then discuss sensemaking aspects, underlying assumptions and their implications.

Description of actions – the four cases in brief

Case 1: The organic food label initiative – das Bio-Siegel

In September 2001 ([BMELV](#)), Germany introduced a label for all produce compliant with the Council Regulation (EEC) No 2092/91 on organic farming and agriculture ([EEC, 1991](#)). The declared goal of this policy initiative was to establish a single, known, trusted and transparent label for organic food in Germany to replace the many logos in use at the time that each adhered to different standards. The *Bio-Siegel* initiative, therefore, involved the national recognition and more rigorous implementation of international standards as well as frequent, at least yearly, assessments by



independent, certified controllers. The percentage of agricultural land used for organic production has increased from 1.6% in 1994, to 3.7% in 2001 and to 6.1% in 2011 ([BMELV](#)).¹ Between the introduction of the Bio-Siegel in September 2001 and December 2012, the amount of registered Bio-Siegel products has increased from just over 1,200 to almost 66,000 ([BLE, 2012](#)) and continues to rise despite the existence of an EU logo for organic produce since July 2012. The EU logo is based on the same standards and its use is obligatory for all organic produce compliant with those. German producers or retailers are nevertheless still allowed to apply for and use the German Bio-Siegel in addition to the obligatory EU logo ([European Commission, 2010](#)).

The declared goals of the Bio-Siegel were to emphasise EU standards for organic farming and to offer guidance for consumers through the jungle of existing labels and claims. This host of logos, labels and claims about 'environmentally friendly' and 'ecological' products on the market was hence the problem targeted by means of a uniform label and supplementary information via online and print media about the design, meaning and control mechanisms behind the label.

Although this analysis is not meant as effectiveness evaluation, it is worth pondering whether the declared goal has been achieved. The Ministry aimed to strengthen internationally agreed standards by creating a single, uniform organic label accompanied by a control system that rendered all labels based on lower standards less trustworthy. However, the obligatory EU logo for organic products, which is based on the same standards, has not substituted the Bio-Siegel in the first fourteen months of its existence. Instead, the, among German consumers much better known, Bio-Siegel is frequently featured alongside the EU logo.

The Bio-Siegel communicates to people that the product they consider purchasing was organically produced in accordance with EU legislation.² The EU-wide successor solely shows twelve white stars in the form of a stylised leaf on a green background. The lack of explicit mentioning of "eco", "bio", or "organic" in writing, may, in addition to the former label being a decade older and hence better known, be one of the reasons why many producers and retailers continue using the Bio-Siegel in addition to the EU logo.

Furthermore, a number of initiatives by producers and retailers, e.g. *Bioland*, *Naturland* and *demeter*, make use of stricter standards and continue using their labels next to the EU logo as well as the Bio-Siegel. In addition, most retailers have created their own, easily recognisable organic brands and display the EU logo, occasionally accompanied by the German label on the package, yet not necessarily prominently. In other words, the co-existence of numerous organic labels persists.

Case 2: The food waste initiative – *Zu gut für die Tonne* (Too good for the bin)

Upon its premier in Germany in February 2011, the documentary *Taste the Waste* triggered a public debate by showing how approximately 50% of all food in Germany is wasted on its way from the field to the plate. The Federal Ministry for Food, Agriculture and Consumer Protection (BMELV) subsequently entrusted the University of Stuttgart with a study to determine the actual amount of food waste and to evaluate strategies for reduction. In March 2012, the BMELV hosted a conference with stakeholders from industry, retail, gastronomy, agriculture, consumer organisations and NGOs to present the research findings (e.g. about 30% of all food bought by private households is thrown away ([Kranert et al., 2012](#))) and to discuss cooperative strategies for food waste reduction.



¹ These figures nicely show that the increase in organic agriculture is not (at least not in its entirety) due to the labelling initiative as its proportion of the total amount of cultivated land increased prior to the introduction to the label already.

² The label reads "Bio nach EG-Öko-Verordnung" which means "Organic according to EU-Eco-Directive".

In March 2012 a nation-wide awareness campaign under the banner of “Teller oder Tonne” (*Plate or bin*) started off, targeting the best before date and its appropriate interpretation. In April of the same year, the BMELV launched the “Zu gut für die Tonne” (*Too good for the bin*) initiative which consists of a number of instruments, e.g. a website and an app to inform private households about food waste and how to avoid it, a number of action days in different cities in cooperation with the *Bundesverband Deutsche Tafel* (an organisation collecting food from restaurants and supermarkets that would be thrown away but is still edible and offers it for free or at very low cost to the poor), churches and Slow Food Deutschland to raise awareness. Additionally, the BMELV cooperates with the German hotel and restaurant association to reduce food waste in the hospitality sector by, amongst other, establish doggy bags and offer varied dish sizes.

For evaluation purposes, a number of efforts were undertaken. A survey conducted in March 2012 showed that 81% of the German population above the age of 18 had taken notice of the discussion on food waste in the media and about 20% (23% of the female and 14% of the male population) stated they had already made changes to their ways of dealing with food and food waste (BMELV, 2012). Unfortunately, the survey did not ask for specifics about new behaviours or strategies adopted. In November 2012, Infratest dimap conducted a representative survey to evaluate several aspects of the food waste initiative. Key findings were that 95% of the German population support the goal to reduce food waste and 51% had heard about the BMELV food waste initiative. 26% stated that they are handling food more consciously while 73% said they hardly changed their behaviours. 97% of the people surveyed consider *Tafel* initiatives worth supporting and 50% could “certainly” and 35% “potentially” imagine becoming personally involved (Infratest dimap, 2012). In other words, in terms of awareness and good intentions, the food waste initiative delivered impressive results while actual changes remained limited and details unmonitored.

Case 3: The Food Licence for children – *der aid-Ernährungsführerschein*

The Food Licence initiative forms part of the IN FORM programme, a national action plan of the German Federal Ministry for Food, Agriculture and Consumer Protection (BMELV) to address the prevention of malnutrition, lack of physical exercise, overweight and related diseases. The Food Licence targets primary school children aged eight to nine (BMELV & BMU, 2011) and aims to teach about a healthy diet, food preparation, hygiene and table manners in six or seven practical sessions, including two playful “assessments” in form of a quiz and a practical test. The initiative offers an information kit for teachers, including letters to parents in several languages and a presentation to explain the aims and content of the Food Licence to colleagues and parents as well as the service to hire an expert to join the sessions. In addition, a booklet is provided for the kids with explanations, tasks and recipes. By March 2013, after six years of its existence, over 580.000 children had acquired a Food Licence.



In each of the sessions, a different theme is central, e.g. breakfast, salads, cold snacks or warm dishes, yet the goal to teach theoretical knowledge whilst practicing skills and enjoying the activities remains. Children are supported in reading and experimenting with recipes and encouraged to carry out all tasks as independently as possible (aid).

This initiative frames a healthy and more sustainable lifestyle as one involving a balanced diet including freshly made food. The problems targeted by means of information for teachers and parents and practical sessions for children are the dwindling knowledge about what constitutes a healthy diet and skills to prepare self-made food, also among parents. The large coverage of the initiative to date is not only due to clever marketing by the BMELV as the main financer or the *LandFrauen Verband* (Countrywomen’s Association), i.e. the experts who can be hired as in-class supporters, but also due to the teachers’ frustration and active search for help motivated by the

frequent encounter of children who arrive at school without having had breakfast or with only sweets and candy in their lunch boxes (B. Kaiser, personal communication, Sept 11, 2013).

The keys to success that trigger long-lasting knowledge and behaviour change appear to be experience and experimentation rather than lecturing and indoctrination. An evaluation among 77 classes across Germany found that the initiative has positive and lasting effects (tested after 6 months) with respect to knowledge, motivation, competences and behaviours related to a healthy and varied diet, food preparation, hygiene and table manners. The evaluation also showed that children greatly enjoyed participating. Parents noted that children after participation were keener to help with grocery shopping and food preparation and also paid more attention to hygiene and table manners ([Sommer, Ekert, & Otto, 2011](#)).

Case 4: Public urban gardening – *die Essbare Stadt* (The edible city)

In 2010, the garden architect Heike Boomgarden and the geo-ecologist Lutz Kosack, who works at the municipal urban planning department of the city of Andernach, developed a concept of urban agriculture with the aims to reduce care and maintenance cost of public green spaces, to provide employment and qualification opportunities for long-term unemployed, to improve the city's eco-balance³ and to make people aware that public space is their space (and not the municipality's), e.g. by allowing them to pick herbs and ripe fruits and vegetables for free and involving volunteers in care-taking.



This urban gardening initiative runs by the name *Essbare Stadt* (Edible City) and does not follow a fully worked out project implementation plan. Instead, the plan evolves and subsequent steps emerge as the project develops. This is remarkable since public expenditures are often tied to specific targets and require detailed planning. Due to the fact that no additional cost were involved, however, the municipality gave the project managers plenty of rope and allowed the testing of different approaches and letting the project grow slowly according to its own speed.

Three and a half years later, the initiative has expanded from a permaculture project that had already been in place outside city borders and provided training and work for long-term unemployed, to agricultural plots in a number of sites throughout the city, the most prominent being a large plot in the moat of an old castle in the city centre. Numerous citizens, school classes and voluntary groups are supporting maintenance of public plots or created gardens on their own premises, an organic fair trade shop is selling the permaculture produce in the city centre and urban agriculture courses and workshops are offered to interested locals and externals by Boomgarden, Kosack and other experts. Over the years, Andernach has won the internationally recognised gold award of the *Entente Florale* twice and a “liveable city” award.

Since the early stages of this initiative, the project implementers sought close cooperation with local and regional media, also to inform citizens about plans and intentions and to invite them to join. After Andernach won the *Entente Florale* for the second time in 2012, also national newspapers and television channels have featured this successful initiative and the project managers and implementers in Andernach like to take credit for the several initiatives that have started to take shape in other cities since then (H. Boomgarden, personal communication, April 16, 2013).

Generally, people doubted this initiative would be long lasting and having an impact. Especially elderly were sceptical about the success of the project as vegetable plots in public spaces of the inner city reminded them of post-war experiences. However, after initial hesitation to pick food for free, people increasingly dared to take what is available, enthusiasm grew and increasingly, people wanted to become engaged in urban gardening activities. In terms of other goals met, it

³ For example, by using no fertiliser, herbicides and pesticides and planting domestic plant species mostly – also to the great enjoyment of domestic animal species.

can be stated that tourism has increased over the past years also due to visitors from other municipalities who would like to learn about experiences made in Andernach first hand ([Andernach City Council](#); [Kosak](#)). People's motivations to make use of the free food and become involved range from saving money, to eating healthier and more varied, to educate children about domestic plants, how they grow, taste, etc. The municipality's fear of vandalism has, so far, proven to be unnecessary ([Kosak](#)).

Analysis of assumptions and appropriations

For this analysis, the assumptions, appropriations and actions of actors explicitly engaged in transition efforts, i.e. institutional entrepreneurs, are of key concern. The four exemplary cases discussed are each examined in terms of focus, addressed problem, defined goals and employed tools or measures. In a subsequent step, these initial findings are questioned in terms of the notion of the human being underlying the approach and the, thereby, assumed effectiveness of chosen tools and adopted strategies. These reflections are transposed to organising principles that form the undercurrent to assumptions, appropriations and actions encountered.

To ensure analytical breadth, cases have been selected that can be considered archetypal in the sustainable consumption domain, including a labelling programme (i.e. the "Bio-Siegel", organic label), an educational awareness campaign (i.e. the "Zu gut für die Tonne", "Too good for the bin" food waste initiative) and a practical, or "hands-on", educational initiative (i.e. the Ernährungsführerschein; food licence) as well as a project targeting the setting or context of people's workaday life (i.e. Essbare Stadt; Edible City).

The analysis is inspired by the *sensemaking* literature; on the one hand, in terms of its unit of analysis, namely spoken and written narratives offering rationales for chosen strategies, in this context transition efforts, by relating to circumstantial developments, i.e. cues that actors distil and that are perceived as problematic. On the other hand, this analysis subscribes to the notions that sensemaking is social and sentiments need to be shared to result in (collective) action and that sensemaking is enacted which entails that the reality perceived is the reality created.

The following table summarises the preliminary outcomes of the preceding description of the four cases and will be discussed thereafter.

Table 2 Summary table of results based on case analysis

Case(s)	Organic label programme Food waste campaign	Food waste campaign	Food Licence initiative Edible City (EC) project
Focus	Consumption patterns	Consumption levels	Ways of living
Goal	Adaptation of existing practices to include "more sustainable" choices	Adaptation of existing and adoption of new practices to reduce consumption and share with others in need	Letting children or citizens experience the enjoyment of self-prepared, fresh and healthy food EC only: Changes in the city's infrastructure to accommodate new ways of producing and consuming
Defined problems	Lack of awareness about implications of current practices and alternative consumption choices	Lack of knowledge and skills to change unsustainable consumption behaviours	Lack of support (by parents or available infrastructures) to engage in healthier and more sustainable behaviours EC only: Decreased attractiveness of the city for young people and families, long-term unemployment

Tools	Campaigning and information (on product package; through print and online media)	Campaigning and information (print and online; also action days in various cities)	Spaces and places for shared experiences and collaboration
Notion of human being	<i>Homo eco-economicus</i>	<i>Homo economicus moralis</i>	<i>Homo creativus</i>
Organising principle	Green consumption	Sufficiency	Collective experimentation

Case 1: The organic food label initiative – *das Bio-Siegel*

The *organic food label* is based on the assumption that people would like to trust that what is said to be organic food is organic indeed and will choose for the product bearing the label. The key assumption underlying every product label is that provided all necessary and relevant information, people will make the more informed and intelligent decision. The assumption that people are bound to make the better decision given the appropriate information is tied to the notion of the human being as a rational actor. As appropriate, necessary and relevant information is deemed that particular detail which is thought to orient people towards the desired decision, in this case the organic characteristics of the production process. Policymakers, often supported by scientists and stakeholders, decide what the particular piece of information to be provided is – obviously confined by the amount of information that can be displayed on a product and the level of detail that is sensible to communicate at the point of decision-making.

Usually, alerting stickers or labels on products or shelves communicate to people “buy this bargain”, with personal profit maximisation (or personal cost minimisation) as the only factor considered to play a role in rational decision-making. However, displaying a label that bespeaks a production method less harmful to the environment and may thereby explain higher purchasing cost involves a broader definition of profit- or utility-maximisation. In addition to money, also public and personal health, environmental protection and animal welfare enter the equation.

The notion of the human being as a rational actor, capable to take all relevant information into account and solely focused on maximum utility has been challenged in economics, psychology and sociology alike. It has, for example, been shown that intentional, motivational factors and perceived control play a role in decision-making ([Ajzen, 1991](#)) and that decision-making is based on bounded rationality ([Simon, 1991](#)). In addition, practice theories discuss how behaviours relate to social norms and are embedded in systems of provision and institutional contexts ([e.g. Shove, Pantzar, & Watson, 2012](#)). To remain in the mathematical analogy, there are hence numerous factors that enter or are excluded from the equation that makes for the outcome of a decision-making process dependant on the kind of choice being made, after careful weighing of available options and potential consequences or not much conscious consideration at all.

We noted above that the use of an eco-label broadens the notion of rationality from purely monetary gains to include environmental and health benefits. In more detail, its use assumes a careful and conscious decision-making process that includes taking note of the label as well as a genuine interest in and concern for the environment that cause the decision-maker to make a positive purchasing decision based on (knowing) what the label denotes. One way to frame the notion of the human being at work when implementing an organic food label is, hence, that of the *homo economicus* yet with ecological concerns, i.e. a *homo eco-economicus*.

Labels are a (common) way for policymakers to engage in transition efforts towards more sustainable ways of living. The Bio-Siegel as an example in the food domain is representative for a number of eco-labels advertise a “more sustainable” product while, at the same time,

frequently justifying its higher purchasing price. From the perspective of the consumer, a label provides sought for information. If the consumer is concerned about health and the environment, and sufficiently solvent, he or she may purchase the product and feel exalted, possibly along the lines of: “I may be paying more, yet, the label tells me I am doing something good”. From the perspective of producers and retailers, a label sets inspirational and aspirational standards that are pursued for economic as well as ecologic reasons. A label can, therefore, be conceptualised as an instrument that aims to organise producers, retailers and consumers around a shared view on the importance of high-standard produce that motivates and justifies higher expenditures.

In other words, a label can be viewed as forming part of a cluster of transition efforts that involve the same practices (e.g. growing crops, fruits and vegetables, breeding animals, harvesting and culling, processing and packaging, transporting and selling, buying and consuming) yet now in line with particular, supposedly more sustainable standards that differ from “mainstream” regime standards. These efforts can be viewed as being organised by a principle of “green consumption” that include the same the production-consumption chain, yet somewhat differently⁴.

On the part of the consumer, these transition efforts organised by “green consumption” hardly require any changes, especially since most supermarkets in Germany today, offer a broad range of organic products. Ironically, the purchase and consumption of organic products does not really require consumers to go much out of their way, yet it is frequently marketed as a “great deal of difference” to enhance the feel-good factor amongst consumers or to justify expenditures or praise for government interventions. In short, eco-labelling initiatives address consumption patterns and systems of provision rather than consumption levels.

Case 2: The food waste initiative – *Zu gut für die Tonne* (Too good for the bin)

Also in the context of the *food waste* campaign, assumptions of the human being as rational actor with self-interest but also moral motives can be noted. On the one hand, people are being made aware of how much money they are throwing out of the window or, rather, into the bin with every still edible food item they are disposing off and about the detrimental effects this has on the environment. In this respect, the *homo eco-economicus* can again be considered as the underlying notion of what people base their choices on because the “appropriate choice” is rational albeit considerate for social and environmental repercussions.

In the context of this initiative, food waste is defined as the problem to be addressed and the set target is to half the disposal of all edible food waste by 2020, in reference to the European Commission’s Roadmap to a Resource Efficient Europe ([2011](#)). Since the BMELV food waste initiative is composed of several informative, institutional and infrastructural instruments, a number of assumptions regarding the different instruments and their effects need differentiation. The deployment of media awareness campaigns and action days assume that temporary information provision about monetary and environmental costs involved will entail long-lasting behaviour change countering food waste. The assumption underlying the website and app is that continuously available information (e.g. a database with leftover recipes) will continuously help to counter the problem defined. Furthermore, the endorsement of doggy bags in restaurants and the possibility to order varied portion sizes targets social norms and institutions.

In comparison to the previous initiative on organic food that did not involve any significant change in habits aside from picking the products bearing an organic label from supermarket shelves, this initiative on food waste asks people to do quite a number of things rather

⁴ This formulation is not intending to belittle all the work, changes and investments that have to go into converting a conventional into an organic farm. For the sake of the argument, however, it needs to be clear that “in principle” many norms and ways of doing things remain untouched albeit becoming aligned with a particular set of standards.

differently. On the one hand, the campaign openly addresses the issue that buying more than needed is “bad”, for the wallet and for the environment. Yet, in case one has bought too much (in particular retailers and restaurants) and cannot consume or sell it all, there should be regard for others and Christian, if not human values require sharing the superfluous with those who have little. Hence, on the other hand, there is an appeal to people’s conscience by raising awareness for others in society who can hardly cater for their own subsistence and who should be supported and shared with.

The use of moral arguments and the cooperation with churches alludes to a slightly different notion of the human being than the one that makes rational choices based on a broad set of factors, including environmental. Within the moral appeal lies the assumption (or hope) that people’s altruistic regard for others and their needs enters the equation and tips its outcome towards more sustainable behaviours. The notion of the human being underpinning this assumption can be framed as a *homo moralis* who avoids wasteful behaviours based on the concern for others’ needs. In addition to consumption patterns, this initiative also addresses household consumption levels by educating about appropriate ways to plan grocery shopping, finishing left-overs and still edible products beyond the expiration date as well as passing on what oneself will not use to others in need.

The analytical gaze, therefore, reveals two principles that underlie these efforts towards more sustainable consumption. Similarly to the previous case, a “principle of green consumption” is at work which frames and gives meaning to slight, presumably more sustainable variations of current practices, e.g. making better use of left-overs or only throwing away products that have actually gone off and not just passed the expiration date. In contrast, a “principle of sufficiency” underlies the replacement of old ways of doing things by different ones that involve reduction and abstinence, e.g. better planning and only buying what is needed or donating to others in need. However, people are not explicitly asked to restrain themselves, possibly because policy does not want to appear to dictate “appropriate behaviours” or because otherwise retail and restaurants may not have become engaged. Instead, people are asked to consume carefully and share what is too much with others who have too little.

Regarding the declared goal (i.e. halving food waste) and the selected instruments (i.e. website, app, action days, campaigns through print media) both principles, green consumption and sufficiency work in parallel and complementarily⁵. The stakeholder alliances formed and the measures taken to educate about, motivate and support different practices regarding food purchase, handling and consumption are the same for each principle. Since the reduction of food waste is a comprehensive goal that relates to a number of interrelated practices, involves a considerable amount of knowledge and skills and relies on systems of provision, some of which clearly favour wasteful consumption, a myriad of changes is needed to make any progress towards the desired goal at all. Therefore, it may come as no surprise that different approaches and arguments are used that are based on a couple of different notions of human beings, framed and made meaningful by a couple of principles.

Case 3: The Food Licence for children – *der aid-Ernährungsführerschein*

In the context of the *food licence* initiative, the assumed view on human nature and what motivates more sustainable behaviours is different than that of the two initiatives discussed above, possibly because it targets children. Instead of providing information to be passively absorbed, the food licence aims at attitude and behaviour change through playful, experiential and experimental learning and practicing. During the sessions, children are encouraged to try out new practices, under the supervision of teachers, parents or nutrition experts, of course. The primary goal is that children feel comfortable to explore and follow their intuition with no more

⁵ There may, nevertheless, be numerous other, possibly more effective ways to support changes for food waste reduction, some of which were also proposed in the study carried out at the behest of the BMELV in the aftermath of the Taste the Waste movie ([Kranert, et al., 2012](#)).

guidance than asked for. The approach and the didactical material facilitate self-dependent testing and learning and hope to motivate lasting behaviour change. Encouragingly, although some effects have been found to dwindle after a few weeks with candy re-appearing in lunch boxes (B. Kaiser, personal communication, Sept 11, 2013), long-term effects in the form of knowledge and behaviours have been established ([Sommer, et al., 2011](#)).

The notion of human experience and behaviour underlying this initiative can be conceptualised as a *homo creativus* who follows own ideas and intuitions whilst applying knowledge (what is healthy), norms (what is appropriate behaviour), skills (how it is practically done) and rules (recipes). It acknowledges the usefulness of playful experimentation in addition to the acquisition of skills and knowledge. The centrality of creativity and self-determined experimentation is shared by all groups of stakeholders who become involved financially or in kind and who help implementing and further developing this initiative. This may not be the case initially, though, as teachers, parents and nutrition experts supervising the classroom activities need to be explicitly cautioned and repeatedly reminded that the didactical core idea is “as little interference and guidance as possible” (B. Kaiser, personal communication, Sept 11, 2013).

The particular strategies chosen and instruments developed for this initiative only make sense and become meaningful based on the assumed *homo creativus*. Given that children are encouraged to experiment with new knowledge, skills and practices in groups albeit self-determined and that all adults do not interfere unless they might otherwise be accused of “non-assistance of a person on danger”, the principle that organises and shapes this initiative or these transition efforts can be described as a “principle of collective experimentation”. Surely, the experimentation is goal-directed, with the goals having been defined by others, not the children themselves, and it is restricted by time and material constraints, e.g. in terms of the school curriculum and equipment provided by the school or supplied by parents. However, within these boundaries, children are free, encouraged even, to find and develop their own ways of doing things.

By the same token, teachers, parents and experts also form part of this collective experimentation. Teachers have rarely done anything similar in class before carrying out the series of practical workshops the food licence consists of for the first time. The experts have and still are specifically trained by the aid, the developer and manager of the initiative, to be able to support the didactical format of self-directed learning appropriately. Parents are usually asked to help prepare and occasionally also assist the in-class activities and have reportedly been surprised by the children’s subsequent and persistent interest in helping with groceries shopping, preparation of dishes with fresh ingredients and instilled hunger to continuously get better at that ([Sommer, et al., 2011](#)).

Case 4: Public urban gardening – *die Essbare Stadt* (The edible city)

The *urban gardening* initiative in the city of Andernach is directed at a broad range of problems its developers identified, including tight public budgets, long-term unemployment, keeping the city attractive to young people and families, decreasing external recognition and interest (e.g. declining tourist numbers) as well as dwindling knowledge about gardening, domestic species and healthy and fresh food among the city’s inhabitants. Furthermore, the conceivers of the urban gardening initiative considered it a pity that citizens did not view public space to be owned by and available to them but rather to be “private” property of the municipality.

The instruments chosen to address these problems are a different spending of the available green keeping budgets, namely to grow food in suitable public areas that previously featured lawns or flower beds, the employment of long-term unemployed for maintenance and the continuous invitation to citizens, e.g. through newspapers and local radio, to pick free food and become involved. After a while, demand by local citizens and interested external parties triggered the development of courses and workshops addressing native plant species and urban gardening practices which were subsequently added to the set of instruments. Therefore, the

success in terms of inspiring, engaging and involving citizens can also be read off from the inquisitiveness triggered. Courses and workshops were developed because people wanted to learn about urban gardening and to help strengthen or reintroduce domestic species.

In comparison to the three cases analysed above, the public gardening initiative stands out by deliberately not educating and informing people about what they should do better or differently, unless they ask. Instead, the city environment was changed into one that “demonstrates” and “talks about” healthy and sustainable food and “invites” participation rather than an environment that “demands”. Based on this and coming back to the central concern of this analysis, the *homo creativus* can again be noted as the underlying notion of the human being. The fact that all project developments cascaded from the “simple” decision to invest public money slightly differently, i.e. to grow edible plants in some areas of the city and, hence, make a change to people’s environment, supports the conclusion that the underlying notion of the human being as a playful, creative animal is a successful one in striving for support and engagement. People even ask for more knowledge, tools and skills and sign up for courses. This enthusiasm and involvement bespeaks a desire for being inspired to take individual and collective action.

In comparison to the food licence case, the recognition of the creative streak of people and their desire to experience and experiment are even more strongly pronounced here as not only participants at the receiving end are invited to engage creatively, but also the developers and implementers of the initiative themselves. There is no set-in-stone plan yet and every step taken in project implementation provides insights and ideas for the ensuing one. In other words, a “principle of collective experimentation” appears to be at work.

These observations offer fertile ground for reflections on the role and functioning of organising principles. It is frequently supposed that powerful visions can provide inspiration and guidance towards desired goals. This assumption may explain the plethora of visions, roadmaps and strategies which forms part of current transition efforts in the business, research policy as well as the civil society domain ([Backhaus, Breukers, Mont, Paukovic, & Mourik, 2011](#)). However, in the case of Andernach, no uniform vision existed, solely a number of ideas, including a rather radical one related to the purpose of public expenditure, that are bit-by-bit brought to life and amidst their implementation cause new plans and ideas to sprout.

Discussion

Transition efforts seek to accomplish fundamental changes in practices which are deviations from usual patterns and habits. In four case studies we tried to delineate the assumptions about what is at stake in such deviations and what strategies can foster the desired change. We labelled such assumptions organising principles, and we found that they are often present as more or less coherent narratives, which are shared and can be referred to as a resource.

In the four case studies, we encountered different versions of three underlying narratives. The first narrative involves notions of the rational human being that also has an environmental conscience and therefore takes decisions that (are assumed to) benefit people, planet, and profit. This *homo eco-economicus* can be viewed as forming part of a paradigm of *green consumption* which suggests that consumption can continue as previously as long as we switch to more sustainable products. The second narrative revolves around *sufficiency* ideas and asks people to consume as they please yet not take more than they need. In this case, the *homo economicus moralis* can be considered the central notion, i.e. a person who acts rationally and follows own interests yet also cares about the subsistence and well-being of others. Lastly, we noted a narrative that conceptualises the human being as a curious and experiential animal, which we termed the *homo creativus*, who likes to engage in *collective experimentation* to explore ways of living, working and interacting to find out what suits oneself and others best.

In each case, the underlying paradigm or principle was shaped by the actors involved in the initiative and the instruments chosen, and – vice versa – played a role in decisions related to the

actors invited for engagement and the selected instruments. In other words, structuration processes occurred that echo Weick's (1995) notion of enactment in organising processes based on the idea that interpretations that draw on paradigms or framings shape actions taken. At the same time, these processes remind us of the duality of structure because nothing was predetermined and every actor involved has, and often makes use of the opportunity to mould the initiative to particular interests, i.e. to exploit the potential of embedded agency (Mutch, 2007).

In every case study, institutional entrepreneurs could be observed in the social construction of identity, in making sense of and finding legitimacy through past events (retrospective), in continuously extracting or actively creating cues to make sure the planned initiative pleases financiers, suits the target group and meets its goals. Notably, however, not every actor presents plausible stories about how the planned measures address defined problems and help attaining project targets. For example, the food waste campaign discusses at length how many people acknowledge the problem and have heard about the initiative but not in how far progress has been made towards the target to half food waste by 2020. Regarding another case, developers of the food licence declare that sustainable consumption is not their primary concern but that they aim at developing lasting knowledge, skills and motivation among children to eat fresher and more varied food, argue how and why their approach helps in achieving this goal and explain how the materials developed underwent rigorous testing (B. Kaiser, personal communication, Sept 11, 2013). In the case of the urban gardening initiative, the developers admit that that they have exceeded their targets and expectations (H. Boomgaarden, personal communication, April 17, 2013) and jury members confess that they were reluctant to reward the city of Andernach with yet another prize (F. Lohrberg, personal communication, Sept 18, 2013).

There lies a danger in neglecting assumptions about the effectiveness and efficiency of transition efforts. If underlying assumptions remain unacknowledged and, therefore, not investigated there is not only the threat of a given initiative failing but the challenge that every initiative creates ideas and expectations amongst recipients or participants about "appropriate and suitable" measures to address a defined problem, i.e. about the pathway to follow. This is of particular danger given that unacknowledged assumptions, including those known to be faulty, are frequently strategically appropriated by actors with the interest to maintain the status quo. For instance, industry happily succumbs to the *organising principle of green consumption*, which closely resembles the by Holt fiercely criticised *ethical values paradigm* (2012), since this implies that any effort made at strengthening environmental values through information and campaigning shows concern and engagement on the side of the campaigner but is likely to be in vain as the relation between abstract values and actual consumption patterns has been shown to be mild, at the most.

Conclusions

The number of sustainable consumption initiatives is large already and growing still. This paper analysed four exemplary cases in the domain of more sustainable food consumption in Germany and found that each initiative is structured by a particular principle or paradigm. The four cases scrutinised were inspired by a principle of *green consumption*, *sufficiency* or *collective experimentation*. Such organising principles, on the one hand, provide rationales for the problem addressed, the choice of participants and the measures taken. On the other hand, they are actively constructed and maintained by the actors involved. These findings resonate with and draw on organisational studies and, more specifically, the sensemaking literature.

This study of narratives draws attention to the workings of organising principles as paradigms that allow for collective sensemaking and hence action. In addition, this analysis points to the, often hidden, implications of unacknowledged assumptions about the effectiveness and efficiency of sustainable consumption initiatives and their strategic appropriation by particular actors.

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Innovative value creation models for sustainable living

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Along with product and process innovation, we urgently need to make fundamental changes to business models – and the systems that support them – to meet our current and future sustainability challenges.

Ryan Whisnant, SustaiAbility

Abstract

Current production and consumption are unsustainable. Traditional business models do not fully account for ecosystem services and social costs. Innovative value creation models (IVMs) that take into consideration environmental costs and social goals in addition to financial profit in which new modes of production, consumption and value creation are devised by new set of actors are needed. IVMs have not been researched systematically. This paper aims to 1) showcase IVMs supporting sustainable living; 2) discuss their environmental implications and role in fostering sustainability transitions. Theories applied are business model and social innovation, and socio-technical transitions. Case study approach is used to analyse IVMs in four consumption sectors: energy and housing, food and drink, mobility and consumer goods. Data is collected via meta-analysis of peer-reviewed articles, books, conference proceedings, reports and policies in online data bases. Data is analysed via in-depth case analysis of IVMs in four sectors, and cross-case comparison between the sectors. The paper discusses actor-network and institutional dynamics in IVMs and their environmental implications. It identifies patterns in the development of IVMs: shifts in producer-consumer dynamics, which have implications for resource flows in the society, and IVMs' potential to reduce environmental impacts. It highlights the importance of ICT in IVMs' proliferation and acknowledges the risk of rebound effects stemming from wicked problems associated with IVM implementation. Future research needs to focus on development of IVM classification, delineation of mechanisms and pathways to scale up the promising IVMs and the development of a sound methodology to measure environmental, social and economic effects of IVMs.

Introduction

Current patterns of production and consumption are unsustainable. Consumption levels have increased six-fold since 1960s (Backhaus et al. 2012). Consumption of food, drink, transport and housing accounts for 70% of environmental impacts in Europe and contributes to major greenhouse gas (GHG) emissions (EEA 2013). Technical innovations alone have proven to be insufficient to solve the pressing problems of today (Johansson, Kisch, and Mirata 2004; Mont et al. 2012; Backhaus et al. 2012). Therefore non-technical innovation is also required to enable transitions to green economy¹ and more sustainable living (Steward 2012; Witkamp, Raven, and Royakkers 2011). Responding to this EU 20/20/20 policy encourages innovations to involve producers, consumers and diverse social actors - 'public authorities, economic operators and citizens alike' (EC 2008).

Traditional business models create value and generate profit via volume sales and often do not fully account for ecosystem services and social costs. There is a fundamental need for innovative approaches for creating, delivering and capturing value to ensure more sustainable living (GlobeScan and SustaiAbility 2013). Sustainability transitions cannot be solely supported by traditional business models, but should include development of *innovative value creation models*

¹ Green economy – economy that results in improved human well-being and social equity while significantly reducing environmental risks and ecological scarcities (UNEP 2011, 2011)

(IVMs) in which new modes of production, consumption and value creation are devised by companies, public actors and individuals. IVMs focus on the environment, well-being and quality of life in addition to financial profit. IVMs are broadly defined as novel forms of exchange at some point along the company's value chain that enable a business to respect environmental limits while fulfilling social wants and needs (Clinton 2013). Examples include neighbourhood biomass heating, community supported agriculture, car sharing, redistribution markets for clothes etc.

Despite the fact that IVMs emerge in different sectors and can deliver sustainability benefits, IVM phenomenon has not been researched systematically. Particularly the ways in which IVMs influence consumption patterns and lifestyles have not been sufficiently addressed. In addition while business model innovation represents a common and frequently occurring global phenomenon, examples of IVMs advancing a sustainability agenda are more rare and difficult to discover.

Therefore this paper aims to contribute to knowledge in two ways:

- 1) to showcase good practices of innovative value creation models that support sustainable living;
- 2) to discuss their environmental implications and potential role in fostering sustainability transitions.

Case study research is used to analyse IVM examples in four consumption sectors: energy and housing, food and drink, mobility and consumer goods. These sectors are selected for analysis as they lead to the most significant environmental impacts from households in Europe (EEA 2013); demonstrate unsustainable trends in terms of environmental pressures; and provide ample empirical evidence of diverse IVMs in each sector.

Case study research is selected among other methodological approaches since it is preferred for thorough examination of causal paths (George and Bennett 2005), when the investigator has little control over events, and when the focus is on a contemporary phenomenon (e.g. IVMs) within real-life context (e.g. four consumption sectors) (Yin 1994). It will help explore conditions under which specified outcomes occur (e.g. IVMs reduce consumption levels or change consumption patterns), mechanisms via which they occur (e.g. mechanisms to shape more sustainable lifestyles), rather than uncovering the frequency with which they arise (George and Bennett 2005).

Data is collected via meta-analysis of peer-reviewed articles, books, conference proceedings, reports and policies in online databases (LUBSearch, ProQuest, EBSCO, SSRN) and in-depth interviews with actors involved in selected IVMs. Major themes for data collection include green business models, business model innovation, social innovation, distributed economies, collaborative consumption, and sustainability transitions.

Data is analysed via 1) in-case analysis of IVM examples in four sectors; 2) cross-case analysis and comparison between the sectors. The framework, which ensures a consistent analysis of data and cross-case comparison of different IVMs, includes key elements of innovation systems: *actors*, their *networks*, and *institutions* (Malerba 2005; Carlsson and Stankiewicz 1991; Bergek et al. 2008). While the role of *technology and infrastructure* in the success of IVMs is highlighted, it is not of a primary focus for the analysis in this paper as IVMs mainly represent non-technical innovative solutions. At the same time, the role of *markets* is deemed crucial to take up in the analysis and discussion since market relations have implications for resource flows and environmental impacts of IVMs. In addition to the analysis of these elements, the implications of IVMs for the environment and their role in transitions to more sustainable lifestyles are discussed.

The paper is structured as follows. This section introduced a research problem, outlined main knowledge gaps, and presented the aim and methodological approach of the paper. Section 2 discusses theoretical underpinnings guiding the research and reviews documented empirical

evidence of IVMs. Section 3 presents IVM case studies in four consumption sectors including energy and housing, food and drink, mobility and consumer goods. These are analysed and compared in Section 4, which also discusses the potential of selected IVM examples to deliver environmental and social benefits, and contribute to sustainability transitions. Section 6 provides conclusions and outlines areas for future research.

State-of-the-art

Relevant theories

Theoretical schools of thought informing this research on IVMs include innovation systems studies (primarily business model and social innovations) and socio-technical transitions.

A broader field of *innovation system* studies incorporates “all important economic, social, political, organizational, institutional, and other factors that influence the development, diffusion, and use of innovations” (Edquist 2004). Innovation systems approach is applied at various scales (from technology-specific to national) (Hannon 2012; Carlsson and Stankiewicz 1991) and to technical and non-technical innovations. Particularly relevant are ‘system innovations’ (Steward 2012), which include multiple technical and non-technical solutions and a mix of societal actors. Such innovations are argued to enable fundamental change in the way people think about production and consumption and reconfigure established routines.

Business model innovation is a development of a novel set of activities for value creation and capture (Chesbrough 2010). Research exists on what constitutes a business model (Osterwalder and Pigneur 2010; Zott and Amit 2010) and how and why novel business models emerge and challenge existing ones (Teece 2010; Johnson, Christensen, and Kagermann 2008). Particularly relevant are studies on green business models (Stubbs and Cocklin 2008; Bisgaard, Henriksen, i Bjerre 2012; Boons and Lüdeke-Freund 2012), which support the development of products and services with reduced environmental impacts and that are economically viable. However, very little research exists to address alternative ways of organizing production and consumption by engaging actors other than traditional business players, i.e. IVMs.

Social innovation is an emerging field of practice and research that does analyze value models provided by actors other than traditional businesses. Social innovation includes new ways of satisfying social needs (through products, services, models) by creating new collaborations among societal actors (Murray, Gaulier-Grice, and Mulgan 2010). Social entrepreneurs find alternative ways to use under-utilized resources for the benefit of society. They create a “third sector” between private and public sectors (Shaw and Carter 2007) and are often the actors engaged in IVMs. Social and business model innovation literature will inform this research on IVMs’ potential to connect business with social entrepreneurs and their value models.

Theoretical school of thought on *socio-technical transitions* (Rip and Kemp 1998; Geels 2002; Geels and Schot 2007; Geels 2011) combines concepts from evolutionary economics, science and technology studies, structuration and neo-institutional theories (Geels 2011). Socio-technical transitions literature explains how and why the transitions occur and highlights interconnectedness between social and technical elements. Empirical examples include sustainability transitions in mobility (Köhler et al. 2009; Nykvist and Whitmarsh 2008), urban development (Hodson and Marvin 2010), organic food (Seyfang and Smith 2007), housing (Seyfang and Smith 2007) and energy sectors (Geels and Raven 2006; Hannon 2012). This literature provides theoretical insights on interactions between IVMs, established business models and policy arrangements, and pathways for niche innovations to scale up. The literature is, however, in its formative phase and has been criticized for the difficulty of empirical application, lack of attention paid to the role of innovative business models in socio-technical transitions and the main focus on technical and macro-level innovations (Hannon 2012).

At the same time, some studies (Malerba 2005; Mont and Emtairah 2008) have outlined several types of emerging forms of transformation and coordination in business models including: 1) the role boundaries of actors in the system relative to conventional practices change; 2) institutions involved in the interactions and coordination of value provision change and/or co-evolution; and 3) technologies and physical and knowledge infrastructure that shape and are shaped by the emergent value creation models. Changes in the market relations also have implications for resource flows and environmental impacts of IVMs as compared to traditional business models. In addition, innovating firms need to be able to see and adapt to shifting market and other conditions by identifying trends and engaging stakeholders (Whisnant 2013).

By exploring the IVM cases with an attempt to merge business and social innovation studies with research on socio-technical transitions, this paper seeks to fill some of the aforementioned gaps in these two theoretical schools of thought. In particular, the analysis of transformations in market relations will help better understand the nature and extent of the change in the system elements, such as the roles of actors, their networks and strategies they pursue, physical re-arrangements, and institutional changes, as well as environmental implications of such changes.

Empirical evidence on innovative value creation models in literature

Empirical evidence on the emergence of IVMs and their potential to deliver economic, environmental and social benefits exists in sustainability studies. The first strand of studies is on *collaborative consumption* (Botsman and Rogers 2011; Seyfang 2009), where IVMs occur within its 3 systems: digital sharing, product service systems (PSS), and redistribution markets and collaborative lifestyles (e.g. car or bicycle sharing, swapping or reselling clothes, tools exchange or land sharing). The second strand of studies includes *distributed economies* (Johansson, Kisch, and Mirata 2004; MESPOM 2009): instances when consumers become co-producers and/or suppliers of energy (e.g. biomass neighbourhood heating in Nordic countries, community based wind electricity production) (MESPOM 2009; Voytenko and Peck 2012) or food (e.g. community supported agriculture, urban agriculture) (MESPOM 2009; Seyfang 2006). IVMs engage new actors on the markets (e.g. social entrepreneurs, municipalities, living labs etc.) and create new value chains. Driven by a different set of priorities compared to traditional businesses, IVMs promote sustainable business, innovative products and services and enable sustainable behaviour of consumers, as well as ensure accessibility and affordability of products and services for all socio-economic groups (Mont et al. 2012).

Although there is no established IVM definition, there is a list of their key features mentioned in several studies (Mont et al. 2012; SPREAD 2012; Hicks, Groezinger, and Thorne 2012):

- create, capture and deliver value by selling function / utility of a product (not product per se);
- include environment, well-being and quality of life in addition to economic values and financial profit;
- involve actors from public (e.g. social entrepreneurs, municipalities, NGOs, research institutes, living labs etc.) and private (e.g. companies, business hubs etc.) sectors;
- mix profit and non-profit, individual and collective activities;
- represent business-to-business (B2B), business-to-consumer (B2C), consumer-to-business (C2B) or consumer-to-consumer (C2C) market relations;
- may contribute to the establishment of new sustainable markets;
- intend to support individuals in making more sustainable lifestyle choices;
- often represent decentralized production units.

Despite empirical evidence of emerging IVMs and their potential to deliver sustainability benefits, IVM phenomenon has not been researched systematically. Although studies on

business models, social innovation and socio-technical transitions provide valuable insights to the understanding of IVM concept, neither of these strands has explicitly addressed the role such models play in a transition to more sustainable living. This paper seeks to open a new research agenda, which will be able to fill in the aforementioned knowledge gaps.

Case studies

IVM examples discussed in this paper represent different market relations, originate from various geographical and institutional contexts, and fall within four sectors with the most significant environmental impacts in Europe including energy and housing, food and drink, mobility and consumer goods.

Energy and housing

Many regions in Europe that used to generate heat and electricity from centralized oil, coal and nuclear power shift to biofuels, wind and solar energy (Voytenko and Peck 2012; MESPOM 2009). This leads to decentralization of energy production and supply, bringing it closer to end-users and thus reducing waste generation and carbon-intensity. Such energy systems engage new actors (farm based entrepreneurs, rural cooperatives, municipalities etc.) and contribute to local development via rural diversification and job creation.

One type of IVM envisions co-production of value with active involvement of consumers or clients in energy generation and supply. In this model, individuals in addition to being consumers start playing an active role in a co-production of utility, e.g. households become co-producers and consumers of district heat (Voytenko and Peck 2012) or electricity (Southerton, Chappels, and Van Vliet 2004). The service and value is thus produced in a close contact with or by the actual user. Examples of this IVM are presented below.

Co-production of electricity, Samsø island, Denmark

Electricity distribution on Samsø island (Denmark) is managed by a cooperatively owned local utility. Electricity is supplied by 11 land-based and 10 offshore wind turbines. Nine land-based turbines are owned by local farmers, while the other two – by local cooperatives. The municipality of Samsø invested in five offshore turbines, three are owned by small local businesses and two belong to cooperatives comprising of local residents and non-islanders who have some relation to Samsø. Electricity demand of 4000 island inhabitants is fully met by the land-based turbines. The offshore wind park generates 10% surplus that is exported to the mainland. A small share of electricity is also generated from private installations of solar PVs. The Samsø Energy Academy has 100 m² of PV panels integrated on the roof (MESPOM 2009).

Co-production of district heating and hot water, Horbelev, Denmark

A farmers' cooperative in the village of Horbelev (Denmark) owns a 1.6 MW straw-fired plant that supplies district heating and hot water to 205 homes. This initiative was steered by a group of citizens in Horbelev who saw a need to substitute expensive oil and electricity heating in the village with locally sourced biomass. Horbelev municipality acted as a warrantor on the bank loan and an owner of the distribution network. Each citizen pays an annual fee for the service and saves up to 1000 EUR per year on heating. Climate and energy security benefits are achieved by substituting fossil fuels with locally sourced straw fuel (Voytenko 2012).

Food and drink

In many instances across Europe a transformation to more sustainable agriculture via distributed local farming has taken place (MESPOM 2009). As in the energy case, such initiatives engage new actors (farm-based entrepreneurs, farmer cooperatives, urban farmers etc.), who are food co-producers and suppliers. They are located closer to consumers, often rely on

methods of organic or integrated pest management farming and thus deliver environmental and social value locally and regionally. Examples of IVMs that envision organic food delivery from a farm directly to consumers are provided below.

Organic food supply to consumers, A@rstiderne, Denmark

A@rstiderne is a Danish Internet-based company delivering a wide variety of organic food (fruits, bread, meat, fish, nuts, wine etc.) from its own farms in weekly wooden returnable boxes directly to more than 35 000 households in Denmark and Sweden. The company employs 110 people and has an established co-operation with other organic growers and farms. A@rstiderne supplies the products via subscription schemes. Its strategy is to deliver first class organic food and provide convenience, storytelling and simple recipes. The company aims to raise awareness on sustainability, food quality, energy savings and fair and ethical trade (A@rstiderne 2013).

Organic food supply to consumers, Mossagården, Sweden

Mossagården is a family owned business, which cultivates organic vegetables and delivers about 900 boxes with organic food per week to consumers in Scania region (Southern Sweden) by vehicles on biogas or bicycles. The paper delivery box is recycled through a payback system. The company has long-term contracts with municipalities, private actors and schools. It has also established cooperation with other companies in Scania, Italy, the Netherlands, Ecuador and Spain to ensure organic food supply in a low season. In 2008 Mossagården was awarded regional environmental award for its commitment to the cultivation of organic food and information spreading about organically grown vegetables (Mossagården 2013).

Mobility

New modes of personal mobility such as car sharing and pooling in addition to public transportation, cycling and walking have a potential to reduce negative environmental impacts from the transportation while delivering similar to the private car function. Another concept that is being developed in many cities includes integrated mobility services. The seamless transport systems are often enabled by the use of information and communication technologies (ICTs).

Ride-sharing services are found across the globe (ZipCar, goCarShare, GoGet, Liftshare, Connect by Hertz, Lunds Bilpool etc.). In 2016, about 10 million car-sharing members are expected in North America, Europe and Japan (Mont et al. 2012). Advantages for car sharing include cost savings for users, convenience and guaranteed parking opportunities.

Integrated Mobility Apps (IMAs) are an example of ICTs embedded into “smartphones” that make seamless mobility systems customer-friendly. IMAs allow individuals to access information about various mobility options and efficiently link several modes of transport into a customised solution. In terms of a business model, integrated mobility systems are provided by different public and private actors who all contribute with parts of the total offer. IMAs often provide integrated payment methods through one channel and linked to one account.

Examples of IVMs supporting more sustainable ways of moving are provided below.

Integrated mobility app by Daimler, Germany

The mobility platform Moovel is a pilot project launched by Daimler in 2012 in Stuttgart. It links integrated mobility system to the optimisation of resources. Moovel's users can optimise their mobility routes by comparing different mobility modes, identifying best connections between the modes, choosing suitable times and comfort levels, and the best price. Moovel has a built-in function that identifies ride-sharing possibilities for specific routes. It can help order a taxi or use vehicles from car-sharing services. According to Daimler (2013), over 50% of ride-sharing bookings were for distances of less than 10 km.

Car sharing scheme Lunds Bilpool, Sweden

Lunds Bilpool is a Swedish non-profit car sharing cooperative which is run by individuals on a voluntary basis. It owns 11 cars of various models and has about 230 members. The annual fee for those actively involved in the working groups of the cooperative is EUR 100 and EUR 200 for all other members. The price for renting a car includes costs for fuel, insurance, tax, services and repairs. The cooperative is a self-governed organisation coordinated by the Board and managed through the working groups (Lunds bilpool 2013).

Bicycle sharing scheme Vélib', France

Vélib' is a public bike-sharing system in Paris. A bike can be hired either at one of Vélib' stations or online, and then returned to any Vélib' station. A one day ticket costs EUR 1.70 while long-term annual subscriptions cost EUR 30-40. The first 30 minutes of each trip are free of charge. To keep the bicycles in appropriate condition service teams regularly check them at the stations and repair the broken ones. Vélib' seeks to reduce car use and encourage healthy lifestyles by promoting physical exercise through biking. The system is funded by the JCDecaux advertising company in return to that the city of Paris places advertising boards on its streets (Vélib' 2013).

Consumer goods

Many products are designed with unjustifiably short life spans, which leads to a throwaway society characterised by growing volumes of waste, increased resource use and environmental pollution linked to production and disposal (Cooper 2010). IVMs have emerged in the consumer goods sector with an aim to reduce environmental impacts from unwanted or obsolete goods by prolonging their lifespan using different strategies.

Promising IVMs in this respect include 1) re-distribution markets with products swapping, reselling or donating either through business-to-consumer (B2C) models (e.g. eBay, second-hand stores etc.) or via micro-transactions in a consumer-to-consumer (C2C) non-profit network (e.g. flea markets, Freecycle.org etc.); 2) extension of a product lifespan through repair (Repairnetwork Vienna) (Mont et al. 2012); 3) upcycling of used materials or products to create new goods of a better quality and thus contributing to more efficient product end-of-life and reduced resource use (e.g. Patagonia, Royal Robbins, Worn Again, [Relevé Design](#) etc.); and 4) actively engaging consumers in the design of the products they will use via so called “user-driven innovation”². The later IVM increases a chance that the product will be used for a longer time, will be appreciated and well taken care since the customers participated in its design and adjusted it to their specific needs.

Real life examples of IVMs in the consumer goods sector are briefly described below.

User-driven innovation for customised sneakers by Nike

As it is sometimes difficult to find perfect sport shoes, many of the largest sneaker manufacturers including Nike, Puma and Keds initiated a service offering a customisation opportunity to consumers online. The consumers get a possibility to choose the size, arch support and different types of soles suitable for their feet and preferred types of running, colour and a graphic they desire. After these choices have been made, the shoes are produced and sent to the consumer (Nike 2013).

Second-hand market Blocket, Sweden

Blocket is a Swedish second-hand market similar to Amazon or eBay. It is a private company that started in 1996 and which employs 57 people. It is the largest national retail marker with 4 million people visiting its webpage daily. Individuals and businesses advertise used and new

² User-driven innovation or design implies an active involvement of consumers in the design phase of a product or service

products via blocket.se, which creates revenue by charging a fee for each advertisement. This IVM embraces mainly C2C market relations but aims to increase B2C sales of new products. In 2013 Blocket estimated that its sales of second-hand goods in 2012 contributed to savings of 1.6 million tonnes of GHG (Blocket.se 2013b). These results were communicated to Swedish people together with suggested strategies on how they can further reduce their environmental impacts. Blocket also sponsors collaborative consumption initiative Retoy (Blocket.se 2013a).

Clothes library Lånegarderoben, Sweden

Lånegarderoben is a non-profit clothes library in a suburb of Stockholm. Its customers pay a membership fee of EUR 70 per half a year or EUR 17 per month in return for a possibility to borrow a maximum of three garments every three weeks and keep them during this time. Clothes are supposed to be returned clean, and laundry advises are provided. Available collection includes 800 vintage, second hand and new garments, both male and female, which are donated by Swedish designers. There are up to 200 active members. Since all the work is done on a voluntary basis, the library is only opened once per week and one weekend per month (Lånegarderoben 2013).

Analysis and discussion

In this section the potential role of IVMs in enabling and fostering sustainability transitions is analysed by focusing on the dynamics and transformations in the main elements of innovation systems including actors and their networks, and the broader institutional context.

It is generally accepted that innovations do not only happen at organisational level, but are often associated with, driven by or themselves trigger changes in other organisations and in broader socio-technical and institutional environments in spatial and sectorial contexts (Asheim and Gertler 2004). Therefore, the innovation systems approach often enables more structured discussion on the factors that typically influence the development, diffusion and use of innovations. Innovation studies recognise the importance of several critical elements in innovation processes, such as actors, interactions among them, technology and institutions (c.f. Malerba 2005; Carlsson and Stankiewicz 1991; Bergek et al. 2008). These elements are often conceptualised into a framework to describe activities that enable, facilitate or hamper innovation processes (Edquist 2005).

Thus the innovation dynamics results from the interaction and co-evolution between different elements, e.g. technology, knowledge and learning, demand, business and other types of organisations and institutions (Malerba 2005). Business models innovation also to a large extent builds on the co-evolution of similar elements. One of the often-omitted parameters in the evaluation of business models, however, is the direction of innovation. Typically, the emphasis is placed on the rate of innovation, rather than the direction of innovation processes (Edquist 2005). In the context of the sustainability discussion, the direction of innovation processes becomes both directional and normative, as we would like to see changes in existing production-consumption systems towards greater environmental, social and economic sustainability. Therefore, this paper seeks to investigate the sustainability of IVMs and how they evolve and interact in the broader socio-technical and institutional contexts. Below factors that trigger and shape system level changes are identified and analysed with specific focus on the nature and dynamics of transformation in production and consumption patterns.

Actor-network dynamics

Several dynamic mechanisms can be observed within presented IVMs cases. In some of them, there is a *shift* from traditional business models based on offering material goods and products to consumers to satisfy their needs towards either *product-service combinations* with the main idea to create value through access to product use (e.g. car- or bike-sharing) or *integrated systems* where consumer needs are satisfied through a comprehensive package of products and

services and infrastructural systems (e.g. integrated mobility systems). These shifts in the way consumer needs are satisfied obviously have implications for relationships between the actors engaged in the system of provision, as well as for the system of provision itself.

Often *new actors* become part of the system, while incumbent companies are often faced with a difficult choice of being threatened by constellations of newcomers. In the case of car sharing, for example, car manufacturers seldom feel compelled to enter the car sharing market as they feel this would undermine their business case of profit generation through producing cars. In a way, the newcomers see themselves as players in the market of mobility, while car manufacturers act on the market of producing cars. However, car manufacturers make more profit from after-sales support and repair business, making planned obsolescence a successful strategy. The average lifetime of cars reduced from 25-30 years in mid-1960s to less than 10 years in present times, indicating clearly the trend among car manufacturers towards shorter lifespan of cars. On the other hand, provision of mobility through alternative means is gaining ground, especially among younger generation - some even talk about car ownership peak - and this puts additional pressure on car manufacturers. However, a certain reluctance and path dependency can be recognised in responses of the mainstream car manufacturers to the emerging value creation models and new-coming actors. At best, car manufacturers are working on making marginal optimisations of existing technologies and mobility systems, but they clearly shy away from taking on macro-challenges that the sector faces, which require reconsideration of traditional business models for providing mobility services to people.

This supports the findings from literature that product and process innovations are typically incremental innovations and that business model innovation creates a new form of exchange between a company and its customers, its suppliers, and its employees (Amit and Zott 2012). The car manufacturers are the dominant actors of the prevailing private car regime locked into old ways of thinking and with large sunk investments in car producing facilities. The new-coming players, e.g. car- or bike-sharing organisations, are small and flexible organisations that often target specific local market. They typically operate in niche markets and thus have not only to develop alternative ideas for mobility provision, but also to find ways to collaborate with other than incumbent companies actors. Therefore, car sharing often collaborate with public transportation companies, car rentals and leasing firms, taxi companies and bike-sharing organisations. The new constellations of actors mean new interactions and relationships among them, which might require new ways and types of learning and sometimes even establishing new "rules of the game" in the prevalent regime (Mont and Emtairah 2008). These ideas are further discussed in the section on cognitive institutions.

Institutional dynamics

Existing studies indicate that business model innovation often catalyses a broader system change either by triggering other companies to consider alternative ways to satisfy people's needs and to take a stand towards newcomers, by initiating change in social norms and values in society or by driving change in regulatory, economic or other institutional frameworks.

Institutions

New constellations of actors often depend upon or entail changes in institutional and infrastructural contexts, regulations and even social values. Indeed, institutional settings shape and influence the emergence, evolution and success of innovative value creation models. They can be categorised as regulatory, normative and cognitive institutions (Scott 1995: 33-45).

Regulatory institutions comprise laws and regulations, various kinds of administrative and legal instruments, as well as economic and financial mechanisms and information-based strategies to support or hamper certain developments in the society.

Policies and laws advancing certain business models in general and IVMs in particular are rare (Bisgaard, Henriksen, and Bjerre 2012); however some examples of supporting mechanisms for

IVMs could be identified from the case studies analysed. One example is restrictions on private car use in urban centres and availability of parking spaces at train stations designated for car sharing, which send a signal to the public about the preference for shared cars.

Another example is A@rstiderne in Denmark, which capitalised on the existing demand from customers for organic food, which was otherwise difficult to find in mainstream stores. Denmark was one of the first countries in the world to introduce legislation on organic production in 1987 and to support organic farming (Frederiksen and Langer 2004). The concept of A@rstiderne was also made possible because it was built on a shared risk between the farmers and the customers through a pre-payment scheme. According to the company, A@rstiderne is now a business run without subsidies, providing an opportunity to other organic farmers to join in and challenging the conventional agriculture sector.

The *normative institutions* include values and norms in society and these are of major importance both for developers of IVMs and their consumers and users. One example is the idea of sharing cars, which has for a long time contradicted the established norm of car ownership and the perception of a car as a status symbol. Therefore, many car sharing organisations have been working on improving the image of shared cars as a status good, e.g. Mobility, a Swiss-based car sharing organisation, sacrificed having its logo on shared cars in order to satisfy the needs of its members for status.

In traditional business models the role boundary between producers and consumers is clearly defined and consumers are typically assigned a passive role, but in many IVMs the role boundary is becoming blurred as consumers are becoming active players on the market who not only define and vocalise their needs, but become co-producers and co-creators of alternative systems of production and consumption. Three types of the dynamics can be observed in these models.

The *first* one reflects the changing role of individuals who, in addition to being consumers, take an active role in customising what is being produced through the so-called user-driven design (e.g. sneakers design by Nike). In this way, the final offer is customised to the needs, preferences and financial situation of the user. There are numerous examples when products, from sneakers to cars, are being shaped by online users, who can express their unique preferences with regards to product colour, size, specific additions and aesthetic features. A more advanced type of co-production is the production on demand, when products are manufactured only after the request from the market. This model has potentially significant implications for resource flows in society as only the products that are actively requested by users would be produced, and production of many products that are not sold could be avoided. Community-supported agriculture is based on the same principle, where consumers pay upfront to farmers thereby guaranteeing that agriculture produce will be bought and potential costs of low harvests are shared. Besides environmental implications, such schemes have positive social implications for economic security of farmers.

The *second* type of dynamics assumes an active role of consumers in the production of utility, e.g. households become producers and consumers of electricity, district heating or hot water. Another variation of this is the open source innovation when anybody can contribute to the development of a new computer program, a game or a unique collaborative platform by building on what has been previously produced and shared by other users.

The *third* type of dynamics reflects the engagement of individuals in co-creating alternative systems of consumption based on, for example, sharing and exchange and actively participating in the systems of collaborative consumption (Botsman and Rogers 2011; Murray, Gaulier-Grice, and Mulgan 2010).

These dynamic mechanisms have potential consequences not only for the conventional production-consumption and producer-consumer dichotomy, but also eventually for the resource flows in the society. A similar change in the role-boundary structure of the market actors can be observed in all analysed cases. For example, the straw based neighbourhood heating plant in Horbelev was started by villager dwellers themselves, who own the plant. They

received support from the municipality who acted as a warrantor for the bank loan and who also owns the heat and hot water distribution network. Five villagers - farmers, who have written contracts with the plant, supply the straw to the plant. Thus the users of the district heating and hot water became producers of these utilities. These findings are supported by the previous observations from the literature on product-service systems, which show that sometimes effective and efficient satisfaction of people's needs takes place when non-traditional actors, who are typically placed outside the traditional supply chain, are involved. The cases in this article further extend this view by first of all going beyond the private companies in supply chains, and by including public organisations (e.g. municipalities, public authorities etc.) and individuals. This finding speaks to a need to extend the borders of the analysis from private-public partnerships towards public-private-people partnerships.

In addition to the consumers taking over the production of goods and services, the consumption of these goods and services also becomes a field for new markets and IVMs. For example, in the case of second-hand/vintage goods the entrepreneurs capitalise on saturated markets of durable and fast-moving products and on the growing idling capacity of these products in a private possession. This enables the entrepreneurs to create common platforms for the exchange of goods in a private possession (e.g. online market places) allowing consumers to exchange goods and services. It can be seen as a revival of our traditional ways of living in social groups where sharing and lending, as well as bartering and swapping, was a natural part of everyday life. People used to exchange both products and services and to come together to fulfil the needs of individual members of the community, e.g. building a house for a young family. The Renaissance of such collaborative consumption schemes and alternative ways of delivering value to people can be explained by the existence of well-known concepts such as libraries, laundromats, car rental companies, families and friends passing on children's clothes etc.

In addition to products and their idling capacity, people also possess many skills and would like to share them or trade them with others, at the same time better utilising their life experiences and capabilities, extending their social network and learning from others (e.g. ourgoods.org). Another human feature is that people might get easily bored having the same art on the walls or sport equipment at home for several months, and therefore seek to organise swapping events and bartering networks (e.g. a designer Peter Viksten gives away free art in Sweden).³

In addition to normative institutions, also *cognitive institutions* play role. The cognitive institutions address the learning processes that help individuals understand and make sense of reality. Individual cognitive processes, including decision-making with regard to production-consumption and the environment, are rather group-oriented and are affected by social norms prevalent in the society. Some of the cases in this article offer useful insight into how cognitive processes of individuals could be shaped into more sustainable direction if they are targeted by specific strategies and activities.

For example, in the case of Danish island Samsø a large network of different actors was created, comprising the administrators of the energy project, local citizens, farmers, small businessmen, the municipality, and the national government (MESPOM 2009). However, from the beginning, many actors were reluctant to engage in the project. The project leader took the initiative and established Samsø Energy Academy in 2007, which became a meeting place for local residents and tourists. Knowledge and engagement of the project leader created a high level of trust and close relationships among the project players and community. More importantly, everyone had a chance to get involved in the decision-making process from the very beginning. General public participated in the meetings where the decisions on the electricity and heat supply, transportation and technology alternatives, infrastructure, costs, payback times, and avenues for participation were made. In addition, a number of information campaigns and activities took place including training, house calls by energy advisors, open house visits, and working groups

³ <http://www.trendhunter.com/trends/art-you-cant-own-designer-peter-vikstens-free-art-happening-in-sweden>

with the municipality, project managers, and utility firms (MESPOM 2009). Local authorities were also involved in bringing together different actors and founded the Samsø Energy Company together with the Farmer Association, Samsø Energy and Environment Office, and the Commercial Council. Although some training was needed in order to involve local craftsmen in the energy projects, islanders already had most of the capacity needed to participate. This fact has also contributed to the increased acceptance and the sense of belonging to and ownership over the project. As more and more inhabitants became involved, social pressures to join instead of “free ride” also helped to empower participants.

The role of innovative value creation models for sustainable living

While product and process innovations are still needed for businesses to stay afloat and be able to gain competitive advantage, business model innovations are recognised as particularly important since they offer an often underutilised source of future value (Amit and Zott 2012), and are particularly crucial when it comes to sustainability transitions (Whisnant 2013). Following the tentative characteristics of IVMs in the beginning of this paper, one of the fundamental distinctions between traditional business models and IVMs is that IVMs normally include environment, well-being and quality of life as purpose of the IVMs in addition to economic values and financial profit. This section seeks to critically analyse IVM examples from the four consumption sectors and discuss whether this is always the case.

In the *energy and housing sector*, the substitution of traditional fossil fuel based systems with renewable energy plants for the generation of electricity, heat and hot water delivers climate and environmental benefits due to the avoidance of GHG and other pollutant emissions linked to the combustion of fossil fuels. In addition, direct engagement of energy users in the generation of renewable energy increases their awareness about environmental and climate change challenges and improves their knowledge on more sustainable energy solutions. Moreover decentralised renewable energy production and supply has positive implications for energy security provision, local socio-economic development via rural diversification and employment creation.

In the *food and drink sector*, the provision of organic food directly to consumers particularly by more environmentally friendly transportation means (e.g. biogas vehicles, electric cars or bicycles) reduces environmental impacts from consumers travelling to the store by car. In addition, the customers are likely to purchase less of conventional food products, the production of which entails the use of pesticides and chemical fertilisers, hormone treatment, monoculture cropping that leads to biodiversity and soil fertility losses, and intensive livestock production with associated environmental pressures. Moreover organic food consumption has positive implications for human health and well-being. However, if the customers continue using car to satisfy other shopping needs and/or purchasing non-organic products from other sources, environmental benefits of this model can be somewhat undermined.

In the *mobility sector*, the choice of different mobility options combined with real-time information hold a promise to affect levels and patterns of consumption and resource use in society by reducing reliance on private car use and instead sharing the use of other means of transport, both public – buses and trains and private – car sharing and ride sharing options. This promise holds true if people abandon private car ownership and use integrated mobility systems instead and not in addition to using own car.

In the *consumer goods sector*, one important feature of the discussed IVMs is that they search for new ways to create value without using more resources. Swapping and leasing enables individuals to get access to products and satisfy their needs without purchasing new ones. Efficient re-use, recycling and upcycling strategies have a potential to reduce a need for the production of new goods and therefore reduce resource use and environmental pollution associated with the production processes. However, not all products might be suitable for swapping, leasing or reselling due to hygiene as well as cultural values.

Reflections on cross-sectorial differences and similarities between IVMs

A number of *similarities* can be identified when looking across sectors and IVM examples, which are discussed below.

First, all analysed IVMs have shown the potential to contribute to more *sustainable living* and reduce environmental impacts along one or more steps in the product or service value chain including production, consumption and the end-of-life. In addition to direct impacts on the promotion of more sustainable lifestyles among consumers, IVMs often make indirect contributions through their actions towards increased *awareness* on environmental and sustainability issues among their users and other related stakeholders. This occurs either through targeted campaigns (e.g. organic food and drink festivals, sharing information on the Internet about healthier and more environmentally sound diets or GHG emission reductions linked to the purchase of used goods instead of the new ones etc.) or by engaging new actors into IVMs (e.g. energy users participate in renewable energy generation through their membership in a cooperative).

Second, while all IVMs have shown a potential to deliver environmental and socio-economic benefits, some of them may be better suited than others in terms of supporting sustainable lifestyles. The success largely depends on how IVMs are implemented, as there is always a risk for *rebound effects*. For example, often people use integrated mobility schemes in addition to private cars and not instead of car ownership or they sell used goods on the second-hand market in order to upgrade to a new product and not just get rid of goods they do not use. In the latter cases redistribution markets could increase consumption and associated resource use. A recent study of eBay traders found that “an opportunity to get rid of things” and “cleaning out” are the main drivers for selling used goods online (Clausen et al. 2010).

Third, when analysing and comparing IVMs in all sectors *the role of ICTs* becomes critical. In many cases ICT fulfils the role of enabler for IVMs, which otherwise would not be functional or would have a reduced outreach to their customers and therefore doubtful competitive advantage. For example, both cases from the food and drink sector use food orders via Internet in addition to more old fashioned bookings via telephone or in person, which helps the IVM actors optimise their food deliveries and to cover a broader geographical area. In the mobility sector, the IVMs would simply not be functional without the Internet. In consumer goods sector, the majority of peer-to-peer markets operate through online platforms. This concerns not only ordinary buy-sell markets, but also exchange, sharing and leasing of goods. Besides ICT facilitated social networks, ICT support learning from other companies and soliciting feedback on the companies' actions. Networking is arguably important for new behavioural trends such as peer-to-peer consumption and product reuse and upcycling.

Fourth, an important factor observed throughout IVM cases, which supports their competitive advantage on the market against the established businesses, is *convenience*. It is evident that IVMs seek for new and more comfortable ways of delivering products or services to customers (e.g. customers of organic food box schemes make their orders online from home and get the food delivered to their doors; the users of Blocket buy or sell goods any time of the day or night regardless of the opening hours in retail).

In addition to the described similarities between IVM cases and consumption sectors analysed, a number of *differences* have also been identified. In studies of systems of innovation in different sectors, Malerba (2005) demonstrated that differences exist between *sectorial systems of innovation*. Therefore, it is important to analyse whether there are sectorial differences also among business models. Earlier studies indicate that in some sectors, mostly among *business-to-business (B2B) market relations*, large disparities are observed in the level of penetration/dissemination of IVMs, such as product service systems. Chemical management services penetrated 80% of car manufacturing sector and selling “power by the hour” takes place in 50% of aeronautic companies (Mont and Emtairah 2008).

In the current study, the first main difference between various IVMs refers to *market relations* they represent. Some models include business-to-consumer (B2C) markets, e.g. organic food supply to the customers, integrated mobility systems, others operate on consumer-to-consumer (C2C) basis, e.g. online second-hand markets for goods, sharing markets etc., others represent consumer-to-business (C2B), e.g. co-production of renewable electricity and selling it to the grid, or business-to-business markets (B2B), e.g. the case of Interface documented elsewhere (Mont and Emtairah 2008).

Analysis of IVMs in *B2C markets* presented above demonstrates that there might be sectorial differences among IVMs when it comes to dynamic processes, actors and institutions. However, analysing *C2C or peer-to-peer examples* innovation transcends the sectorial boundaries. Blocket, eBay or Netcyclar are virtual platforms where various types of goods and services are being sold or exchanged. Another example includes C2C sharing schemes when people share a stock of products with an idling capacity. What distinguishes IVMs from traditional business models is the fact that often *new actors* might be involved beyond the boundaries of the sector. Therefore the focus of analysis of such models should be on the dynamics and transformation of particular societal functions (e.g. provision of mobility rather than selling cars).

Conclusions and future research

Conclusions

The primary purpose of this paper was to open a new research agenda on IVMs and the role they might play in a transition to more sustainable living. This article showcased good practices of IVMs and concluded that they have a potential to support sustainable living and foster sustainability transitions since they often search for resource dematerialisation, alternative market places and contribution to social capital.

IVMs offer alternative to traditional business models ways of organising production and consumption by engaging actors other than conventional business players, including public actors and individuals. What also distinguishes IVMs from traditional business models is the fact that new actors might often be involved beyond the boundaries of the specific industry sector.

Three types of institutional dynamics has been discovered in IVMs: 1) a changing role of consumers who take an active role in customising the design of the products they consume and might as well facilitate the production of goods on demand; 2) an active role of consumers in the production of utility; 3) a dynamic engagement of individuals in the systems of collaborative consumption.

While IVMs have a potential to deliver environmental and socio-economic benefits, and contribute to more sustainable lifestyles of people, this potential depends on the way they are implemented and could be limited by associated rebound effects.

ICT is found as an important enabler for the majority of IVMs, without which their performance and functionality might be seriously undermined. Besides, many IVMs seek to deliver a higher level of convenience to customers during their order of a product or service (e.g. home delivery of products ordered online, 24/7 access to online platforms etc.), which can be seen as one of the strategies to achieve competitive advantage on the market.

IVMs are found to have a potential to catalyse a broader system change by either triggering other companies to consider alternative ways of satisfying people needs, by initiating a change in social norms and values or by driving a change in regulatory or economic institutional frameworks. One way for governments to support IVMs that are not built on the premise of selling more material products is, for example, by extending producer responsibility along the entire product life cycle. This would reposition consumers as users, where products are hired/leased/rented rather than purchased for as long as the product is needed.

Future research

While this paper sheds some light on the environmental implications of IVMs and their potential to foster sustainability transitions, there is still a need for deeper research on the ways in which IVMs influence everyday lives and prevailing institutional frameworks. In particular, the implications that the promising IVMs have for consumption patterns, consumption levels and more sustainable lifestyles and practices should be further investigated.

Another area for further research is a deeper investigation on how IVMs connect mainstream businesses with social entrepreneurs and their ways of delivering value to people. Particularly interesting issue to explore is how mainstream businesses perceive ideas of collaborative consumption actors and social innovators, and what role incumbent actors play in shaping online and physical peer-to-peer markets, as well as markets for social innovation and community-based services.

Questions of the economic sustainability and financing schemes of IVMs are also important to explore. Examples of potential research questions could be the following: How can the emergent IVMs be supported by cross-financing? What is role of the government in this regard? What is the role of 'impact investors' in enabling and collaborating with social and eco-innovation entrepreneurs? What are the mechanisms and the role of crowd-funding for shaping the landscape of social innovation and collaborative consumption.

Our analysis also demonstrates the importance of building values and developing infrastructure for collaborative networks and sharing systems to be embedded into everyday choices. This might lead to higher acceptance of such IVMs particularly in the cultures with values based on possessive individualism. Many intriguing research questions could be explored in this regard: Are examples of sharing networks a sufficient step towards more sustainable lifestyles, or whether steps towards simplifying and dematerialising our lifestyles even further are needed. Another question is whether the current policy climate enables such IVMs or serves as a barrier, and what policy mechanisms are needed to provide an opportunity for people to participate in sustainable non-technical innovations. The last question is what implications these schemes have for mainstream businesses, i.e. do they pose a threat, an opportunity to learn and innovate not only products, but also services and integrated systems; is this a way towards a collaborative economy where companies provide experiences to communities of prosumers (producing consumers) who actively participate in creating experiences for themselves and others?

Last but not least, although it has been shown that the theory on socio-technical transitions can be applied to explain the evolutionary dynamics in IVMs and co-evolution mechanisms, there is a need for deeper research on the role of IVMs in socio-technical transitions and sustainability transitions in particular, which needs to be supplemented with additional theoretical insights, e.g. drawing from network and organisational ecology theories.

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Discussant Contribution

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The two papers fit well within a workshop that aims to bring together approaches from different participatory and bottom-up endeavours, as both papers explore consumption (and production) niches represented by case studies, to then understand pathways towards local consumption transitions. I will briefly summarize the key points of each paper, discuss strengths and weaknesses, as well propose some areas for discussion that hopefully link the two papers together.

Backhaus and van Lente look at four policy initiatives aimed at supporting more sustainable food consumption routines, including an organic label, a food waste reduction initiative, a food 'license' to promote healthy eating among children, and finally the edible city, a public urban garden initiative. To analyse these case studies, they draw from transition research, organizational science and 'sense-making', as well as institutional change frameworks. They focus on what they call 'institutional entrepreneurs' or people who play a role in legitimizing the creation of institutions. The goal of the paper is to uncover the assumptions, appropriations, and actions of these actors, in an analysis of written texts and spoken discourse. The authors then try to link these initiatives to different 'human nature' prototypes.

The case studies are presented in sufficient detail, with the authors focusing in on how these efforts towards more 'sustainable food consumption' draw from and reinforce certain assumptions, and how the different actors involve interpret them. They note a distinction between efforts to provide information, versus efforts that engage people in forms of demonstration. In the discussion, the authors uncover three main narratives that are promoted through the case studies: *homo eco-economicus* (economic and ecological man); sufficiency ideas; *homo economicus moralis* (economic and moral man). One immediate question that came to mind was whether people can embody more than one 'narrative' when faced with different consumption contexts, and what the implication of this may be. Are we coherent? The authors also show how the case studies inspire three types of principles: green consumption, sufficiency, or collective experimentation. One of the main findings is that certain assumptions can be unacknowledged but valued implicitly by those involved, which in some cases reinforces the *status quo* (i.e., un-sustainable consumption). What happens if they are made explicit?

In the Voytenko and Mont paper, the authors look at Innovative Value Creation (IVC) models or novel forms of exchange that consider environmental and social values. Their goal is to showcase different IVC practices and discuss implications for more sustainable consumption. They draw from innovation systems, business model innovation, social innovation, and socio-technical transitions – merging business and social innovation studies. Ten case studies are briefly presented from among four consumption sectors. Their analysis considers different factors, including actor-network dynamics, where they note that IVCs tend to represent a shift to product-based services (e.g., car sharing over ownership) or integrated systems (e.g., platforms that offer integrated mobility services).

Through the case studies, they show that new actors seem to be entering established sectors and creating entirely new sectors, which may lead to new 'rules of the game' in a prevalent regime. In terms of institutional dynamics, new IVCs both come from and cause changes in an institutional context, including policies but also norms and values, and what they call 'cognitive institutions'

or how people understand different processes. They also note how the role boundary has changed, from the sole category of 'consumers' and 'producers' to new roles such as co-production, co-creating alternative systems, production on demand, community-supported agriculture, etc. Briefly, the authors claim that IVCs tend to have an overall positive impact on the environment, with some caveats, as well as a positive impact on awareness. The article is engaging, in that a new perspective – that of IVCs – is proposed, but perhaps it would have benefited from less case studies presented in more depth, and a more narrow conceptual framework that might have shed light on one aspect of IVCs – either the changing roles and actors, or changing institutional contexts and values, or changing practices, for example.

As I am not an expert on the literature behind the conceptual frameworks of both papers, I cannot comment on their contribution to that literature, but will draw out three main discussion points:

1. Question of values and goals:

- Understanding the 'assumptions' in initiatives or the exact 'value' they seek to promote is a central theme in both papers, but one that merits exploring further.
- Are we clear about what values we need to put forward in the 'sustainable consumption' community, towards transitions? Beyond the general goals of 'social, environmental and economic values,' are there certain things that should be valued above others? This seems to be one of the main issues with 'sustainability,' being clear and explicit about value systems.
- The social and solidarity economy (SSE) has explicitly placed people and planet above profit, and the value system is very much emphasized both in theory and in practices. What can we learn from the SSE (also being approached as New Economics)? Should we be bridging with that community of researchers and practitioners? Is it important to place different economic activities in relation to the market economy, as opposed to other forms of exchanges (redistribution, reciprocity, etc.)
- In all case studies, I would challenge the authors to further consider: what is the ultimate goal we are trying to achieve? Are we getting to an overall reduction in consumption, or more consumption in a different way?

2. Question of power and responsibility:

- The papers also discuss how certain initiatives are being framed and how they appeal to different 'types' of people. It may be worth thinking about the question of power and responsibility.
- For example, is it the consumer who should choose organic? Is it the household that must decrease food waste? What if supermarkets were responsible for only allowing environmentally and socially sound products on their shelves, and do they have the power to do so? Do we need to 'consume carefully' or is the majority of food waste happening elsewhere, at retail level and in restaurants? What is behind overly moralistic messages about how everyday people consume?

3. Question of real impacts:

- In most cases, I would also be optimistic about the projects being discussed here, but measuring actual impacts would be necessary. Can impacts be measured? Are they being measured and against what indicators? Over what scale and time period?
- In the Nike offer, whereby consumers are invited to customize their sneakers, can we know for sure that this leads to less overall consumption? It seems hark back to notions of 'shopping as a identity seeking' popular in the 1980s and 1990s, with the added support of technology. In this example, are people really encouraged to buy less?

Discussion Report

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Derk Loorbach, serving as the session's moderator, opened the plenary discussion by challenging the group with the assertion that the proposed alternative models sounded very nice, but left a doubt of mere green washing of lifestyles without any real change further upstream in the production chain. Adding to this first observation, one participant equally questioned the real impact on lifestyles by pointing to the consumption habits prevailing among many young people focused on buying ever more, often low-quality clothes and gadgets. Yuliya Voytenko concurred that the sustainability contribution of the production and consumption models proposed in her paper indeed still needed to be examined in more detail.

Another participant raised the question how the examined product-service models might affect the workforce. The presenters replied that some of the models such as Community Supported Agriculture (CSA) schemes for example could also create new jobs locally.

With respect to the Backhouse/Lente paper, participants questioned the choice of the term 'organising principle' as opposed to alternatives such as 'discourse' as well as the distinction between the 'homo eco-economicus' and 'homo economicus moralis', pointing to inconsistencies in real-world consumption behaviour of individuals. In her response, Julia Backhaus clarified that her research examined the assumptions of humans that underlie the assessed campaigns and programs, not the consumption behaviour types as such.

Another participant asked about people's motivations to use innovative value creation models. Yuliya Voytenko explained that value creation is always one element of the motivation, while the wish to contribute to environmental improvement and provide social benefits often also plays a role. This intervention led to wider discussion about how to delineate some business models as model for 'sustainable living' linked to the underlying question how to define sustainability. Yuliya Voytenko explained that for their research the authors searched for models with some element of environmental, social or well-being concern, but did not quantify or measure it in any way. Derk Loorbach added a question of scale by asking how many people needed to be reached by any of the models for it to qualify as element of a wider 'transition'. Walter Wehrmeyer remarked that an overlap between the two papers consisted in the difference between innovation and transition. While he sees innovation is directionless, transitions have clear target, prompting the group to think about how to direct innovation. Derk Loorbach disagreed with this statement.

Gábor Király asked Julia Backhouse if she had also come across consumer identities based on non-consumption? She replied that non-consumption was included in the 'homo economicus moralis'. She also explained that non-consumption was an absolute no-go for projects which involve retailers, but could be included in church projects.

The last part of the discussion evolved around the pathway implications of the examined models, reflecting on conditions for mainstreaming. The two presenting authors and the discussant agreed that before thinking about scaling up, the innovative models need to be evaluated more thoroughly with respect to their social and environmental benefits. They also pointed out that strategic thinking about mainstreaming is already ongoing within some of the initiatives, but might not be the appropriate approach for others.

2a

**Individual and
structural
factors in
pathways for
sustainable
consumption**

Towards a governance of sustainability transitions

Giving place to individuals

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Abstract

Policies for sustainability transitions necessarily have three main characteristics: they are prescriptive with regard to dynamic societal processes, linked to the normativity of sustainable development, and are able to interlink both the societal and the individual levels. Taking transition management as a starting point, the paper elaborates that it cannot well address the second and third characteristic. We therefore suggest complementing transition management approaches with the individualistic capability approach and the more structural practice theory. We suggest a heuristic combination that places individuals back into the study of sustainability transitions and show with three suggestions how this might change research on and for transitions. Firstly, we propose to assess sustainability on individual, niche, and regime level; Secondly, we show that the crucial learning processes occurring in the transition processes can be better understood when interrelating the three levels; Finally, we elaborate that the governance of sustainability transitions necessarily has – at the same time – to foster free spaces for experimentation and to select those niches that are conducive to more instead of less sustainability.

Introduction

There are multiple on-going attempts to develop the necessary scientific knowledge to enhance policies for sustainability transitions, i.e. knowledge that supports the development of policies that further the fundamental changes needed in our societies for a shift to sustainable development (e.g. WBGU 2011, Shove and Walker 2007, Rotmans et al. 2001, Loorbach 2007). Considering however these scientific attempts' relatively weak performances in effectively supporting change on larger scales, it might well be assumed that these attempts remain incomplete, if not inaccurate. In the present paper we will identify which central elements are neglected in three of the most prevalent approaches that are currently used to scientifically ground the governance of sustainability transitions. We purport that these three approaches are actually a combinable set of approaches, which become in our understanding a promising bundle to ground a more effective and large-scale governance of transitions.

Sustainability transitions comprise a series of analytical tensions, the occurrence of which raised our curiosity. Consider, for instance, the following tension between the societal and the individual levels. Sustainability transitions have been defined as fundamental society-wide modifications that target on changing everyday behaviour of citizens/consumers. However – quite paradoxically – behaviour can only to a small part be explained as outcome of individualistic and rational decisions (Røpke 2009), but are rather enshrined in societal practices. In parallel, sustainability transition policies are inherently normative. Even though neither the objective nor the process of particular transition experiments and dynamics are pre-defined, hence they are meant to navigate in a space which is not defined by the normative stances of the initiators of the transitions, a governance of transitions can not avoid sustainability (i.e. intra- and intergenerational justice) as its overarching target. Most concepts of justice, though, are – as most normative ideas – individualistic in the sense that it is the improvement of an individual's condition that the implementation of the justice concept is evaluated against. By extension, sustainability transitions are thus societal phenomena targeting to improve (inter- and intra-generational) justice at societal level, but which is measurable only at an individual's level.

As a consequence of these tensions, we argue that transition governance should be conceptually enriched in order to be able to relate to both, i.e. the societal and the individual level. It is precisely the conceptualisation of this bridge between individual and societal levels which we want to explore in the following paper. Developing policy-relevant knowledge clearly is a prescriptive task that can neither be based exclusively on description, nor on pure normativity (Bell 1988). Therefore, scientific advice for sustainability transition policies has to explain how societal transitions happen and how precisely those transitions can be selectively supported which strengthen sustainable development.

We present three different heuristics that we purport as being complementary with respect to their strengths and weaknesses and sketch how these could be conceptually linked to each other. (1) Transition Management (TM) has its focus on enhancing societal transitions towards sustainability and advises policy makers on how to encourage the building-up and mainstreaming of niches. As a heuristic TM is clearly prescriptive. (2) The Capability Approach (CA) aims at assessing the enhancement of social justice based on human well-being, and strives to account for the interaction of societal and personal factors and a motivational mix. As a partial theory of justice (Sen 2009), the CA clearly is normative. (3) Practice theory (PT) disentangles human action as resulting from the interaction between meaning, material, and skills. PT provides us with the analytical capacity to develop a reading at meso-level of how change occurs and evolves, and as such is inherently descriptive.

In other words, our attempt is to ground the prescriptive governance of normatively-defined transitions on a rich description of change(s). We implicitly argue that the strengths and weaknesses of these three heuristics – CA, TM and PT – can be fruitfully combined into a meta-heuristic which will allow to re-situate the individual into the conceptualisation of societal transitions and which will help to address the normativity-gap of current TM-approaches. Considering that none of the three approaches are considered as being fully elaborated theories, we refrain from a discussion of these three approaches in their full theoretic depth: we rather use them as a three-folded heuristic basis which allows us to develop an enriched (meta) heuristic of transition governance.

Contrasting their respective strengths, each heuristic has blind spots, too: (1) TM fails to distinguish the normative content of sustainability transitions, has no concept of the individual engaging in transitions, and a perhaps naïve understanding of the power of niches for the mainstream. (2) The CA has, in its core, remained a static concept of well-being analysis; herewith, it is not apt to deal with societal dynamics and even less with prescriptively induced transitions. Furthermore, the CA – being individualistic in its fundamental perspective – has no

theory of the societal which makes it ill-suited to handle societal issues such as policies for sustainability transitions. (3) PT, finally, describes changes in practices as complex processes, which makes it difficult if not impossible to identify leverage points for changes. Moreover, PT – being in opposition to individualistic models of human behaviour – has difficulties in integrating aspects of human freedom as they are expressed, for instance, in conscious decisions. PT has hardly a normative dimension – it may therefore not distinguish whether a practice is more or less sustainable, or if a transition is a good or a bad thing to happen. PT fundamentally argues to understand societal evolutions as resulting from the deep entanglements of many factors and conditions, and does therefore offer little insights on the identification and ordering of those factors, conditions and levers, even while the identification of such interrelationships would in the end facilitate to use PT for policy-making.

Our paper is structured as follows. We will first present each of these three approaches at a glance, emphasising those parts that are particularly fruitful to our argument of interlinking. Then, we elaborate how a combination of these approaches can achieve three tasks that science for sustainability transitions should achieve: (1) assess niches and mainstream practices on their contribution to the societal aim of sustainable development, (2) address how social learning can change individual motivations and social practices, and (3) support the mainstreaming of sustainability-enhancing niches.

Theoretical background – taking a glance at the heuristics

Transition Management

Transition studies and sustainability transitions

Rotmans and Loorbach define transitions as radical, structural changes of societal (sub)systems (2009: 2). Following Rotmans, Kemp and van Asselt (2001, p. 16), transitions “can be described as a set of connected changes, which reinforce each other but take place in several different areas, such as technology, the economy, institutions, behaviour, culture, ecology and belief systems”. Transition research, aiming to develop analytical tools that take into account the complexity of societal systems and their mechanisms of innovation, combines innovation studies, history, and ecology with sociology, political and governance studies as well as psychology (Wittmayer et al. 2013). In more detail, Markard et al. (2012, p. 955) distinguish four different theory strands of transition studies: technological innovation systems (e.g. Bergek et al. 2008), the multi-level perspective (MLP) on socio-technical transitions (e.g. Geels & Schot, 2007), strategic niche management (Kemp et al. 1998) and finally transition management (e.g. Loorbach, 2007; Rotmans et al. 2001). The first two aim at analysing and describing transitions as processes of radical and structural change focussing on transition dynamics. The latter two are rather prescriptive and focus on issues of agency and how actors (can) influence transformation processes, yet including insights on transition dynamics, too.

The multi-level perspective, as a shared analytical concept, differentiates three levels to analyse changes: the landscape (macro level), the regime (meso level) and the niche (micro level) (Rip & Kemp 1998). The regime, as the underlying societal structure, can be understood as “a conglomerate of structure (institutional and physical setting), culture (prevailing perspective), and practices (rules, routines, and habits)” (Rotmans and Loorbach 2009: 2). A niche is built up by a small group of actors differing from the regime and is a place where radical innovations may occur (Geels & Schot 2007: 400). The landscape in turn is thought of as the exogenous context, which is hard to influence, like e.g. global trends (climate change, urbanisation) or globally shared norms (human rights) (Schneidewind & Scheck 2012: 49).

Changes in societal systems do appear frequently; they can be slow and small, or fundamental and operating at fast speed. However, with respect to orienting our societies onto a sustainability pathway, the prevailing changes are too incremental and slow, hence are not

considered substantial enough by many scholars to cope with today's sustainability challenges (Markard et al. 2012: 955). "The MLP proposes that transitions, which are defined as regime shifts, come about through interacting processes within and between these levels. Transitions do not come about easily, because existing regimes are characterized by lock-in and path dependence, and oriented towards incremental innovation along predictable trajectories. Radical innovations emerge in niches, where dedicated actors nurture alignment and development on multiple dimensions to create 'configurations that work'" (Geels, 2010: 495). Transitions, as shifts of the regime, happen due to three basic reasons: top down, when landscape developments put pressure on the regime to change; bottom up, when niches scale up and become dominant; and, third, when learning processes at the regime level lead to an integration of innovations from the niche level into the regime (Rotmans & Loorbach 2010: 137 f).

With regard to sustainability transformations, i.e. radical transformation towards a sustainable society (Grin et al. 2010), the situation is even more difficult: even when there is a radical, structural change, historical studies of transitions have shown that these often not have led to a more sustainable society (Rotmans and Loorbach 2009: 2). Sustainability transitions require a fundamental change in the structures, cultures, and practices of a societal system for the system to become (more) sustainable (Frantzeskaki and Haan 2009). Rotmans et al. (2001) refer to the fostering of sustainability transitions as transition management.

Sustainability transitions and transition management

Transition management (TM) is an explorative and participatory process addressing 'persistent' or 'wicked problems' and searching for long-term sustainable solutions (Rotmans et al. 2001, Loorbach 2010). 'Persistent problems' are based on failures of societal systems, which can only be overcome by a restructuring of these systems, i.e. a transition (Rotmans & Loorbach 2009). Following Loorbach, the TM framework provides the basis for manage transitions in an operational sense: it is "flexible enough for adaptation but prescriptive enough to be functional in practice" (Loorbach, 2010: 172). Following Wittmayer and Schöpke (2013), TM is based on action research (Loorbach et al. 2011), as well as on other research approaches such as Integrated Assessment (Rotmans 1998), Post-Normal Science (Ravetz 1999) and Sustainability Science (Kates, Clark et al. 2001). It puts forth a number of prescriptive tenets to manage complex systems (e.g. Loorbach 2007).

Rather than assuming that societal change processes can actually be 'managed' as the name implies, transition management holds that sustainability transitions cannot be governed in a regular way. Due to their open-endedness, non-linearity and uncertainty, sustainability transitions require an iterative, reflective and explorative way of governing aimed at societal learning (Frantzeskaki et al. 2012, Loorbach 2010). Transition management is such a reflexive governance approach. It can be understood as "a multilevel model of governance which shapes processes of co-evolution using visions, transition experiments and cycles of learning and adaptation. Transition management helps societies to transform themselves in a gradual, reflexive way through guided processes of variation and selection, the outcomes of which are stepping stones for further change. It shows that societies can break free from existing practices and technologies, by engaging in co-evolutionary steering." (Kemp et al., 2007, p. 78) (cp. figure 1). Transitions need to be directed towards sustainability, although sustainability is never a given but always the outcome of negotiation, debate, competition and experiment. (Loorbach 2007: 80). Hence, quality criteria regarding the process are considered more important for sustainable development than pre-defined understandings or end-states (ibid.).

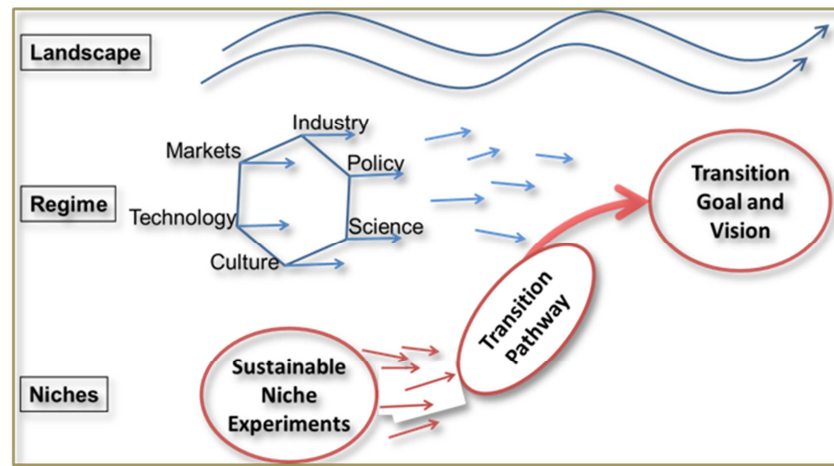


Figure 2: Multilevel perspective on sustainability transitions (changed from Geels and Schott 2007)

As radical innovations in niches are core sources of possible radical system changes, they play a central role in transition management. TM aims to provide space and resources for experimentation at a sufficient distance from the dominant regime which shall empower niches and allow for the development of alternatives (Avelino 2011, Loorbach 2010: 168). A diversity of niches built up can together create an alternative regime (Rotmans & Loorbach 2009: 5). “The ultimate goal of transition management should be to influence and empower civil society in such a way that people themselves shape sustainability in their own environments, and in doing so contribute to the desired transitions to sustainability” (Loorbach 2007:284).

While TM can build on existing niches, its specificities are highlighted even more when TM is used to create transition arenas and develop them further to influence the regime (cp. figure 2, Loorbach 2007, 2010). In the TM process, a group of individuals (called frontrunners) come together in a series of meetings to agree on a problem description, formulate guiding principles for a sustainable future, and determine pathways for how this vision is to be achieved. In a first step therefore a transition team, as an interdisciplinary group of researchers, is built to analyse and prepare a transition management process (cp. Figure 2). The actual starting point in a TM process (step 2 in figure 2) is to structure or reframe an existing societal issue in a way that allows for a deep and integrated understanding of problems by all involved (Wittmayer & Schöpke 2013). This is done by the frontrunners, who, together, form the transition arena. These frontrunners are not selected due to principles of representative participation, but with regard to their possible contribution to a process of radical transformation. Therefore criteria for their selection are: willingness to learn, openness for innovation, ability of complex thinking, authority in their community, ability to look beyond disciplinary boundaries, as well as ability to establish and explain visions of sustainable development within their own networks (Loorbach 2010). Based on the shared understanding of the present, a common sustainable future is imagined for the system in question, e.g. a city, a sector or a region (Loorbach & Rotmans 2010). Building on this vision, possible pathways to realize it are explored, and concrete steps for the realization are backcasted. Thereby long-term vision and short term actions are connected into a transition agenda (step 3). In a next step (step 4), frontrunners start short term actions and experiments to realize the developed vision.

Building up a broadening network of diverse actors that engage in the debate, thinking and experimenting, creates the conditions that allow for the formulation, up-scaling and possibly even the breakthrough of innovations (last step in figure 2). The whole process is constantly monitored and evaluated by the transition team.

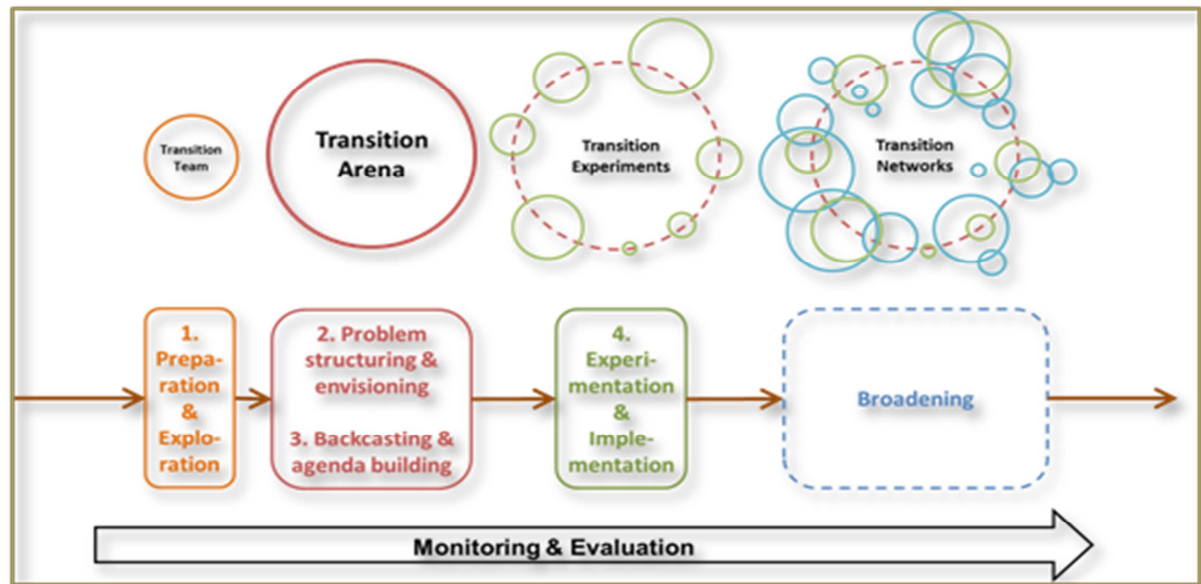


Figure 3: Transition Management process (Wittmayer 2013 referring to Roorda et al. 2012)

By implementing TM in a structured action research process, new insights emerge on individual and societal levels and are implemented and reflected upon in a continuing process (Wittmayer et al. 2013). The objectives of the transition arena “should be flexible and adjustable at the system level. The complexity of the system is at odds with the formulation of specific objectives and blueprint plans” (Loorbach 2010: 167). The developed vision and agenda always need to be adapted to new insights and development during the transition process. Therefore TM avoids a too early selection of innovations and keeps options open to learn about alternatives before selecting (Rotmans & Loorbach 2009: 6). This allows for an adaptive, open and participatory process of vision development, which at the same times shall contribute to sustainability.

Although TM has concrete impacts, e.g. the implementation of the agenda agreed in the arena, one major aim is the facilitation of collective and individual learning which leads to changing discourses and related attitudes of (dominant) actors (Loorbach & Rotmans 2010). There are different forms of learning discussed, all of which are supposed to include a lasting change in the interpretive frames (belief systems, cognitive frameworks, etc.) guiding the actions of a person (Grin and Loeber 2007; Grin et al. 2010; cp Wittmayer et al. 2013). A basic differentiation is done between first and second order learning: first order learning is based on gaining new knowledge, while underlying assumptions, values and identities remain the same (Argyris and Schön 1978; 1996). Second order learning is considered to be most relevant in transition management (Wittmayer et al. 2013). It involves learning processes including changes in fundamental values and assumptions. These learning processes are at the basis of fundamental change and adaptation processes and allow dealing with complexity and uncertainty, e.g. through collaborative action and dialogue (e.g. Schein 1993; Garmendia & Stagl 2010). Second order learning is assumed to be one possible precondition for voluntary intrinsic behavioural change (Wittmayer et al. 2013). Grin and Loeber (2007) see a) surprises, b) outside views, and c) safe spaces as the most important stimuli for second order learning. Learning and concrete actions in turn are connected: ‘learning-by-doing’ and ‘doing-by-learning’ (Loorbach 2007: 81).

Strengths and weaknesses of transition management for sustainability transitions

The challenge explored in this section is to analyse to which degree TM addresses the challenges of sustainability transitions i.e. that are prescriptive, linked to the normativity of sustainable development, and are able to interlink both the societal and the individual levels.

1. TM aims at structural, societal transitions and has been practiced in a variety of policy fields (Avelino et al. 2012, Verbong and Loorbach 2012), on regional and urban scales

(Roorda et al. 2012, Wittmayer et al. 2011) in the Netherlands and beyond. It focuses at enabling radical changes of societal systems, building on an understanding of the interplay between different levels of societal structures.

2. TM furthermore provides an interventionist approach building on empowering alternative niches as it translates descriptive knowledge of complex systems development into tenets and instruments of transition governance. In linking theoretical knowledge and practical engagement when enabling transitions (Rotmans & Loorbach 2010: 140 f.), it goes beyond traditional understanding of sciences.
3. As one of its major contributions, the TM framework provides the basis for managing transitions in an operational sense. The transition management cycle and the transition arena methodology allow undertaking concrete management steps, that are “flexible enough for adaptation but prescriptive enough to be functional in practice” (Loorbach 2010: 172).

Nevertheless, criticisms of TM led to a productive scientific dialogue and an emerging stream of critical transition researchers (Jhagroe 2011, Avelino 2011, Jhagroe & Wijsman 2011, Eshuis, et al. 2012, Van Steenberghe & Wittmayer 2012, Wittmayer 2012, Jhagroe & Frantzeskaki 2012). With regard to the challenge of this paper, we identify 3 major blind spots.

1. TM does hardly deal with questions of power. TM has been met with critiques with regard to issues of power, politics and democratic legitimacy (Shove & Walker 2007, 2008, Duineveld et al 2007, Smith & Kern 2008, Smith & Stirling 2008, Hendriks 2007, Meadowcroft 2007). E.g. Shove and Walker (2007: 764ff) argue that too little attention has been paid to the processes of negotiation of the goals. “Stakeholder selection and power dynamics highly influence the goals and visions and undermine the assumption of shared societal and environmental goals” (Feiner & Wesely 2012: 3). Duineveld et al. (2007) are concerned by researchers having a ‘double role’ which can be prone to obscuring the analysis (Duineveld et al. 2007) as well as to possessing definitional power on how issues are framed in the participatory process (Avelino 2011). Although an empowerment of niches and frontrunners is a core aim of TM, it remains unclear what exactly is meant by this empowerment and what it can be built upon (ibid.).
2. TM falls short of distinguishing the normative orientation of change. TM is claimed to be “explicitly a normative model by taking sustainable development as long-term goal” (Loorbach 2009: 163). Rotmans and Loorbach furthermore recognize that this explicit normative orientation is crucial, since past transitions would often not have led to a more sustainable society (Rotmans & Loorbach 2009: 2). Despite of focussing explicitly on sustainability issues, the TM concept has witnessed critique of its understanding of sustainable development as being rather blurred (e.g. Smith & Sterling 2008, Smith & Kern 2008). As the transition management methodology puts the concrete definition and valuation of sustainability in the hands of the participating frontrunners (Rotmans & Loorbach 2009: 10), a more substantial definition of sustainability cannot be found in TM literature. The approach neither describes how frontrunners get confronted with the normative concept of sustainability nor does it propose methods to assess sustainability visions developed by participants against more scientifically grounded understandings of the approach. This may lead to sustainability becoming completely negotiable, and therewith random, at niche levels.
3. TM neither has a clear concept of the individual engaging in transition experiments nor a basis for assessing changes occurring within the individuals. Although TM focuses on participation of so called frontrunners, and social learning is a major aim of it, it has no clear concept of why and how individuals engage in these transition experiments in terms of a psychologically founded behavioural or learning model. Since the participating frontrunners are essential to develop innovations with regard to strengthening sustainability, a concept of the individual should include – besides the

characteristics cited above – questions of values, motivations and reasons for action. This extended focus might help to assess intra-individual changes with regard to sustainability awareness or motivation prompted in the learning processes facilitated in the TM process¹.

In the following we present the capability approach, which – in its core – is a normative and individualistic approach and therewith may provide further insights on the last two blind spots.

The capability approach

The capability approach: normative and individualistic

The capability approach (CA), as developed by A. Sen and others, has been designed as a model to measure human development differently than by relying on resource availability (e.g. such as income), basic needs' fulfilment (e.g. such as food, shelter), or subjective well-being (e.g. such as happiness). It rather is an individualistic approach (cp. Robeyns 2005), but uses a model of humans that is more open than the mono-dimensional model of homo oeconomicus currently underlying many social sciences (cp. Ingebrigtsen & Jacobsen, 2009). First, the CA can be differentiated from resource-oriented approaches as it considers that resources, although important, do not determine what constitutes human development or flourishing, because people differ in their abilities and possibilities to use an identical amount of resources. Secondly, the CA differs from basic-needs approaches: although fulfilment of some socially determined basic needs is important, needs differ from person to person and the freedom to decide which needs to meet how is an important well-being factor for each of us. Thirdly, the CA is not merely subjectivist: subjective well-being is important, but (a) sometimes, people adjust their life to low levels of objective standards of living, and (b) it is part of our human agency to also want to do something that does not only contribute to our, but also to others' well-being.

The CA gives overriding value to the substantive freedom of each individual to live a life one values or has reason to value, defined as capabilities. Capabilities depend on the availability of resources, but also on the personal ability to use those, as well as the social and environmental factors enabling such use (cp. figure 3). Understanding the freedom to live a valuable life as the basic quality of life, the CA offers both, a structure to better understand what individuals require in order to lead a valuable life as well as a framework to evaluate whether policy measures or societal developments such as sustainability transitions contribute to enhancing the freedom of people. The CA does take it for granted that individuals are not only motivated by enhancing their own well-being through improving their standard of living or that of their family and friends, but that people also commit themselves to enhance the well-being of others (Sen 1987). This openness to pro-social motivation (and behaviour) is important in the sustainability discourse, as sustainable development essentially is about intra- and intergenerational justice.

In each of the categories, well-being and commitment to other goals, the CA takes multidimensionality of human goals and realizations for granted. In both motivational categories, it is relevant for individuals which of their goals they can realize (or, in the language of the CA: which functionings they can achieve), but also, whether they have the real freedom to choose among different goals (or: whether they have a large capability set). Resources are a basis for this freedom, but the capability approach pays attention to the personal, cultural and environmental conversion factors that humans require to convert resources into freedoms. An example of personal mobility could illustrate this concept along figure 3: Cycling to work as an achieved functioning could be a realization of a goal of own health, but could also meet other-regarding aims taking into account the bike's CO₂-neutrality, silence etc. Cycling to work requires certain resources (first of all: a bike) and is enhanced by the conversion factors such as

¹ This would also contribute an answer to Loorbachs' call, that transitions need to include new "societal systems that combine freedom of individual development and innovation with (selection) criteria related to collective goods and future developments" including processes of "changes in perceptions, routines, practices and beliefs at the level of individuals" (Loorbach 2007: 81).

gender norms (e.g. allowing women to use bikes), traffic culture (e.g. in Copenhagen or Amsterdam), protective regulations, and by an appropriately moderate climate and land profile. Political measures aiming at promoting the use of bicycles herewith can therefore increase individual freedoms to meet goals of personal and others' well-being in different ways than just by focusing on resources. At the same time, forcing everybody to go by bike would restrict the capability set and herewith lower personal freedom.

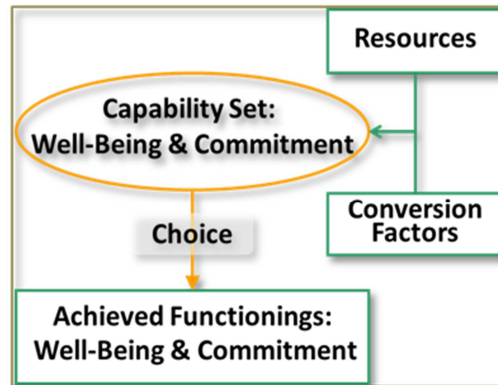


Figure 4: A simplified representation of the capability approach

This implies that real freedom includes the availability of resources, i.e. environmental assets (Polishchuk and Rauschmayer 2012), but also social institutions, individual skills etc. to convert these resources into capabilities. Herewith the capability approach is a means to structurally define the idea of a good life in a culturally and historically independent way (cp. Giulio, Brohmann et al. 2012). This structure can be used to specify a good life non-paternalistically in concrete situations as shown by the example of personal mobility above, but it can also be mobilized for conceptions of justice and can herewith be useful for conceptualising sustainable development (Ballet et al. 2011, 2013, Sen 2013, Rauschmayer and Lessmann 2013). In this sense, intra- and intergenerational justice can be measured by capabilities instead of using subjective metrics, such as pleasure or preference, or objective metrics, such as income or access to other resources² (Gutwald et al. 2011). Practically, though, this encounters the problem of operationalization: what exactly are the valuable dimensions of human well-being? Are there thresholds? Are the dimensions (partially) commensurable?

Sen and Nussbaum have developed different versions of what is called the capability approach (cp. Sen, 1985; Nussbaum, 2011). Sen and Nussbaum agree that the evaluative space of what is valuable for human life, i.e. the goal of public policy, is multidimensional. While Sen does not define these dimensions (he argues that this should only be done in context-specific democratic deliberations), Nussbaum has – in a preliminary consensual process – defined a list of fundamental capabilities which she thinks is essential for any good human life and which any government should guarantee for its citizens³.

Strengths and weaknesses of the capability approach for sustainability transitions

The challenge explored in this section is to analyse to which degree the CA addresses the challenges of policies for sustainability transitions i.e. that are prescriptive with regard to dynamic societal processes, linked to the normativity of sustainable development, and are able

² Within the current sustainability indicators, nearly only environmental indicators deal with intergenerational aspects. They are motivated by resource-views (ecosystem goods), but also concern environmental conversion factors (Polishchuk and Rauschmayer 2012). Social and individual conversion factors are rarely represented as sustainability indicators.

³ According to Nussbaum (2000, 2011), the ten central capabilities refer to: life, bodily health, bodily integrity, senses, imagination and thought, emotions, practical reason, affiliation, other species, play and control over one's environment.

to interlink both the societal and the individual levels. Here, the CA's main attractiveness might result from its clear stance on normativity: its aim is to foster human flourishing, conceived of as an enhancement of individual capabilities. In this sense, capability-based assessments have been widely used to monitor societal achievements. The most prominent example for its evaluative use is the World Development Index, but the CA has also been used to measure inequalities due to gender, age, or education (Lessmann 2012). The CA can also be used prospectively, i.e. to predict effects of specific measures on human development. CA provides a quite straightforward analytical avenue to sustainable development, i.e. development aimed at human flourishing of all current and future people (e.g. Sen 2013). This first-level understanding is however not without problems when analysed more sharply (Lessmann and Rauschmayer 2013). When measuring sustainability achievements at two points in time, the capability-based assessment approach is, in principle, able to discriminate between sustainable and unsustainable developments.

On the other hand, the use of the capability approach for sustainability transitions encounters several drawbacks:

1. As an evaluative concept, the capability approach is limited to comparative statics. Herewith, it cannot capture the highly important dynamic and reflexive processes happening during sustainability transitions.
2. The CA has no theory on societies, governance, group deliberations, etc. The importance of public discourse (Alkire 2006) as well as the interdependencies of individual capabilities (Drèze and Sen 2002) have been acknowledged, but the capability approach essentially remains a normatively, methodologically, and ontologically individualistic approach. For the moment, the CA only has a very rough (and controversial) understanding of collective capabilities (e.g. Ibrahim 2006), misses hence an understanding how the interaction of individuals in groups creates capabilities that can enhance the flourishing of each member in a way that could not have been achieved without this interaction.
3. The CA is based on the assumption that individuals decide consciously and individually on their behaviour – it neglects more structural approaches that see individual behaviour much more as a result of structural forces than of conscious individual decisions (cp. Shove 2010 on her critique to individualist behavioural models – see next section).

These factors make the CA unsuitable to deal with aspects of societal transitions to sustainability. In particular, the three flaws make it difficult to deduce prescriptions for societal processes from an analysis based on the CA alone. At the same time, and in sharp contrast to practice theory, the CA allows predictions of well-being effects. CA furthermore offers an approach to justice and normativity that is richer than most other approaches used in social sciences and closer to operationalization – notably for evaluations and assessments of individuals' trajectories - than most other philosophical approaches to justice (such as Rawlsian theories of justice – Sen 2009).

Practice Theory

Practice theory in short: a change in focus

When calling for change and transitions in contemporary societies, a rather straightforward question is: change of what exactly? While it is the outcomes of our human activities – be it in terms of pollution, emission or health hazards – that are obviously targeted in a results-based approach, it is more difficult to find an answer when we look at the generators of these outcomes: Is it individuals, societies, or something else that generate the outcomes? Classic socio-economic approaches invoke basic aggregational principles and conclude that if the necessary change is recognized to be societal, then the analytical foci are those individuals that compose a society. It is thus individual behaviour which should be taken as the correct analytical

unit of change. However, the more progressive approaches – even in the realm of economics (e.g. see evolutionary and ecological economics) – have since long critiqued the focus in economics onto individuals, and be it only because such a focus has all too often implied to accept the existence of certain forms of individual rationality as being explicative of societal dynamics. Practice theory (PT) has been developed to bridge individualistic (*homo oeconomicus*) and structural (*homo sociologicus*) approaches (Reckwitz 2002); it sees human behaviour as being embedded in a conjunction of individual, structural, cultural, and technical elements. This modification of the analytical focus onto the level of integrative (Schatzki 1996) practices allows accounting for the change in configurations of material, cultural and socio-economic items that define daily life (Southerton 2009) as well as routinized doings. Besides of this theory-based argument, individuals tend to see their life as being composed of a series of interrelated practices such as cooking&eating or moving&travelling, instead of a set of behaviours as consumers or as choice agents; a fact which Røpke (2009) sees as a major argument to employ that very filter of reading for analytical work too.

Applying a practice focus on societal transitions allows de facto to describe the occurring change as a co-evolution of innovations in material artefacts, socio-economic conditions, organisational and institutional re-configurations, but simultaneously to account for evolutions in collective and individual values, moral interpretations, lifestyles, social capital, body activities, emotions, knowledge (Shove et al. 2012; Reckwitz 2002). In this sense, practice theorists and scholars might be particularly well equipped to investigate transitions that go beyond the introduction of mere technological innovations, and which encompass a profoundly socio-technical reading of contemporary societies.

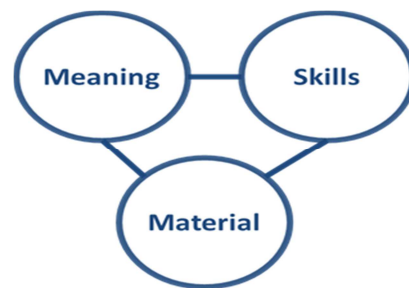


Figure 5: The three elements of practices (inspired by Shove 2003)

At least since Warde (2005), practice approaches have become the reference in consumption studies, notably because they can be very explicative of what consumers do, say, think they do, say they do, mean to do. Shove (2003) has equally brought practice approaches to some prominence with extensive case-study work in the area of consumption studies. Her description of the evolution of cleanliness, hygiene and comfort shows the profoundness and richness of understandings which can be gained from observing and translating everyday practices over time and space, and by accounting properly for the meanings, skills and artefacts that ground practices (cp. figure 4). In effect and by definition, practices are neither homogeneously distributed over a society, nor identical from one individual to another, nor consensually perceived as such. Problematic for case study work then is the definition and delimitation of what a practice actually is, and Reckwitz's (2002) heuristic approach that "practices exist as provisional but recognizable entities composed of recognizable conventions, images and meanings; materials and forms of competence" does not necessarily provide an operational blueprint to proceed to classification and identification work. Indeed, while some authors (Spaargaren 2003, Southerton et al. 2004) apply a very broad categorisation of (social) practices (e.g. eating, sleeping, moving), others use practices as a heuristic while working on relatively

confidential alternative phenomena (e.g. vegetarianism, collaborative sharing). Additionally, on theoretical level, Schatzki (1996) introduced dispersed practices to account for generic (horizontal) behaviour in societies such as for instance consuming, contemplating or explaining. Shove introduces bundles and complexes of practices to account for either loose “co-location and co-existence” (2012: 17) or the more integrated and “co-dependent” (2012: 17) aggregation of practices into peoples’ lifestyles. This aggregational conceptualisation can be of particular interest if – as in the present case – the interactions between the regime (of social practices) and whole bundles (or complexes) of alternative niche practices are explored.

Strengths and weaknesses of Practice Theory in the light of sustainability transitions

The challenge when thinking PT in the light of transitions is to analyse to which degree practice approaches can address the main challenges of governance of sustainability transitions i.e. be suitable for prescription and notably with regard to dynamic societal processes, be linkable to the normativity stance of sustainable development, and be able to interlink both the societal and the individual levels.

Inserted in their particular web of meanings, skills and artefacts (Shove 2003), practices change over time and are diffusing over space. Practice approaches reveal complex pictures of the entanglement of everyday life. The paradoxical downsides of this being that practice approaches have difficulties (Warde 2005) to accurately account for change; more precisely, to identify the sequence of what change in meanings (or skills or artefacts) preceded or even cause what evolution in skills (or meanings or artefacts). Causalities or consequential delimitations are rather impossible to be recognized from practice work. Most operationalizations, including work by primary scholars in practice approaches (e.g. Shove and Walker 2010), mirror this very difficulty by the fact that their descriptive work is only shallowly usable to deduce any form of interventionism or governance approach or prescription. This does not mean that the question of the steering or governance of practices is not seen as being a primordial one; quite the contrary, as many of the current practice scholars are very actively trying to investigate this space. To give an example of the problems they face: while it is rather easy to observe the changes in the intimate cleanliness-related practices of bathing, showering and flannel-washing (here referring to its main artefacts), PT does not allow ‘predicting’ which policy intervention on which aspect of the entangled elements of the practice might be successful to lower the CO₂-emissions due to those cleanliness practices. With respect to our investigation into transitions and their governance, such a fundamental difficulty provides actually for an entry point to link practices with transition management approaches, which are per definition oriented towards interventionism.

On a second level, practice approaches reveal inherent difficulties when used to conceive assessments of the sustainability of practices. While it is rather straightforward to assess and rank the practices of bathing, showering and flannel-washing according to the CO₂-emissions related to their use of hot water, this may already be different in terms of their complexities when referring to these practices’ embeddedness in other practices (e.g. urban living) or when attempting to assess climate-impacts of the wider practice (e.g. of cleanliness). A much wider difficulty lies however in the fact that Practice approaches can, e.g., observe and describe the societal shift to more frequent leisure flights along the different skills, artefacts, and meanings related to this change in practice. However, PT will neither be able to assess the effects of these multi-dimensional changes on the well-being of the people effectuating this shift in their practice, nor on the well-being of the world’s poor or future generations. Under no circumstances could it be said that participating to ‘more’ practices would be better than being involved in less, nor whether more conscious participation to practices would be better than a totally passive induction of practices. With other words, it will be impossible to judge the impact of measures targeting a shift in practices against criteria stemming from intra- and intergenerational justice precepts.

In the end, PT can contribute to improve our understanding of sustainability transitions by providing a framework which we can use to produce a more complex picture of everyday changes that are lived by individuals but develop into some form of coherence (and hence, their *raison d'être*) only at the societal level. However, PT has no normative standpoint – it may therefore not be easily used to distinguish whether a practice is more or less sustainable and whether a change in practices is conducive or not to more human wellbeing. As it rather highlights the complexity of human behaviour, practice approaches cannot be used to deduce proposals for leverage points for behavioural changes – PT is neither prescriptive nor interventionist.

Heuristic assemblage – interrelating transition management, practice theory and the capability approach

It might seem to be a heroic undertaking to combine such different approaches. The objective of our effort needs thus to be clarified. What we do not intend, not even think of, is to develop the ground for a theoretically sound overarching approach to change. What we rather have in mind is to present an eclectic assemblage of heuristics, the combination of which can be used to guide prescriptions for governing sustainability transitions which are both normatively assessable and linking the individual to the societal dynamic.

Above we developed the specific strengths of the three approaches: Practice theory is well performing at rendering the bigger picture by highlighting the complexities and entanglements of human activities. The interrelations between skills, material artefacts and meaning can be used to observe macro-societal change (e.g. analysing meta-practices such as food provisioning) as well as on the level of collectives or groups which practice non-mainstreamed activities (e.g. analysing the introduction of “Veggie Thursdays”). These meso-level activities, i.e. meso-level practices which involve collective agency, might be those that transition management approaches are focussing on. A rich body of experiences building on rich descriptions of case studies has emerged on the configuration of what is addressed in TM as being niches, e.g. how collaboration and learning happen, how niches impact on the mainstream. The capability approach, in quite a complementary fashion to practice approaches, offers a very clear conceptualisation of the individual; CA allows to foster our understanding why individuals engage in these activities, and how participation to such collectives can impact on individual wellbeing. By extension, CA can be mobilized to comprehend how such engagement could be strengthened or even made more effective in terms of its impact on individuals' capabilities. In effect, the capability approach offers a normative framework for sustainability-related assessments.

Figure 5 illustrates somewhat a simplification of our heuristic assemblage. Starting from the top, the societal urge for transitions appears because obvious ‘unsustainable’ practices (in blue) prevail and should somehow transform into ‘sustainable’ ones (in green). While PT can be mobilized to analyse the entanglements between skill, material and meaning of both kind of practices, PT does not help us to distinguish between sustainable and unsustainable practices, nor does it really allow us to prescriptively devise – i.e. to steer and govern – a world of blue practices into a world of green ones. It is here that TM comes into play as the body of experiences and experiments with the management and mainstreaming of transition arenas (i.e. niches). Still TM cannot be used to determine the sustainability of niches; it merely purports a promise to enact change. The sustainability assessment of practices on the level of niches and on the level of regimes can be undertaken through CA-based assessments at the individual levels. The latter CA-based level of evaluation also renders a picture of the reasons of such niche-level engagements, and - by extension - how transition governance could facilitate such engagement and make it more effective.

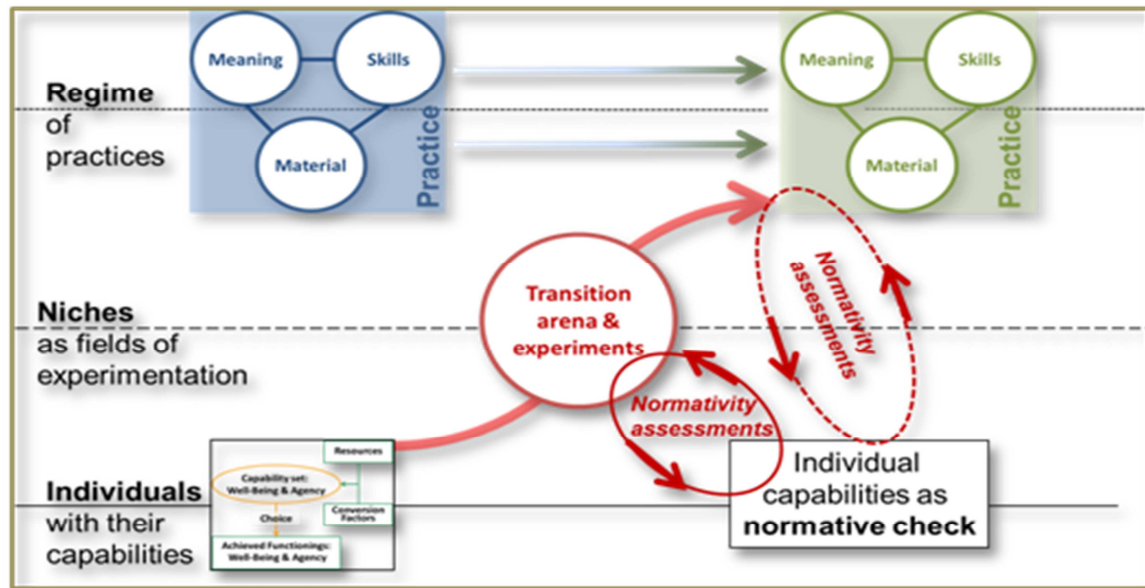


Figure 6: Assembling practice theory, transition management and capability approach for governing sustainability transitions

While much of our intuitive heuristic assemblage remains unexplored, we focus in the following to critically assess whether the interplay between individual and societal (and meso) levels that the assemblage wants to generate might further our understanding of the governance of sustainability transitions. We develop this critique while further developing three specific proposals that are enabled by the heuristic assemblage: (I) As policy advice for sustainability transitions needs a normative foundation, we link transition governance at the meso- and the macro-level back to the individual level. (II) Social learning in those transitions is an interaction between the meso-level (dealt with by TM) and the individual level (CA). (III) Finally, the governance of niche practices is critical for the societal success of transition management and places itself at the intersection of meso- and macro-level, or TM and PT, respectively.

Spelling out three proposals along the heuristic

Sustainability assessment: involving the individual

Sustainability transitions have a normative aim: sustainability. As a consequence, one has to be able to discriminate between sustainability-oriented transitions and other-oriented transitions – or, as this won't be a black and white distinction, between the degree of progress towards sustainability that a transition aims to achieve, is achieving or has achieved (ex ante, ad hoc, or ex post assessment). Independently of the moment of assessment, of whether sustainability is seen as inherently multi-dimensional or has the potential to be aggregated to one single final objective (and hence become measurable with a single index), a normative measuring rod is required to make such an assessment possible. What could be the source of such normativity?

The Brundtland Commission report (WCED 1987) sees the source of normativity in principles of intra- and intergenerational justice, measured at the level of the needs of the world's poor and of future generations. Even though the report has an unclear understanding of needs, it implicitly aims at achieving and guaranteeing the fulfilment of a minimum level of individual needs. The report's normativity originates from a consequentialist worldview (i.e. improving individual quality of life) coupled to a set of systemic conditions (i.e. preservation of ecosystems, appropriate socio-economic systems etc.) which are means to this end. The basic measuring rod for sustainability transitions should therefore be a measurement of life quality (Costanza et al.

2007, Rauschmayer et al. 2011), focussing on the attainment of these minimum thresholds by all and forever.

Against such an understanding of sustainability, it seems appealing to use the capability approach as a basis for assessing the achievement of basic quality of life (de Vries & Petersen 2009). Alkire (2002) analysed several proposals of what people currently consider as relevant dimensions of quality of life (or human development) and she concluded that there was a large overlap between economic, sociological, psychological, and philosophical analyses. Conceptually, it is tempting to extend the scope of this endeavour to future generations (cp. Sen 2013), but this is bound to difficulties, not the least one being that we can say only little about the capabilities of future generations. It is then inevitable to develop models of how individuals depend on ecological and socio-economic systems and of how these will evolve over time (Lessmann and Rauschmayer 2013). Based on these models, one might then develop indicators to measure the probability of achieving these means to the end of a decent human quality of life for future generations. The discussions in the EU “Beyond GDP”-initiative (e.g. European Parliament 2011), the Stiglitz-Sen-Fitoussi commission (Stiglitz et al. 2009), or the recent German Enquete Commission on growth, welfare and quality of life (Enquete Kommission, 2013), have shown different ways how this can be done on a macro-level – even though not necessarily in a theoretically consistent way.

The challenge to develop consistent assessments of sustainability on all levels (individual, niches, regimes) necessarily brings to the fore a more complex mix of process-, output-, and outcome-related criteria – nearly all of them being proxies for the quality of life of future generations and partially also of the world’s poor (cp. Rauschmayer et al. 2009 on process- or outcome evaluation). Evaluation criteria which target the outcomes of transition processes – in parallel to standard outcome-oriented criteria such as decrease in CO₂-emissions – could therefore also include perspectives such as ‘changed psychological settings’, ‘changed material use in practices’, or ‘societal performance of niches’. Some scholars of sustainability research (e.g. Leach et al. 2010) tend to refrain from all kind of outcome-related sustainability assessments and focus on process-related criteria instead. This may be due to an increasingly arbitrary use of the concept of sustainability, but also to the impossibility of predicting future states of quality of life. Process-criteria are merely proxies for the ultimate objective of sustainability – or, they relate to different, non-consequentialist understandings of normativity, such as discourse ethics or libertarian perspectives. How to practically assess niches? Transition management (as well as other parts of sustainability research) emphasises the necessity to make assessments in a participatory way – notably to foster the possibility for learning (see section 4.2 below) and to facilitate the change of meaning of practices (see section 4.3).

However, transition managers tend to be cautious to confront the participants of proto-niches (i.e. the so-called transition arena participants) with a priori normative perspectives, as this might lead to reactance from participants. This caution is related to the tension inherent in the action research design of transition management: on the one hand, the organisers of the management process are just organisers, facilitators, and moderators and should therefore adopt a normatively neutral position. On the other hand, TM has an explicit normative aim and the organisers are obliged – and often motivated – to foster this target (cp. Wittmayer, Schöpke et al 2013). Looking more deeply into the CA, a way to handle this tension might become visible. Along the lines of CA’s differentiation between concerns for one’s own well-being and commitments to others, one may interpret sustainability concerns as concerns for the well-being of others. Then it is possible for the TM facilitators to try to strengthen sustainability concerns not as a limitation to concerns for one’s own well-being, but to empower participants in their freedom to pursue other-related goals. When combining the CA with results of environmental psychology (see e.g. Schöpke and Rauschmayer accepted), transition managers should design interventions that target the normative and consequentialist side of sustainability transitions (i.e. highlight intra- and intergenerational justice as being the meta-objective of the local or sectoral process) as to enhance the agency freedom and agency achievement of the participants.

This could be done through helping the participants to see possibilities how they can contribute to the well-being of the world's poor and of future generations. Niche participants might then become more aware of – or even value higher – the well-being of these distant people.

Intrinsically, we propose to explicitly maintain a normative and content-related character to transition governance. The freedom of participants and non-participants of sustainability transitions can be strengthened by referring to the needs of unborn people or the world's poor in a way that stimulates and enhances that part of human agency that is geared towards the well-being of other people. Many methods targeting this motivational change⁴ rely heavily on aspects of social and individual learning which is the topic of the next subsection.

Social learning for sustainability transitions: empowering individuals, creating alternative niches and changing practices

Social learning is of relevance at three different levels: the individual level, the niche level and the regime level. Briefly stated, at the individual level, social learning can contribute to empowering individuals as well as to raise their awareness and motivation for sustainability-related activities. At the niche level, learning can contribute to the development of alternative ways to solve complex challenges, to innovations and therewith – indirectly and potentially - to the empowerment of niche participants. At the regime level, learning processes are part of adaptation and change processes of practices, and therewith one possible core source of transitions. At the same time learning processes at the different levels are interlinked: e.g. alternatives coming up as results of learning processes in a niche provide a changing context for individual development and learning. And changed societal practices at the regime level in turn provide different contexts for the development of alternative niches.

Within sustainability transitions, innovative niches are meant to play an essential role. In such niches, reflexive governance approaches - like TM – attempt to stimulate innovations notably via processes which focus to foster the social learning of engaged 'frontrunners'. To comprehend changes initiated at the level of these individuals, it might be important to grasp the learning processes facilitated by TM. Among these learning processes, social learning as been described as a source for the emergence of the (radically) new, of empowering niches and individuals and of influencing how sustainability is valued in the transition process. Three very basic questions raised by Bennet and Howlett (1992) help to structure an analysis of social learning: (I) who learns, (II) what is learned and (III) what is learning supposed to contribute to?

(I): Looking at niches, we focus at the individuals that learn. E.g. in a TM process facilitating the development of transition arenas as proto-niches, it is the participants as well as action researchers that learn. But, as said, learning never is a purely individual experience, but happens in a social setting (Del. 4.1, Wittmayer et al. 2011: 19f; Wittmayer 2013 b), linking the individual and the collective level.

(II): Within social learning processes, one can differentiate two⁵ different orders referring to what is learned: first-order learning is based on gaining new knowledge, while underlying assumptions, values and identities remain untouched (Argyris and Schön 1978; 1996). Second-order learning includes changes in fundamental values and assumptions.

(III): The latter learning processes are at the basis of fundamental change and adaptation processes and allow dealing with complexity and uncertainty, e.g. through collaborative action and dialogue (e.g. Schein 1993; Garmendia & Stagl 2010). Second-order learning processes are

⁴ Concretely, this could mean to include moments of deep questioning (Naess 2000, e.g. through why-laddering, Wittmayer et al. 2011), of dialogues (Buber 1995), dynamic facilitation and wisdom councils (Rough 2002), systemic constellations (Sparrer 2007), sociocratic or holacratic facilitation (Charest 2009) or further forms of process work (Mindell 1995). In June 2011 one of the authors organised a workshop, funded by the European Science Foundation, where more than 20 researchers applied the named and additional methods to find out whether and how those are suitable for facilitating sustainability transitions (see Omann, Bohunovsky et al. 2011).

⁵ Other authors differentiate three learning orders (e.g. Hall 1993).

equally and traditionally taken as important in any innovative process as they assure that improvement – or change, or new products – is critically reflected upon on its way towards institutionalisation and generalisation. Furthermore second-order learning is supposed to be one important source for voluntary behavioural change (Wittmayer et al. 2013), which in turn is of core importance in the light of aiming for radical changes towards sustainability transitions.

Looking more into TM as an approach to facilitate niches development, Rotmans and Loorbach (2009: 10) explain that transition experiments have a social learning objective aiming to contribute to sustainability goals in a significant and measurable way. Nevertheless they do not define these objectives in a more explicit way then stating that all sustainability dimensions (economic, ecological and socio-cultural) should get addressed. As outlined above, within TM there is a strong reliance on the participating frontrunners to decide on how to deal with sustainability. This brings up the question, what kind of learning experiences may lead to a contribution to sustainability goals. Here we distinguish two basic directions: (1) participants can discover new or more effective ways of realizing an (already) intended sustainable development and (2) participants can gain insights which make them more aware of sustainability issues and more motivated to address them in the TM process. In the first case social learning as well is contributing to TMs' core aim of empowerment of individuals and niches (Wittmayer et al. 2013, Schöpke & Rauschmayer 2012).

But learning (and empowerment) depends on the participating individuals and is not necessarily connected to sustainability, drawing attention to the second case: social learning in connection to values, worldviews, motivation and awareness related to sustainability. As Schöpke and Rauschmayer (2012) put forth, the learning and empowerment process needs to get connected to a raising awareness and motivation on sustainability issues. The concept of social learning in general describes this change, as it is not just about finding "new facts and a better understanding of relations and impacts but [...] a way to shape our values and reflect on assumptions and limitations behind our knowledge" (Garmendia & Stagl 2010: 1714). But: again not all kinds of learning including value and worldview change can be considered to be connected to sustainability awareness and motivation. Rauschmayer and Omann e.g. highlight the need for deep changes including strengthening the intrinsic sustainability motivation of actors (2012) in opposite to extrinsic motivations (Kasser 2010). Hedlund-de Witt (2013) very recently showed how only certain worldviews are positively related to sustainability motivation and behaviour. This may as well form a basis to further develop facilitation techniques to allow for second-order learning that works towards empowerment and raising sustainability awareness and motivation like.

In the TM methodology there is a focus on providing the conditions for innovations to arise in these learning processes – e.g. via selecting frontrunner for participation or via the envisioning process – to contribute to radical changes. Only very recently TM projects explicitly address the normative orientation of TM towards sustainability as part of the process; and therewith as part of the social learning experience. Wittmayer et al. propose to facilitate a learning journey to render sustainability relevant for the local context in which the TM project takes place (Wittmayer et al. 2013). They refrain from addressing sustainability directly, e.g. by introducing the concept to the TM process, but relate the envisioning and agenda setting to sustainability via stimulating thinking of participants in four dimensions: environmental and social thinking, time horizon (long- and short term) and interregional thinking (Wittmayer et al. 2013).

Finally, the analytical lens of social learning could help to link the individual- and niche-level learning to the dynamics occurring at the level of practices. Social learning processes in niches – which are partially building on and partly generating changes of values, worldviews, awareness and motivation at individual level - can influence practices at the niche level. This would in principle happen in all three constituents of a practice: skills, material artefacts and meaning. In effect, alternative niches involve the emergence of a particular meaning with respect to the practice at hand. This emerging meaning is supported by learning processes in as far as learning can contribute to change values and/ or worldviews. Similarly, the empowerment of individuals

in niches may build on learning at the level of the development of new skills (c.p. Pick and Sirkin 2011). Last but not least, alternative niches may involve learning to use new material artefacts or to use given artefacts differently.

The governance of niches: heaving alternative practices into the mainstream

Empowerment and social learning at the individual levels are fundamental objectives in TM-like activities, and which co-define almost per definition a capability-based assessment of emerging practices. Simultaneously, the dynamics (e.g. of social learning) as well as the very existence and feasibility of TM-experiments is dependent on a series of collective phenomena which exceed the individual levels of participants or their simple agent-based aggregation. The very foundation of TM-experiments is to see niche practices, i.e. agreed doings by individuals in specific groups responding to particular conditions, inspire the (r)evolution of the general, routinized way of doing, i.e. the regime practices. Beyond the question of the individual and his potentially enhanced and enriched capability-set, lies the question of what the impact, inspiration, and interpersonal learning is that could be generated via niche-level practices. The collective nature of such niches needs to be credited. In our own terminology, this question evolves into how alternative niche-level practices contribute to reconfiguring unsustainable practices. In the background of this question, on whether and how 'niche practices' with their collective form of organisation influence 'mainstream practices', stands not merely the concern of gaining insights into such dynamics, but situates the fundamentally prescriptive question of the governance of the niches, i.e. on how to steer niche practices in a way that they contribute to the emergence of renewed sustainable regime practices.

The dynamics of emergence and diffusion of the practices of existing, non-experimental, self-governed alternative collectives, i.e. collective alternatives which exemplify 'organically-grown' niches, paradoxically enough could provide a series of up-front insights into the existence and position of potential governance levers. Investigating the meanings, skills and artefacts at niche-level practices provide for a certain comprehension of the "configurations that work" (Kemp et al. 1998) which a governance approach would need to address. A considerable amount of scholarly work is thus devoted since recent into accumulating such knowledge on the specific level of grassroots innovations (Seyfang & Smith 2007), within general processes and activities of social innovation and in our case directly within TM-experiments (Avelino & Rotmans 2011). While a systematisation and theorisation of this empirical, case study-based knowledge is still to be developed (Seyfang & Smith 2007), a series of 'conditions' or 'factors' start to be agreed upon in literature.

First, the fundamentals of the emergence and diffusion of niche dynamics have been identified to build among others on the importance given within the collective niche practices to the creation of alternative (to pure monetary) value for the local community, e.g. local jobs, fair trade, fair wages, but also pride, recognition, belonging. A second factor which has been identified repeatedly relates to the significance attached by individuals to the collective character of the niche practices, in particular for instance because the collective enables the niches to develop risk-sharing arrangements. Both factors link, if translated into CA terms, to the joint realisation of other-regarding motivations instead of the quest for own well-being (cp. Mock et al. 2013). A third element is the existence of mechanisms within the collectives which enable and protect the capitalisation of personal and inter-personal knowledge and skills, as well as trust. Learning by doing - and in general second-order learning processes - as stimulated through TM, could be essential in this respect. Fourthly, the proactivity and vision-building which the collectives develop with respect to external catalysts - such as the openness of the technological systems their activities are embedded in or the circumventing of the legal and regulatory frameworks - has been identified as another factor. TM back-casting techniques try to integrate this prerogative. Finally, intra-niche and inter-niche deliberation and collaboration as cohesion- and meaning generating dynamics are crucially implied in the diffusion of niche practices.

With a sight on such ‘configurational’ elements of niche emergence and diffusion, practice approaches reveal not only their usefulness as a heuristic to organize case study descriptions. PT has been widely adopted (Cohen et al. 2013) to account for the apparent non-ordered entanglement of elements, i.e. the web of meanings, skills and artefacts, the co-evolution of structural and individual factors which are prevalent in such niches. As with PT in general, the step from descriptive and accumulative work on niche-regime dynamics into analytical and prescriptive developments reveals far from evident. This intrinsic difficulty with applying PT-grounded case study work to the configuration of governance mechanisms is reinforced by the very fact that grassroot and social innovations remain – and be it via their explicit character of being conscious alternatives to the mainstream – in many instances hostile (or at least suspicious) to interventionism by public authorities. Even progressive conceptions of the mechanisms of governmentality (e.g. Le Galès & Lascoumes 2012), which give considerable room to non-linear, multi-actor and indirect streams of influence of governance schemes on social phenomena, appear relatively unprepared to account for the complexity of avoidance, silent acceptance and partnership mechanisms that niche practices deploy with regard to public authorities in general, and with respect to the instrumentarium of institutional governance in particular.

Along the basic epistemological stance taken by TM, betrayed by its roots in innovation theory, which favours open to pre-determined objectives for its transition arena processes, the governance of niche-regime dynamics remains thus a widely open, normatively non-orientable field of action. Free experimentation in combination with the natural spirit of innovation and human ingenuity is not easily compliant with steering of practices towards the – even if loosely – predefined goal of sustainability. The governance of alternative niche practices hence most often remains a call for framework conditions (e.g. room for experimentation) which merely allow to foster more and wider collaborative experiments, more open spaces in peoples’ and collectives’ lives where alternatives to the regime can locally emerge and flourish, while remaining somewhat outside of any possibility to seriously threaten regime-level practices. Successful ‘organically-grown’ niches do profit quite directly from this generic ‘laissez faire’ with some of them surfing very elegantly the ‘grey zones’ left free of any direct governance interventions. Especially in urban environments such sustainability-inspired experimentation zones have however rightfully given raise to criticisms because of the socio-environmental inequities that such niches can carry (Swyngedouw 2010): access to experimentation can at least implicitly be negotiated only by those who have a particularly favourable set of capabilities, values, inter-personal linkages and social capital.

Conclusion

In this paper, we headed to address one of the most pressing policy challenges with respect to sustainability transitions. Scientific activities which are targeted to engage and enact on societal problems - and transition governance itself is one such activity - are necessarily prescriptive endeavours, have to recognize the fundamental normativity of sustainable development, and need to embrace the importance that individuals take in societal change.

We explored in which way a combination of three heuristics, with their respective strengths and weaknesses, might overcome the lack of an overarching theory which would allow providing the background for understanding sustainability transitions.

First, Transition Management has been developed to infer societal transitions, but TM cannot differentiate between sustainability-related outcomes and other outcomes of transitions. It is even one of the fundamental in-builds – and arguably strengths - of TM to leave the space of objectives open for negotiation and agreement to participants. Furthermore, beyond issues related to individual frontrunners and moderational capacity, TM does not have a sufficiently clarified understanding of those individuals who are participating in the transition experiments.

Second, the capability approach covers part of these normative and individual shortcomings; CA has been developed to provide for normative assessments based on individual human development. CA can – with obvious difficulties, but still – be adapted to be usable for sustainability assessments: CA is able to differentiate between self- and other-regarding motivations, the latter being of particular importance in any move towards more inter- and intra-generational justice.

But, CA-based models are static and contain no theory of societal phenomena. Therefore, they cannot really explain societal, dynamic processes such as sustainability transitions. Practice theory, finally, can be mobilized to describe changes at the societal level, indicating how social practices come about and change. At the same time, practice approaches have no normative foundations and have difficulties in determining causal relationships underlying change. Both aspects make it rather challenging to deduce prescriptive policy advice on the basis of PT.

We tried to show how a combination of these three heuristics could generate a heuristic assemblage which can be of use to describe, explain, assess and interrelate changes at the individual, the niche, and the regime level. We sketched how the indispensable sustainability assessment of transitions should be based on the individual, but comprehend also phenomena at collective, levels. Learning processes which constitute a major aim of TM experiments and are fundaments for enhancing capability-sets of individuals, also show the interrelatedness of individual and niche levels. The CA-based understanding of freedom, in particular the agency-freedom of pursuing other-regarding goals, might show a way out.

The governance of sustainability transitions therefore requires, *inter alia*, to focus on second-order governance, i.e. a governance that does not only concentrate on providing space for niche development and support to niche diffusion, but a governance scheme that can reflexively cope with the learning- and engaging-dynamics at individual levels on which societal sustainability transitions are necessarily relying on. At the same time, governance of sustainability transitions has to be normatively selective, i.e. be able to guide development in and of niches.

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Testing causal models of behavior to define pathways for change in organizations

Results from the LOCAW project

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Abstract

Patterns of unsustainable production and consumption have been recognized as main causes of climate change. The renewed Sustainable Development Strategy 2006 of the EU states that “the main challenge is to gradually change our current unsustainable consumption and production patterns and the non-integrated approach to policy-making” (European Council 2006, p.2). Despite cross-cutting multidisciplinary research and policy efforts in most European states it has not been possible to achieve significant changes in consumption and production which would reverse or slow down the devastating projections outlined by the Intergovernmental Panel on Climatic Change (IPCC) Fourth Assessment Report (2007) for our ecosystem.

The LOCAW project has as its objectives to advance understanding of the drivers of and barriers to sustainable lifestyles by an integrative investigation of the determinants of everyday practices and behaviors within large scale organizations on different levels: by analyzing the patterns of production and consumption in the workplace; analyzing organizational strategies to reduce emissions; investigate practices at work and their relationship to practices outside work; and the patterns of interaction between relevant agents and stakeholders in the organizations' environment.

In order to understand the determinants of (un)sustainable practices in organizations, the LOCAW project has studied social, organizational and individual factors influencing three categories of practices: the consumption of materials and energy, waste generation and management, and work-related mobility. In this paper, we have focused on individual factors affecting practices at work, and have shown how theoretical models hypothesizing relationships among them and complex causal chains can be tested through statistical methodologies such as structural equations modeling techniques. We briefly discuss these results.

Keywords: large-scale organizations; sustainable practices, causal models, individual factors.

Introduction to the LOCAW project

Patterns of unsustainable production and consumption have been recognized as main causes of climate change. The renewed Sustainable Development Strategy 2006 of the EU states that “the main challenge is to gradually change our current unsustainable consumption and production patterns and the non-integrated approach to policy-making” (European Council 2006, p.2). Despite cross-cutting multidisciplinary research and policy efforts in most European states it has not been possible to achieve significant changes in consumption and production which would reverse or slow down the devastating projections outlined by the Intergovernmental Panel on Climatic Change (IPCC) Fourth Assessment Report (2007) for our ecosystem.

This is also recognized by the progress report on the EU’s Sustainable Development Strategy 2008, which concludes that “although a wide range of actions is being initiated, there is only limited evidence in the area of sustainable consumption and production (SCP) that countries are scratching beyond the surface of this fundamental objective” (ECORY p.8). One year later the 2009 Review of the EU’s Sustainable Development Strategy highlights the fact that “despite considerable efforts to include action for sustainable development in major EU policy areas, unsustainable trends persist and the EU still needs to intensify its efforts” (p.15).

While some reductions can be made through carbon trading and other flexible mechanisms agreed upon under the Kyoto protocol, with some countries overachieving agreed-upon goals (see: European Environmental Agency, 2009), in the long term it is vital to enhance the efforts of individuals, organizations, and societies at large to reduce greenhouse gas emissions through changes in the patterns of production of goods and services as well as regarding their consumption.

Governments now recognize that climate change and its consequences need to be addressed by changing peoples’ behavior and everyday practices and that technological fixes alone will not be enough. Even where they can play a role the environmental effectiveness of technological “solutions” is contingent upon the way in which users engage with and deploy them (Midden, Kaiser and McCalley, 2007).

The LOCAW project has as its objectives to advance understanding of the drivers of and barriers to sustainable lifestyles by an integrative investigation of the determinants of everyday practices and behaviours within large scale organizations on different levels:

- a) analysing the patterns of production and consumption in the workplace with their resulting GHG emissions;
- b) analysing organizational strategies to reduce emissions and implement EU regulations regarding the “greening” of their production processes.
- c) everyday practices and behaviours at work of employees on different levels of decision-making within the organization.
- d) the relationship between behaviours and practices at work and behaviours and practices outside work.
- e) the patterns of interaction between relevant agents and stakeholders in the organization’s environment and the resulting barriers and drivers for implementing sustainable practices and behaviours in the workplace.

Sustainability research and models predicting sustainable behavior have, to this date, shown that these topics are highly complex and multi-faceted. Understanding the complex determinants of sustainable behavior and transitions to sustainable everyday practices in different life contexts of an individual requires multidimensional conceptualizations and the study of individual and contextual factors affecting behavior.

In order to map this complexity in a meaningful manner, the LOCAW project has undertaken the study of large scale organizations across Europe, both public and private, in order to understand

the barriers and drivers to achieving transitions to a low-carbon Europe. As workers, people spend a large amount of time in workplaces, in a community that holds the potential to influence behavior and to become a site for learning new practices. People also bring their values, identities, motivations and outside habits to work, thus also potentially transforming workplaces.

Each of the case studies of LOCAW focuses on one large scale organization in a different EU country. In four of the cases, the focus is on the everyday practices of the organization itself and the interactions between structural/organizational conditions and individual factors in generating barriers to and drivers for a sustainable transition to a low carbon Europe (the cases in Spain, Romania, The Netherlands, and Italy). While the interactions of the organizations with relevant outside agents forms part of the study of structural conditions in these cases, two case studies are ethnographic studies of two companies, including their management, their trade unions and their workforce. These two case studies will also look at the relationships between everyday behaviours at work and behaviours outside work (in the United Kingdom and in Sweden). The data obtained from all these case studies is then synthesized and fed into agent-based models from which policy solutions will be derived.

The role of individual factors in sustainable practices in organizations

Understanding the role of individual and contextual factors, and of their interaction, in determining behavior at work provides useful information in designing pathways for change. This requires information on the role of different factors and the weight they have in determining the final result.

The literature on the psychological influences on sustainable behaviour have mainly focused on individual level factors, because individuals have mainly been conceptualized as consumers. Also, the majority of existing studies have focused on behaviours related to household energy use and recycling and very few studies have specifically targeted work related behaviour (e.g., Lee, 1995). Among the individual factors considered relevant for sustainability-related behaviour, the most important ones are knowledge, motivations and ability.

Knowledge

While people are generally aware of environmental problems, and more specifically problems related to energy use (Abrahamse, 2007), although there is still confusion about the causal processes involved (e.g. Bord, O'Connor, & Fischer, 2000; Gorsira, Steg, Bolderdijk, & Keizer, 2009; García-Mira, 2009). Moreover, people know relatively little about the energy use associated with their daily behaviours and they tend to rely on simple heuristics when assessing it (eg. the larger the appliance, the more energy it is believed to use: Baird and Brier, 1981; Schuitema & Steg, 2005). People know relatively little about the energy use associated with water consumption (Schuitema & Steg, 2005) and the energy use related to the production, transportation, and disposal of products (Tobler, Visschers, & Siegrist, 2009).

Knowledge appeared to predict recycling at work: workers are more likely to recycle when they know what to recycle (Tudor, Barr, & Gilg, 2007). Tailored information is a promising tool to increase knowledge and to promote sustainable behaviour both at home and at work (Abrahamse, Steg, Vlek, & Rothengatter, 2005; 2007, Daamen, Staats, Wilke & Engelen, 2001).

Knowledge can be increased by providing people with feedback on their behaviour and the environmental impact of their behaviour (Abrahamse, Steg, Vlek, & Rothengatter, 2005). Feedback proved also to be effective in promoting energy savings of employees in companies (Siero, Boon, Kok, & Siero, 1989; Siero, Bakker, Dekker, & Van den Burg, 1996). Knowledge can also be increased through specific educational strategies (Vega & Alvarez, 2006).

Motivations

In general, motivational factors are not strongly related to household energy use. Socio-demographics, in particular income and household size, are much more important: higher income groups and larger households use more energy (Abrahamse, 2007; Gatersleben, Steg, & Vlek, 2002). This is true for direct as well as indirect energy use (Abrahamse, 2007), and for energy use in home as well as for transport (Poortinga, Steg, & Vlek, 2004).

Motivational factors are important for understanding intentions and willingness to save energy. People have a stronger intention to reduce their energy use when they have a favourable attitude towards energy conservation (Abrahamse, 2007). Attitudes towards energy conservation correlated strongly and positively with intentions to conserve energy at the workplace as well (Scherbaum, Popovich, & Finlinson, 2008).

Environmental considerations are not strongly related to intention to reduce household energy use. So, even though concern with environmental and energy problems is generally high in Western countries (Abrahamse, 2007; Poortinga, Steg, & Vlek, 2002; Schultz & Zelezny, 1999), people often do not act in line with their concerns, that is, many people attach a low priority to saving energy. This suggests that energy use and energy conservation are not only driven by concerns about environmental and energy problems. Many other factors play a role, such as status, comfort, effort, and affect (Stern, 2000). In general, people are less likely to reduce their energy use when saving energy involves high behavioural costs in terms of money, effort or convenience.

Motivational factors do play an important role when explaining specific environmental behaviours. For example, attitudes, norms and perceived behavioural control appeared to be predictive of travel mode choice (e.g., Bamberg & Schmidt, 2003; Heath & Gifford, 2002), the purchase of energy-saving light bulbs, use of unbleached paper, and meat consumption (Harland, Staats, & Wilke, 1999). Interestingly, car use appeared to be strongly related to symbolic and affective motives, while instrumental motives such as costs and environmental concerns were less important (Steg, 2005; see Gatersleben, 2007, for a review). Attitudinal factors correlate moderately with specific sustainable behaviours at the workplace (i.e., turning of appliances or lights when not in use; Scherbaum, Popovich, & Finlinson, 2008). Workers appeared to be more likely to recycle when they had favourable attitudes towards recycling (Tudor et al., 2007).

Various studies reveal that people are more likely to engage in pro-environmental actions when they endorse values beyond their immediate own interests, that is, self-transcendent, pro-social, altruistic or biospheric values, while egoistic or self-enhancement values are negatively related to pro-environmental behaviour (De Groot & Steg, 2007; 2008b; Nordlund & Garvill, 2002; Stern & Dietz, 1994; Stern, Dietz, Kalof, & Guagnano, 1995). Moreover, a higher environmental concern is associated with acting more pro-environmentally, although these relationships are generally not strong (e.g., Poortinga, Steg, & Vlek, 2004; Schultz & Zelezny, 1998). Also, pro-social value orientations might work jointly with group identification in predicting individual willingness to save limited natural resources, such as water (e.g., Bonaiuto, Bilotta, Bonnes, Ceccarelli, Martorella & Carrus, 2008).

Social norms can have an important impact on sustainable behaviours including household energy use (e.g., Nolan, Schultz, Cialdini, Goldstein, & Griskevicius, 2008). However, one study revealed that social norms were only weakly related to recycling at work (Tudor et al., 2007). Sustainable behaviour can be promoted by providing information on the behaviour of others (Goldstein, Cialdini, & Griskevicius, 2008), but social norms may also reduce the likelihood of sustainable behaviour. For example, people are more likely to violate a particular social norm when they see that others violate that specific norm as well (Cialdini, Reno, & Kallgren, 1990; Cialdini, Kallgren, & Reno, 1991). Also, norm violations spread, that is, when people see that a particular norm is being violated, they are more likely to violate other norms as well (Keizer, Lindenberg & Steg, 2008).

This suggests that it is of particular importance to study social norms related to sustainable behaviours. Information on the behaviour of others appears to be particularly effective if it concerns relevant others (e.g., employees from another company unit; Siero et al., 1996), while information on the

behaviour of generalised others proved not to be effective in promoting sustainable behaviour at work (Daamen et al., 2001). For example, a study by Carrus, Bonnes, Fornara, Passafaro and Tronu (2009) showed that descriptive “local” norms (i.e., the behaviour of other people very close to the individual, such as neighbours) might be important predictors of intentions to recycle.

Various studies revealed that sustainable behaviour, and more particularly car use, is habitual (e.g., Aarts & Dijksterhuis, 2000; Aarts, Verplanken, & Van Knippenberg, 1998; Klöckner, Matthies, & Hunecke, 2003). Fujii and colleagues found that temporarily forcing car drivers to use alternative travel modes induced long-term reductions in car use (Fujii & Gärling, 2003; Fujii, Gärling, & Kitamura, 2001) and was thus effective in breaking habits. The impacts of such temporary changes were particularly strong for habitual car drivers. Likewise, a work by Carrus, Passafaro and Bonnes (2008) found that past behaviour, together with anticipated emotions, is a significant predictor of intentions to recycle household waste and use public transportation to go to work, in addition to attitudes, norms and perceived behavioural control.

Ability

Individual ability and opportunities to engage in sustainable behaviours strongly depend on the structural and organisational factors discussed above. However, structural and organisational factors may be perceived and experienced differently. Therefore, it is not only important to study structural and organisational factors objectively, but also to study the perceptions of these factors. This is reflected in the perceived individual abilities to engage in sustainable behaviours. Indeed, perceived behaviour control predicts intention to reduce energy conservation (Abrahamse, 2007), intention to reduce car use (Bamberg & Schmidt, 2003), bus use (Heath & Gifford, 2002), the use of unbleached paper, the use of energy saving light bulbs, water conservation, and the use of other transport modes than the car (Harland et al., 1999). The importance of organizational climate and culture for example, which has been consistently highlighted in relation to factors such as work motivation and satisfaction, or organizational citizenship behaviours, (e.g., Kopelman, Brief & Guzzo, 1990; Schneider, 1985), has been scarcely investigate in relation to sustainable workplace behaviours.

A study by Brothers, Krantz and McClannahan (1994) revealed that physical facilitation can be a crucial factor in promoting sustainable behaviour: when recycling containers were at close proximity to office workers, they recycled between 85 to 94% of all paper, while only 28% of paper was recycled when a central container was provided only.

Predicting environmental behaviour

There have also been attempts to model predictors of environmental behaviour. Particularly influential frameworks for assessing environmental attitudes and behaviour, especially in respect of consumption behaviour are the Theory of Planned Behaviour (Ajzen, 1987) and the Commons Dilemma paradigm (Vlek, 2000), while beliefs, values and social norms have been explored by Dunlap and van Liere's New Environmental Paradigm (1978; 2008) and modelled using, for example, the Norm-Activation theory (Schwartz, 1977) and the Value Belief Norm Theory (Stern et al., 1999) which formalises the linkage between values and norms. The Attitude-Behaviour-Constraint Model (Stern, 2000) and the Needs-Opportunities-Abilities (NOA) model of consumer behaviour (Gatersleben and Vlek, 1998) have sought to overcome the internal/external dilemma by incorporating contextual opportunities and constraints into their understanding of the dynamics of people-environment relationships. Other theories such as cultural theory begin to approach a more macro-level perspective by equating individual orientations with different forms of societal organization (e.g., hierarchical vs. egalitarian). There have also been attempts to devise more integrational models such as Stern's Attitude-Behaviour-Constraint Model (2000) in which an attempt is made to overcome the internal/external dilemma by understanding the dynamics of the relationship between people and their environment (Bonnes, Uzzell, Carrus, and Kelay 2007, Uzzell, Pol, and Badenas 2002; García-Mira et al, 2003, 2005). The complexity of sustainable consumer behaviour changes in terms of their embeddedness in everyday life and its relationship to societal forces and practices is well reflected in Shove's (2005) categorization of consumers as decision-makers (e.g., shoppers), as citizens influencing the provision

of sustainable options, and as practitioners implicated in the reproduction of taken-for-granted practices.

As the conceptual complexity of models becomes more sophisticated and tries to incorporate salient consumption factors, so their practical applicability diminishes. Despite the sophisticated models which have been devised to explain consumer behaviour, when it comes to changing such behaviours the methodologies employed are often highly individualistic, placing a great reliance on persuasion, education, and even coercion through financial incentives and penalties and regulations. However, knowledge and positive attitudes may not be sufficient to encourage behaviour change, even among those who know what to do and would like to do it. Likewise, having the knowledge and material means equally may not guarantee action (Uzzell, 2008). We can change attitudes and behaviours but the attitude/behaviour relationship is complex and non-linear; changing attitudes does not automatically lead to behaviour change, and where it does it can take time.

Furthermore, behavioural impact can be direct or indirect - we can work directly on behaviour change, or indirectly through enhancing social cohesion, and community and place identity. Socially cohesive communities which encourage place identity, and in which residents have a stake in their neighbourhood and act together will be more supportive of environmentally sustainable attitudes and behaviours than communities where cohesiveness and social and place identities are weaker (Uzzell, Pol and Badenes, 2002; Bonaiuto et al., 2008). Increasing attention, however, is now being given to community-based approaches where the emphasis is on engaging communities rather than individuals by identifying barriers to a sustainable behaviour, designing a strategy that utilizes behaviour change tools, testing impact on a small segment of the community and then rolling it out and evaluating it across the whole community. For example, community-centred efforts that use informal social networks (Gardner and Stern, 2002), and the encouragement of socially shared (injunctive) norms and the visible behaviour of 'adopters' (Nigbur, Lyons, and Uzzell, 2009). Tailoring is important, whereby different strategies will be required for different groups depending upon the different barriers they erect to sustainable behaviour (Abrahamse, Steg, et al., 2007). There is much we know already, which can be usefully drawn upon to try and change environmental and consumption behaviours, but one of the challenges is to achieve sustained behaviour change and generate spillover effects on environmental attitudes and other environmentally-significant behaviours (Thøgersen, 2003), e.g., saving energy at home and in the workplace, recycling and energy saving. People will often change behaviour for a short period but then revert to old habits and preferences. We may be able to get people to change behaviour, but what we are really asking of them is to change their lifestyle and practices.

Methodology

Procedure and sample characteristics

The questionnaire was distributed and collected via the online program Qualtrics. Participants filled out the online questionnaire consisting of three parts. First we asked the participants some general questions about their personal situation (such as age and gender) and the extent they believe to have an exemplary role in their organization (see Appendix 1). This was followed by the second part comprising questions about motivational factors (i.e. values and environmental self-identity). We randomised all items from the worldviews, environmental self-identity, norms and efficacy scales to make sure that the order of the questions did not influence the responses. Third, participants completed a set of questions on pro-environmental behaviour at work and at home. The data were collected from June 2012 until December 2012.

Table 1 gives an overview of the number of questionnaires collected, and key socio demographics (gender, age, level of education) for each case study. What we mainly see is that a majority of the respondents comes from the Spanish case study. Furthermore, we see an almost equal distribution of gender, except in the Italian sample, in all case studies and the mean age is between 41 and 45. In the Spanish case study the educational level is the highest. This is an expected consequence of the fact that the Spanish case study area is an university. The Spanish

team, taking into account the nature of the organization, considered 2 categories for 2 different types of Staff: 1) Teaching and Research Staff in leading positions (Top manager); 2) Administrative staff in leading positions (Management); 3) Teaching and Research Staff with no leadership positions (i.e. just to teach or/and just to research, or other supervisory responsibilities) (Supervisory): and 4) Administrative staff with no leadership position: administration staff, technicians (Operation level).

Table 3 Sample Characteristics

	The Netherlands	Spain	Romania	Italy	Total
N	117	255	122	124	618
% Male / Female	49% / 51%	44% / 56%	48% / 52%	70% / 30%	51% / 49%
Mean age (SD)	43.5 (11.13)	44.0 (9.13)	41.5 (10.21)	44.4 (10.478)	43.5 (10.05)
Level of education (SD)	3.6 (.83)	4.21 (1.00)	2.43 (.62)	2.98 (1.11)	3.49 (1.16)

Note: Scores on level of education could vary from 1= no education/preschool to 5=doctorate-level degree

Table 2 provides an overview of the level in the organization at which participants work. Not surprisingly, in all case study areas except the Italian, the majority of participants worked at the operational level.

Table 4 Sample characteristics: Level in the organization

	The Netherlands	Spain	Romania	Italy	Total
Top manager	-	19 (8%)	1 (1%)	9 (7%)	29 (5%)
Management	6 (5%)	4 (2%)	10 (8%)	14 (11%)	34 (6%)
Supervisory	4 (3%)	16 (64%)	22 (18%)	69 (56%)	257 (42%)
Operation level	107 (92%)	70 (28%)	89 (73%)	31 (25%)	297 (48%)

Measures

Values

We measured the strength of values by a 16-item scale (Steg, Perlaviciute, Van der Werff & Lurvink, in press). Participants rated the importance of each value as a guiding principle in their life on a scale from -1 (opposed to my values) up to 7 (of supreme importance). Biospheric values were represented by 4 items (Respecting the earth: harmony with other species; Unity with nature: fitting into nature; Protecting the environment: preserving nature; Preventing pollution: protecting natural resources). Altruistic values were also measured with 4 items (Equality: equal opportunities for all; A world at peace: free of war and conflict; Social justice: correcting injustice, care for the weak; Helpful: working for the welfare of others). We measured egoistic values with five items (Social power: control over others, dominance; Wealth: material possessions, money; Authority: the right to lead or command; Influential: having an impact on people and events; Ambitious: hard-working, aspiring). Finally, hedonic values were measured with 3 items (Pleasure: joy, gratification of desires; Enjoying: enjoying food, sex, leisure etc.; Self-indulgent: doing pleasant things). The value scales showed high internal consistency, overall, as

well as in each case study area. Therefore we computed mean scores of the items included in the relevant scales.

Environmental self-identity

We measured environmental self-identity with three items: 'Acting pro-environmentally in an important part of who I am', 'I am the type of person who acts pro-environmentally' and 'I see myself as an pro-environmental person'. These items were adapted from Van der Werff et al. (2013). Scores on these items could range from 1 (totally disagree) to 7 (totally agree). The environmental self-identity scale showed high internal consistency, overall, as well as in each case study area, therefore we computed the mean score on these items.

Worldviews

Worldview was measured with six items from the New Human Interdependence Paradigm scale (NHIP; Corral-Verdugo et al., 2008): 'Human beings can progress only by conserving nature's resources', 'Human beings can enjoy nature only if they make wise use of its resources', 'Human progress can be achieved only by maintaining ecological balance', 'Preserving nature now means ensuring the future of human beings', 'We must reduce our consumption levels to ensure the well-being of present and future generations', 'If we pollute natural resources today, people in the future will suffer the consequences'. Scores could range from 1 (totally disagree) to 7 (totally agree). The worldviews scale showed high internal consistency, overall, as well as in each case study area. We computed the mean scores on the worldviews scale.

Norms

General descriptive norms were measured with four items reflecting to what extent respondents' believed that a certain reference group acts pro-environmentally at work (cf. Ajzen, 2006): 'Most people who are important to me act pro-environmentally at work', 'Most of the people from my city act pro-environmentally at work', 'Most <Dutch/Italians/Romanians/Spaniards> act pro-environmentally at work', and 'Most people in general act pro-environmentally at work'. The four items for local descriptive norms were similar but referred to people at their workplace: 'Most of my subordinates act pro-environmentally at work', 'Most of my co-workers act pro-environmentally at work', 'Most of my supervisors act pro-environmentally at work', and 'Most members of my management team act pro-environmentally at work'.

We measured general injunctive norms with four items (cf. Ajzen, 2006): 'Most people who are important to me think I should act pro-environmentally at work', 'Most of the people from my city think I should act pro-environmentally at work', 'Most <Dutch/Italians/Romanians/Spaniards> think I should act pro-environmentally at work', and 'Most people in general think I should act pro-environmentally at work'. The four items for local injunctive norms were again similar, but focused on people at work: 'Most of my subordinates think I should act pro-environmentally at work', 'Most of my co-workers think I should act pro-environmentally at work', 'Most of my supervisors think I should act pro-environmentally at work', and 'Most members of my management team think I should act pro-environmentally at work'.

Personal norms were measured with 4 items based on Steg and de Groot (2010): 'I feel guilty if I do not act pro-environmentally at work', 'I feel morally obliged to act pro-environmentally at work', 'I feel proud when I act pro-environmentally at work', and 'I would violate my principles if I would not act pro-environmentally at work'.

All items related to norms were scored on a scale ranging from 1 (totally disagree) to 7 (totally agree). All norm scales showed high internal consistency, overall, as well as in each case study area. Therefore, we computed mean scores of items included in the relevant scales.

Efficacy

The self-efficacy scale consists of three items: 'For me acting pro-environmentally at work is not costly', 'For me acting pro-environmentally at work is easy', and 'For me acting pro-environmentally at work is feasible' (cf. Ajzen, 2006), on a scale ranging from 1 (totally disagree) to 7 (totally agree). The reliability of this scale was good.

Outcome efficacy was measured by three items: 'I can make a positive contribution to the quality of the environment by acting pro-environmentally at work', 'Environmental quality will enhance when I act pro-environmentally at work', and 'I can contribute to reducing environmental problems by acting pro-environmentally at work' (cf. Steg & De Groot, 2012). All items were scored on a scale ranging from 1 (totally disagree) to 7 (totally agree). The outcome efficacy scales showed high overall internal consistency, overall as well as in most case study area. Only in the Dutch case study the reliability of outcome efficacy is somewhat lower. We created mean scores of the items for self-efficacy and outcome-efficacy.

Pro-environmental behaviour at work

We used two measures for pro-environmental behaviour at work. First, we assessed total energy use of relevant behaviours by asking participants about their transport related behaviour (commuting and business trips), and energy use at the workplace (i.e., their use of lighting, the computer, heating and air-conditioning). The following transport-related items were included: 'How many kilometres per week do you on average commute by car?', 'How many kilometres per week do you in average travel for work?', 'When you travel for work purposes, how often do you drive in an energy efficient way (looking ahead and anticipating on traffic and brake and accelerate quietly and change to a higher gear as soon as possible)?', 'When you drive for work, how often do you carpool rather than drive alone?'. To measure the energy use at the workplace we used for example the following items: 'How many hours a day are the lights on at your workspace?', 'How often do you switch the computer off at work when you go home?', 'What is the average temperature setting at your workspace when you are working?' and 'During the year when you are at work, how often do you turn on the air-conditioning at your workspace?'. We did ask for personal control over lighting, heating and air-conditioning. For the full energy use at work scale see Appendix section 1c. In collaboration with an expert in energy and sustainable research from the faculty of mathematics and natural sciences at the University of Groningen, we created a calculator to compute energy use on the basis of the answers provided on the behavioural items. We did this by assigning Mega joules used to each energy behaviour score (see Gatersleben et al., 2002). By summing up all these energy content scores we created a score for individual energy use at work which reflects the amount of energy used in MJ per week per person.

Second we measured self-reported recycling at work with three items: 'How often do you use recycled paper at work?', 'How often do you separate your paper from the regular garbage at work?', and 'How often do you use your own cup instead of disposable cups at work?'. Scores on these items ranged from 1 (never) to 7 (always). For some countries we also asked about separating plastic from the regular garbage. However, this item was not included in the recycling scale, because this question was not relevant for the Dutch sample as in the Netherlands plastic is separated at the waste disposal station, so workers do not need to do this themselves. We found weak correlations between the different types of recycling at work, as reflected in the very low reliability scores. This suggests that engaging in one type of recycling behaviour is only weakly related to engaging in other types of recycling behaviour. This may be due to the fact that different recycling regimes are in place for different types of recyclables in each of the case study areas. Therefore, we decided to run the analysis with the different types of recycling separately as well as with an overall score for recycling in general. As the pattern of results was very similar

for the different indicators of recycling behaviour, we only report the analyses with overall recycling behaviour as the dependent variable.

Pro-environmental behaviour at home

We measured pro-environmental behaviour at home in a similar way as pro-environmental behaviour at work. For the measure of total energy use we adjusted the items in such a way that they targeted the situation at home. We included items concerning transport, lighting, electrical devices, heating, air-conditioning, washing and bathing.

Self-reported recycling at home was measured with six items: 'How often do you use recycled paper at home?', 'How often do you separate your batteries from the regular garbage at home?', 'How often do you separate your glass from the regular garbage at home?', 'How often do you buy goods with minimum packaging?', and 'How often do you refuse plastic bags in stores?'. Again, we included an item on separating plastic from the regular garbage in some countries only, and therefore this item was not included in the recycling scale, for the same reason as in recycling at work. The recycling at home scales showed high internal consistency, therefore we computed a mean score of the items.

Results: testing theoretical models to explain environmental behavior at work and at home

We tested a theoretical model that integrated various individual factors, and predicted a causal chain from values, environmental self-identity, outcome efficacy and personal norms to behaviour. Testing the causal models of sustainable behavior in organizations allows for defining tailored policies that can target the most important factors that affect behavior.

More specifically, the model predicts that values affect behaviour indirectly, via a process of norm activation. It is assumed that values, and particularly biospheric values, affect strength of the environmental self-identity: environmental self-identity will be stronger when one strongly endorses biospheric values (Van der Werff et al., 2013; in press). Environmental self-identity in turn influences the perceived outcome-efficacy: those who think acting pro-environmentally is an important part of who they are are more likely to perceive their own individual contributions to reducing environmental problems as worthwhile. This process will then activate personal norms, which are feelings of moral obligation to act pro-environmentally. Those with strong personal norms are more likely to act pro-environmental (e.g. Steg & De Groot, 2010). The full model is depicted in Figures 11.

We conducted a Structural Equation Model Analysis via AMOS to test this model for the different behavioural indicators. Since personal norms are not significantly related to energy use at work, we only looked at recycling at work. The model proved to be effective in explaining recycling at work (as shown by the index of goodness of fit: CFI= .930.) Considering the recommendations by Bentler (1992) and Hu & Bentler (1999), this model fits appropriately the data (see Figures 1 and see Appendix 1 for the full model). The results show that the proposed theoretical relationships are supported by the data; each variable is related to the next variable in the causal chain as expected.

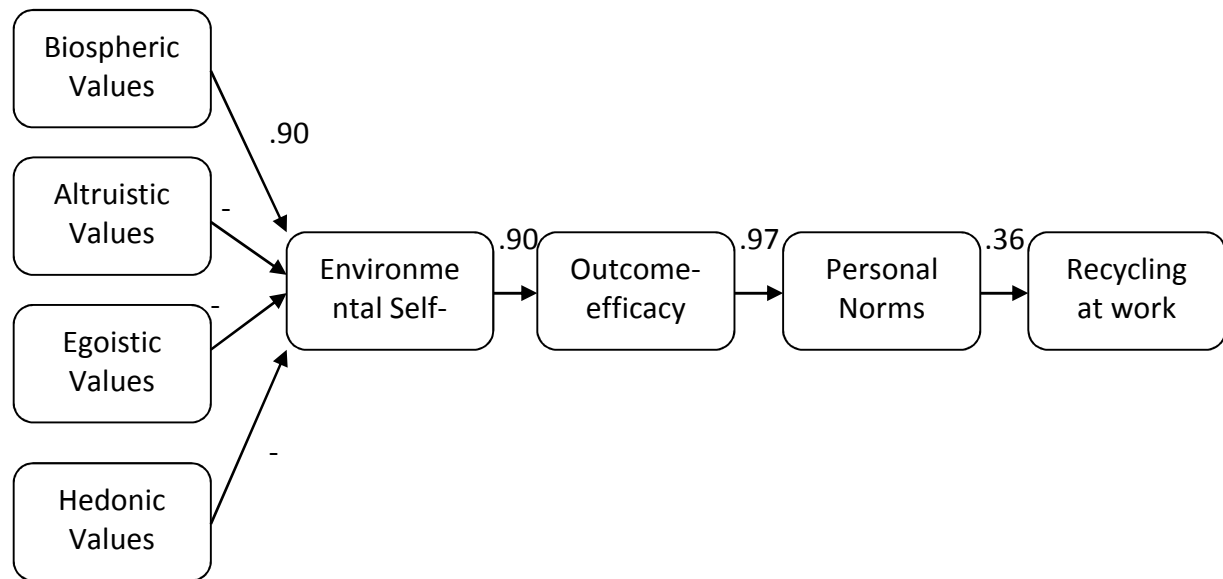
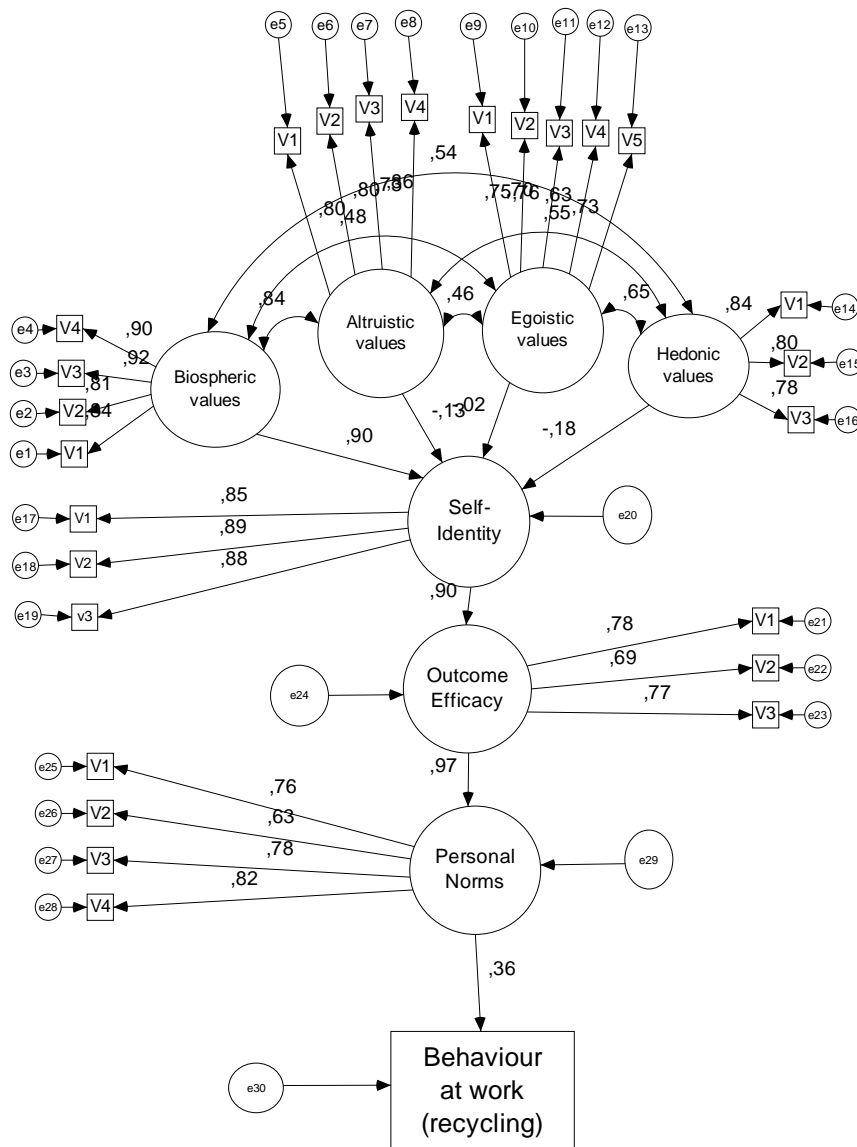


Figure 11 Predicting recycling at **work**: The role of values, self-identity, outcome efficacy, and personal norms in the whole sample (4 case studies). CFI=.930. Numbers indicate Beta weights (standardized estimates), which mean the relative importance of a predictor in predicting the criterion. The larger the absolute value of the beta weight, the more influence this factor has on predicting the criterion.

Discussion and conclusion

Our model predicted a causal chain from values, environmental self-identity, outcome efficacy, personal norms to behaviour. The theoretical model was supported by the data. Indeed, values, and particularly stronger biospheric values, were associated with a stronger environmental self-identity, which in turn was related to perceiving one's own pro-environmental actions as more effective in reducing environmental problems (i.e., a higher outcome efficacy). A higher outcome-efficacy in turn was related to a stronger feeling of moral obligation to engage in pro-environmental actions (i.e, stronger personal norms), which finally increased the likelihood of engaging in pro-environmental actions, in particular recycling at work. Personal norms were less predictive of energy use at work. Again, this shows that energy use at work is not strongly related to individual normative considerations, but probably more strongly depends on other factors, such as situational and organisational factors. This suggests that many different factors can be targeted to promote recycling at work, as targeting factors further up the causal chain is likely to affect factors further down the chain as well. Furthermore, our results show that behaviour is indirectly influenced by values (especially biospheric values) through the strengthening of the environmental self-identity, which influences the perceived outcome-efficacy and can activate personal norms. This implies that when one aims to target pro-environmental behaviour in the organization, the different factors in these models could be taken into account.

Appendix 1.



The role of values, self-identity, outcome efficacy, and personal norms in the whole sample (4 case studies). CFI=.930. Numbers indicate Beta weights (standardized estimates), which mean the relative importance of a predictor in predicting the criterion. The larger the absolute value of the beta weight, the more influence this factor has on predicting the criterion.

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Discussant Contribution

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Garcia-Mira et al. paper

The paper looks at the drivers and barriers around individual behaviors for changing practices or routines in consumption at work and at home. Three factors are identified, namely: knowledge, motivation, ability. While the opportunity to engage in new behavior comes into the argumentation, it is not fully differentiated. Four case studies, consisting of surveys, were carried out in Spain, the Netherlands, Italy and Romania. In terms of its results, the paper addresses values, which underlie a strong environmental self identity, which in turn determines or drives environmentally beneficial actions, such as recycling. The highlight of this paper is the causal relation between values and behavior, though this also raises the question: can a change in norms also result in a shift in values?

Critical questions for this paper concern both its methodology and analysis. Regarding the former, questions arise as to the choice of countries for the study, the common characteristics that make these case studies suitable grounds for research, and the types of organizations considered for each country. It could also be helpful to reflect on organizational values as a 'shadow value set' when examining individual case studies, e.g., an employee of Greenpeace and employee of Exxon or VW. Regarding analysis, though the focus of the study is on the 'self', it would be interesting to find what other factors relate to outcome-efficacy, such as opportunity, or to personal norms. A deeper reflection on 'peer pressure' could be equally interesting. Furthermore, this model could be used to display aspects and drivers of knowledge, in order to reflect on whether or not a 'knowledge society' engages in environmentally positive behavior. As a final reflection, the survey shows a willingness to engage in pro-environmental behaviour. This raises the question of how to tackle the discrepancy between the willingness-to-act and the actual behaviour.

Rauschmayer et al. Paper

The paper presents a very elaborate and critical review of transition management, practice theory and the capability approach. It not only presents the approaches, but also devises a reflexive take on them. A reconceptualization of the multi-level model is proposed from the perspective of practices. This conceptual stand gives grounds for insights into the governance of transitions, but does not shed light on the blind spots that were identified for transition management; it would therefore be important to tease out the implications of this model for them. The paper in its discussion of motives could gain from differentiating between transition management and community arenas, as well as between facilitated, guided or steered groups of actors and emergent initiatives.

Discussion Report

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There was a common link drawn between the two papers about transitions - Rauschmayer et al. defining transitions as fundamental changes in cultures, structures and practices - that take a long time to materialise and develop. From this point of departure, the discussions began with some points about the structures and how they enable change that might be a departure from the old structures thereby generating conflict during transitions.

Although the first paper provided a very insightful overview of Transition Management, Practice Theory and the Capability Approach, the point was raised that it seemed weak on relating the blind spots of TM with regard to change. What are the implications of the conceptual model presented to the blind spots? Therefore, drawing on the conceptual model presented, what are the suggestions for the various blind spots?

A second point related to the first paper regarded the evidence that, without the facilitation and transition management, do emerging initiatives and experiments ensure that these communities facilitate an effective process on their own? What are the capacities that differentiate these communities and underlie the practices of TM established networks and emerging initiatives?

The second presentation linked values and drivers and barriers for individual behaviour in the work environment focussing on knowledge, motivation and ability. As key factors for behaviour, discussions suggested the opportunity to engage could have been better discussed in the paper. The papers' strength rests in its conceptual framework backed by four case studies. Since values may lead to a shift in behaviours, the obvious question might be can a shift in behaviours/norms lead to new values?

A second point for the second paper was for clarification on the context of the work - how, for instance were the companies selected in the study? Organisational values might influence the type of employees who want to work there and their values. For example, an environmental NGO might consist of employees with relatively pro-environmental value set, whereas other organisations might draw employees with somewhat weaker environmental values. The selection of companies was broadly undertaken to try and minimise these biases.

There is general agreement for more space for discussions on blind spots across the conceptual framework with regard to power, normativity, and individuals and how this related to the question . How can a shift in behaviour generate shifts in norms and values?' There is more space for research here.

There was brief discussion about the definition of sustainability and its normative nature. While there are various interpretations, this discussion has previously been undertaken during the InContext project. Short follow-up discussions included the ideas of: the conventional three interlinked circles - economic, social and environmental - where economic growth typically becomes the priority; the biophysical limits approach, in which the social sphere is a subset of the biosphere and the economy respectively a subset of the social sphere; another approach might be the systemic one in which inter- and intra-

generational issues are key. At the same time, values are important, and the differentiation between social and individual can lead to a very complicated environment. Ultimately, sustainable development means little and remains a very elusive term. The idea that individual choice is confined by a decision making architecture well out of reach of the individual was also raised. Understanding how sustainability feeds into transition processes can be challenging. An overview of the debates on sustainability was circulated as an addendum¹.

The discussion on the second paper also touched on the matter of the survey measuring the willingness to act, versus the actual behaviour. This may be resolved by further research and experimentation and observation of behaviour, but this will be costly. For the meantime, observation and psychological research can help develop a certain level of trust in the responses.

¹ B. Hopwood, M. Mellor, G. O'Brien, Sustainable development: mapping different approaches, *Sustainable Development*, 13 (2005) 38-52, <http://onlinelibrary.wiley.com/doi/10.1002/sd.244/full> .

2b

**Self-organising
versus
facilitated
pathway
development:
differences &
similarities**

A Complex Transition Perspective on Community Energy

Exploring the Dynamics of Community Energy from a Complex Transition Perspective

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Abstract

This paper aims to expand the transitions perspective on community energy both empirically and theoretically. So far, most transition studies of community energy are focused on analysing empirical examples in the UK from a socio-technical Multi-Level Perspective (MLP). This paper takes a 'complex transition perspective' to analyse community energy initiatives in four West-European countries (The Netherlands, Germany, Belgium and UK). The term 'complex transition perspective' refers to an assemblage of perspectives in the field of transition research that share a basis in complex system thinking and action research, also referred to as the 'systemic and reflexive approach'. The paper starts with 'fresh empirical observations' on community energy initiatives, describing drivers and barriers in the community energy initiatives, as experienced by practitioners involved. Subsequently, these empirical observations are considered from a complex transition perspective, specifying what the analytical implications are of taking such perspective, how this differs from the socio-technical Multi-Level Perspective, and what kind of implications it has for action research and policy regarding community energy initiatives and sustainability transitions.

1. Introduction:

There is an increasing attention for the role of civil society, grassroots initiatives and community-led innovations in transitions towards sustainability (Seyfang and Smith 2007, Middlemiss & Parish 2010, Seyfang & Haxeltine 2012, Smith 2012). A considerable amount of these grassroots innovation studies have an empirical focus on energy; the phenomena of community energy in particular (e.g. Seyfang et al. 2010, Hielscher et al. 2011, 2012, Hargreaves 2011) and the role of civil society and social movements in energy transitions more generally (Smith 2012, Seyfang & Haxeltine 2012). Many of these studies have employed the 'socio-technical perspective' on sustainability transitions as a theoretical framework to analyse empirical grassroots phenomena, including the strategic niche management (SNM) framework (Kemp et al. 1998, Hoogma et al. 2002) and the multi-level perspective (MLP). The MLP is one of the most central concepts in transition studies (Rip

& Kemp 1998, Geels and Kemp 2000, Geels 2005, Geels 2005, Smith and Raven 2012). The MLP distinguishes between different levels of functional aggregation; 'landscape' (macro), 'regimes' (meso), and 'niches' (micro). From a MLP-perspective, community-led energy initiatives and grassroots innovations are typically conceptualised in terms of 'niches'; protected spaces that enable and shelter radical innovation from the pressures of unfavourable socio-technical energy 'regimes'. A typical dilemma that recurrently appears in both empirical case-studies and theoretical discussions, concerns the mainstreaming of niches: 'as niche practices diffuse into wider society, they always evolve and change, losing some of the aspects that originally made them innovative and appealing to early pioneers, and gaining other characteristics that make them attractive and accessible to wider audiences' (Seyfang & Haxeltine 2012, see also: Smith 2006, 2007). One of the subsequent questions is how and to what extent one can enable niches – such as e.g. energy community – to 'scale up' or 'become more mainstream', while at the same time retaining their innovative potential (Smith 2006, 2007).

In this paper, we aim to *broaden* this transitions perspective on community energy, both empirically and theoretically. Empirically, we analyse case-studies of community energy initiatives in four West-European countries - the Netherlands, Germany, Belgium and UK – thereby aiming to move beyond UK-only studies which seems to dominate much of the community energy and energy transitions debate (Walker et al. 2007, 2008, 2010, Allen et al. 2010, Seyfang et al. 2010, Hargreaves 2011, Hielscher et al. 2011, 2012, Seyfang & Haxeltine 2012, Smith 2012). Theoretically, we move *beyond* the socio-technical multi-level perspective, by taking a '**complex transition perspective**' to analyse community energy initiatives. With the term 'complex transition perspective' we refer to an assemblage of perspectives in the field of transition research that share a basis in complex system thinking and action research. By coining and elaborating this perspective, this paper also has a more meta-level aim of addressing the state-of-the-art of transition research and raising some critical interrogations for future research.

The field of transition research has emerged in the past decade as a new interdisciplinary field that focuses on studying sustainability transitions: long-term processes of change towards more sustainable societies (Grin et al. 2010, Markard 2012). In the state-of-the-art book on *Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change*, a distinction is made between three main perspectives on transitions: 1) a socio-technical perspective (Geels & Schot 2010), 2) a systemic and reflexive approach (Rotmans & Loorbach 2010a) and 3) a governance perspective (Grin 2010).¹ With our 'complex transition perspective' we refer to the second category, i.e. the 'systemic and reflexive approach' and how this has developed in the past years. We call it 'complex transition perspective' because we believe this captures both the systemic and reflexive dimensions, as well as other dimensions that have been added over the years.

The '**complex transition perspective**' originates in a research tradition that combines transition management and complex system transition dynamics (Rotmans 2001, Loorbach 2007, 2010, De Haan 2010, De Haan & Rotmans 2011, Rotmans & Loorbach 2010a,b). This has been elaborated and refined with explorations on policy dynamics and environmental governance (Frantzeskaki & De Haan 2009, Frantzeskaki et al. 2012), linkages with socio-ecological resilience (Van der Brugge & Van Raak 2007, Van der Brugge 2009, Westley et al. 2011, Frantzeskaki 2011), urban transition management

¹ There are different ways in which the field has been categorised. Markard et al. (2012) distinguish between 1) the Multi-level Perspective (MLP) (Geels 2005 2010), 2) Strategic Niche Management (SNM) (Kemp, Schot & Hoogma 1998, Smith & Raven 2012), 3) Technological Innovation Systems (TIS) (Hekkert et al. 2007,) and 4) Transition Management (TM) (Rotmans et al 2001, Loorbach 2007, 2010). We stick to the earlier categorisation as used in Grin et al. 2010

(Loorbach 2009, Frantzeskaki et al. 2012b, Wittmayer et al. 2012, Roorda et al. 2012, Roorda 2012, Van Steenberghe et al. 2012, Nevens et al. 2013), power dynamics and (dis)empowerment processes (Avelino 2009, 2011, Avelino & Rotmans 2009, 2011) and the epistemological complexities of action research (Loorbach 2007, Avelino 2011, Wittmayer forthcoming). These different studies all draw on a variety of 'inter-disciplines', including complex system research, sustainability science, environmental governance and interpretative policy analysis. Considering this rich intellectual diversity, there is in fact no such thing as 'the' complex transition perspective (single), rather there is an assemblage of complex transition perspectives (plural).

The one thing that these various complex transition perspectives have in common, however, is that they start off from 1) **linking between transition dynamics and transition management** (i.e. how things 'are' understood and how they are, can or could be 'influenced'), and 2) **doing so at multiple levels, scales and time frames, always questioning the chosen system boundaries**. While the socio-technical Multi-level Perspective (MLP) (Geels 2005, Smith and Raven 2012) focuses on three specific *levels of functional aggregation* (niche, regime, landscape), the complex transition perspective argues that transition dynamics are an amalgam of many more multi-levelled dimensions. This includes multi-levels beyond and between niche, regime and landscape (De Haan 2010, Loorbach & Rotmans 2010a, Avelino 2011), multi-phases (pre-development, take-off, acceleration, stabilisation, Rotmans 2005, Van der Brugge 2009), multi-patterns (De Haan 2010, De Haan & Rotmans 2011), multi-level management (strategic, tactic, operational, Loorbach 2007, Frantzeskaki et al. forthcoming), and multi-scale (local, regional, national, transnational, global (Coenen and Truffer 2012)). The ultimate challenge for complex transition perspective is to (re)consider how these multi-dimension dynamics relate to one another (Loorbach and Frantzeskaki 2012). In this paper, we will explicate what the implications are of taking such complex transition perspectives to analyse community energy initiatives, how this differs from the socio-technical multi-level perspective, and what kind of challenges this raises for future transition research.

We start this endeavour with 'fresh empirical observations' on community energy initiatives. Rather than starting off with a specific theoretical lens or analytical framework, we first describe the empirical case-studies in terms of drivers and barriers for community energy initiatives, as experienced by (some of) the practitioners involved. We then move to discuss how we can conceptually frame and analyse these empirical observations when applying complex transition perspectives. On that basis, we also formulate a number of hypothetical policy suggestions in the tradition of transition management. Last but not least, we summarise the main insights and conclusions, and identify challenges for future research.

This is an explorative paper; rather than testing predefined hypotheses, the aim is to formulate insights and hypothetical policy suggestions that can be verified, tested and further developed in future research and practice. We do not aim to 'generalise' what the main barriers and drivers for community energy 'are' from 'the' complex transition perspective; rather we focus on empirically observing what the participants in the cases themselves experience to be context-specific drivers and barriers in their respective initiatives, and subsequently discussing how complex transition perspectives may contribute to 1) understand these drivers and barriers and 2) empower practitioners that want to drive their initiatives forward, by suggesting how they might use complex transition insights to deal with the drivers and barriers of community energy in future endeavours.

2. Empirical Case-studies: Drivers & Barriers in Community Energy

Our analysis is based on eight empirical examples of community energy initiatives across four different countries: The Netherlands, Belgium, United Kingdom and Germany (see overview in the table below). These case-studies are part of an on-going research project that focuses more generally on the ‘self-organization of infrastructure by civil society’, by which is meant: the direct involvement of citizens, user cooperatives and/or non-governmental organizations in organizing, operating, and maintaining infrastructures (Avelino & Frantzeskaki 2012, Frantzeskaki, Avelino and Loorbach forthcoming). As such, cases that are not confined to energy *generation*; we also include community projects in Germany that focus on the *reduction of energy use*².

Table 1. Overview of Case-studies Community Energy Initiatives

National context	Socio-spatial context	8 Projects/organisations
Netherlands	Island Texel	Cooperative <i>Texel Energie</i> *
	Eco-district Eva Lanxmeer	Local company <i>Thermo Bello</i>
Belgium	Cooperative Movement	Cooperative <i>Ecopower</i> *
United Kingdom	Community Energy Scotland	Project <i>Urgha Wind</i>
		Project <i>Udny Community Wind Turbine</i>
Germany	Eco-district Vauban Freiburg	Passivehouse » <i>Wohnen & Arbeiten</i> «
		Co-housing <i>SUSI-project</i>
	Town Schönau/ Anti-nuclear movement	<i>Elektrizitätswerke Schönau (EWS)</i>

Our data-collection is based on qualitative research methods: interviews, document reviews and participant observation. A list of interviews is provided in Appendix 1.

In this section, we start by presenting our case-studies as fresh empirical data, in terms of first providing a basic description of the community energy initiatives and then describing the barriers and drivers within these case-studies, as experienced by some of the practitioners involved. We include original interview quotes about both the drivers and barriers, as well as about the national and institutional context. As such, the case-study descriptions are quite elaborate. Those readers who are impatient to get to the more theoretical analysis, are advised to start by reading the overview of barrier and drivers as given in table 2 under section 2.5, and/or to the analyses under section 3. When a specific driver, barrier or analytical comment raises questions, the reader can then ‘move back’ to sections 2.1- 2.4 to read the empirical background and detail behind the identified barriers, drivers and analytical comments.

2.1. The Dutch Cases

National context	Socio-spatial context	Projects / organizations
Netherlands	Island Texel	Cooperative <i>Texel Energie</i>

² As we will argue in our analyses, these cases also provide interesting insights for a complex transition perspective on community energy.

	Eco-district Eva Lanxmeer	Local company <i>Thermo Bello</i>
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2.1.1 Texel Energie

Texel Energie is one of the first and ‘most famous’ energy cooperatives in the Netherlands. It is geographically located on Texel, a Dutch island in the Wadden Sea (North Sea), which harbours 13.000 citizens spread over seven villages. *Texel Energie* is a cooperative with 3.000 members and 4.000 customer connections. One can become a member for 50 euros a year, for which one receives a share in the company, a discount on the energy price, and a vote in the annual assembly. Each member gets one vote, independent of the amount of shares. *Texel Energie* was initiated by three islanders and formally founded in 2007. Initially, the main business was to buy and resell renewable energy, but in recent years it also started producing renewable energy through projects in solar energy, bio-mass and ‘anaerobic digestion’, and it is currently working towards also investing in wind, geothermal and tidal energy.

One of the main **drivers** for *Texel Energie* concerns the local culture; the island of Texel supposedly has a very strong local identity and exceptionally strong cultural and historical strive for “being independent”. A famous example thereof is the story of the company *TESO* – the ferry service that has connected the island to the mainland of the Netherlands for the last century. *TESO* is an abbreviation for *Texel’s Eigen Stoomboot Onderneming* – literally translated as “Texel’s Own Steam Ship Enterprise”. Before *TESO* - until the end of the 19th century - the island was dependent on a commercial ferry company from the mainland. The story is that islanders were getting fed up with the increasing prices and decreasing quality of the ferry service. At the beginning of the 20th century, a small group of respectable islanders started an initiative that would enable the islanders to buy “their own steam ship”. By selling shares of 5 to 25 Dutch guilders (2-12 euros), they managed to collect a total of 76.000 guilders (approximately 35.000 euro), and in the year of 1907, *TESO* commissioned the construction of its first steam ship. Today *TESO* still has over 3.000 shareholders. A ferry ticket to go to Texel is considerably cheaper (nearly 90%) than those to the other Dutch islands (which are offered by commercial ferry services). This historic tale illustrates the island culture of Texel, and *TESO* is very often celebrated and referred to as a model for island independence, also in discussions on renewable and sustainable energy. Our correspondent is not only a board member of *Texel Energie* but also born and raised on the island; he emphasized how important the local identity was, and that the need for independence was and is one of the strongest drivers for the success of *Texel Energie*, much more so than the environmental argument (interview nr. 8).

One of the main **barriers** for *Texel Energie* concern the newness of the business model, and-related to that- the difficulty of getting financed:

“It was new – we were one of the first of this type of initiatives in NL – we really had to invent everything ourselves. (...) [and another barrier is] financing, especially for production – the banks are very hesitant. We need half million, that is so much money... you cannot finance that with 3000 members. (...) It is especially the banks that create difficulties for us – because they don’t know our model we have a very high risk profile” (interview 11).

A related barrier that was mentioned concerned the confusion over the differences between for-profit, non-profit and not-for-profit:

*“Our goal is to provide reliable and sustainable energy for our members, our main goal is not to make profit. We fall in between profit and non-profit, that can be quite difficult: we have to explain and explain it all the time. Many people and government officials do not understand it. A few years ago the *TESO* also had many difficulties explaining their way of working to the EU*

and to the tax offices. It would be nice to have the social enterprise legally recognized... now it does not exist legally" (interview 11).

Our correspondent did however nuance that the main barriers were not necessarily legal or regulatory: "we were not that bothered by laws and regulations. Of course there were some obstacles when we made contracts and so on – since our concept was new – but one should not exaggerate the legal obstacles" (ibid). Although "there is a lot of talk about getting rid of laws and regulations", our correspondent also warned against the falling in the trap of a legalistic discussion:

"There is a lot of talk about getting rid of laws and regulations. We do have a lot of laws and regulations, but they are not there for nothing. We should deal with those laws and regulations more creatively ... and be careful not to blame everything on regulations. We should particularly be careful to say that we need to get rid of legal barriers. You should check out this whole discussion about the electricity law – there are endless discussions about everything. It is very difficult to pinpoint what are the exact legal barriers that can be abolished. Rather we should stop thinking in terms of barriers and think more in terms of opportunities. We [Dutch] think in terms of limitations and not in terms of possibilities. If you ask a farmer how high his barn will be he will ask "how high is allowed to be" and then if one says 6 meters, the farmer will say he wants 6,5 meters". (interview 11)

When asked explicitly about the interaction with government, our correspondent answered that "there is no interaction with government – we consciously choose not to involve them" (ibid). Although the interest of government officials for local energy initiatives has considerably increased in recent years, our correspondent doubts the usefulness of government involvement and facilitation.

Another correspondents emphasized that recently there has been a bewildering amount of departments and organizations enthusiastically 'jumping on top of citizen initiatives' and commented that all this attention is not always particularly helpful:

"Now government officials all over us and other initiatives (...) they made a mess of (un)sustainable energy themselves and now they see all these nice citizens initiatives and they want a piece of it. Would it not be nice if we could simply leave it up to citizens? Government should learn to let go of what they can let go" (...) "there is [also] a bewildering amount of [civil society] organizations (...) who approach [us] for meetings, interviews and so on (...) they all want to do something with local energy: it is a hot item the last few years. I cannot cope with it all – and it is amazing how much double work occurs - I often get the same questions from many different people" (confidential).

2.1.2 Thermo Bello

The second empirical story revolves around *Thermo Bello*, a local energy company that is part of the eco-district *Eva-Lanxmeer*. The eco-community *Eva-Lanxmeer* includes around 250 houses and is located within the Dutch town of Culemborg. Since 2009, *Thermo Bello* is operational as the producer, network operator and supplier of district heating for *Eva-Lanxmeer* via a geothermal water heat pump, servicing a total of 180 private homes and 8 utility buildings (e.g. school, office complex, etc.). *Thermo Bello's* heat pump is connected to the water pump owned by *Vitens*, the regional company that supplies *Eva-Lanxmeer* with drinking water. This arrangement originates in a contract ("raamwerkovereenkomst") that was made in the year 2000 between: 1) the water company *Vitens*, 2) the council of Culemborg, and 3) the residents' association ("bewonersvereniging") of *Eva-Lanxmeer*. In this contract, the three parties made agreements regarding the development and exploitation of district heating, including

ecological targets. In 2006 *Vitens* decided to divest the heating supply, and the local government refused to take over. This is why and when the residents' association of *Eva-Lanxmeer* was asked to take over (interview 1 & website *Thermo Bello*). *Thermo Bello* has the ambition to become a full-fledged energy company in the future, including solar energy, wind energy and possibly biogas "in order to prepare for a period in which we will not depend on fossil fuels at all anymore" (ibid).

So far *Thermo Bello* has formally operated as a Limited Company (Ltd.) with the three founders functioning as directors (all residents of *Eva-Lanxmeer*). This is a temporary arrangement; the aim is to eventually place the Ltd. under a non-profit foundation with considerable decision making power, including a 'working group' of *Eva-Lanxmeer* residents. When asked why the initiators prefer this combination of legal forms (rather than e.g. a co-operative) our correspondent answered that this choice was made "in order to safe-guard decision-making capacity... if you have the whole neighbourhood deciding you cannot make progress as an entrepreneur" (interview 1).

One of the main **drivers** for the *Thermo Bello* company seems to be its embeddedness in *Eva-Lanxmeer's* eco-oriented housing community. Not only did the very existence of this community provide the origin of and possibilities for the foundation of *Thermo Bello*, some of the residents of *Eva-Lanxmeer* are also involved as volunteers in measuring and maintaining the heating facilities (ibid). Our correspondent emphasized that government and politics are incapable of taking action or at least far too slow, and that therefore citizens need to take action themselves, supported by government (ibid).

In terms of interaction with the government, *Thermo Bello* has mostly been supported by local and regional government. Although the council did not want to be involved in taking over the heating supply from company *Vitens*, the council did provide a guarantee to support the take-over by the association of residents, which was an important initial drivers (ibid). Moreover, *Thermo Bello* also received a subsidy from the regional government (*Province Gelderland*) to improve and extend the underground infrastructure needed for the heating supply.

Regarding **barriers and challenges**, our correspondent emphasized that a major bottleneck is formed by the "approaching national heating law", which aims to regulate heating supply in terms of price-caps and mandatory licenses. According to our correspondent, this law is supposed to protect citizens from large energy companies, but mean while the result is that the small local energy companies cannot survive because they cannot compete with large companies (who can afford lower prices):

[This law is] "a bureaucracy that aims to protect consumers; but we as local energy companies are the victims. The irony is that we ARE the consumer... we want to do it ourselves, but the government says 'that is not allowed, because we decide what the logic should be' (...) I really worry about this because the gas and energy prices are going to rise and the laws and regulations about heating prices will depend on the gas price. This means that we [Thermo Bello] will also have to base our energy prices on a global casino... We get stuck in a bureaucratic mill that does not allow us to take our own responsibility"(interview 3).

In conclusion, our correspondent emphasized that national Dutch government is "not at all supportive to these sort of [local, citizen-led] initiatives. They want to have new types of infrastructure, but they want to hold on to the same rules (...) they are still based on an old model of the monopolistic enterprises" (ibid). Moreover, our correspondent argued that the Dutch focus on and vested interests in its natural gas resources limits the opportunities for renewable energy technologies (interview 3). It is indeed no coincidence that this phenomena – i.e. the presence of a natural resource limiting investments in alternative economic developments – is widely known as 'the Dutch disease'.

2.2. The Belgian Case: Ecopower

National context	Socio-spatial context	Projects / organizations
Belgium	Cooperative Movement	Cooperative <i>Ecopower</i>

Ecopower is an energy cooperative in Belgium, which aims to ‘to collect funds for renewable energy projects from as many members as possible’ (website *Ecopower*). Founded in 1991, it has grown to an organization with 36.855 members at the end of 2011 with an average of 4,3 shares per individual member (one share costs 250 euro) (*Ecopower* 2012). Each member gets one vote, independent of the amount of shares. Since 2003, *Ecopower* also sells energy to its members (electricity and more recently heating). In 2011, *Ecopower* produced nearly 30 million kWh of renewable energy, owing a total of 11 wind turbines, 3 hydroelectricity stations, 1 biomass installation and 270 solar cell installations (*Ecopower* 2012).

One of the main **drivers** for the *Ecopower* organization concerns the ‘co-operative movement’. The co-operative movement refers to a transnational network of co-operatives and networks organizations that aim to promote and spread the co-operative philosophy of solidarity economics and not-for-profit enterprises. The *United Nations* proclaimed 2012 to be ‘the International Year of Co-operatives’, which is understood as “an acknowledgement by the international community that co-operatives drive the economy, respond to social change, are resilient to the global economic crisis and are serious, successful businesses creating jobs in all sectors” (<http://www.2012.coop/>). UN Secretary General Ban Ki-moon stated that “co-operatives are a reminder to the international community that it is possible to pursue both economic viability and social responsibility”. One of the interviewed board members of *Ecopower* is also a board member of the organization *Rescoop Europe* (a federation of groups and cooperatives of citizens for renewable energy). Both the board members emphasized that *Ecopower* was strongly embedded in the cooperative movement, more so than for instance in the environmental movement (interviews 5&6). In relation to that, representatives that speak on behalf of *Ecopower* consciously stress issues such as citizen participation, local economy, independence, economic security and solidarity, more than pure environmental arguments: “we increasingly talk more and more about money and local economy, more than about kilowatt hours, emissions and environment” (ibid).

Another **driver** for *Ecopower* has been the liberalisation of the energy provision market; “this [possibility of selling energy] is one of the main factors that has enabled the organisation to grow... especially those co-operatives that are not only producers but also suppliers of energy are growing in Europe” (ibid). Also a driver for *Ecopower* concerns the legal recognition of the organization as being a not-for-profit social enterprise. Amongst other things, this legal status enables member shareholders to receive a tax redemption of 180 euro per year. The other side of the coin is that the shareholders’ profit is legally limited to 6%. When asked whether this was considered to be a barrier/limitation, the board members emphasized that -on the contrary- this limitation helped to safeguard the main goals of the organization, as also stated on the website: “This is not necessarily a limiting factor. On the contrary, it creates possibilities, as the financial surplus can be used to finance less profitable projects. Moreover, 6% is a good rate of return considering the current interest rates applicable to savings accounts” (website *Ecopower*). In the interview it was also stressed:

“we want to make kilowatt hours for our people... we do not want them to make money... we want to safeguard their energy supply for the future... so our product is renewable energy for our

people. Those 6% that we provide in profit; that is not our [main] product: our product is not a financial product but kilowatt hours" (ibid).

When asked about interaction with the government, *Ecopower* representatives narrated how back in 1991 – when the co-operative was founded – “there was no space for renewable energy”, and that the organization initially invested a great deal of time political lobbying (e.g. through the *ODE* – Dutch abbreviation for ‘Organization for Sustainable Energy’) (interviews 5&6). Also nowadays *Ecopower* is actively involved in political lobbying, such as recently a campaign regarding wind power: “currently it is possible for one person to buy the property rights of the wind... we want to claim the wind for the citizens... the wind belongs to everybody... we want to decouple the use of the wind from private ownership” (interviews 5&6). Regarding cooperation with the government, *Ecopower* emphasizes that their method of working is especially suitable for cooperation with city councils. For instance, *Ecopower* cooperates with the city of Eeklo as follows. After the city council had selected three sites for windmills and formulated specific environmental and social criteria, a total of seven companies competed for the right to construct and operate the windmills. *Ecopower* won the competition:

Ecopower-Eeklo: successful cooperation with a city council. (...) Thanks to an explicit information strategy and campaign – a shared initiative of Ecopower and the city – the inhabitants of Eeklo are well informed and very supportive of the project. Moreover, they are convinced of the windmills’ potential and many have purchased shares in Ecopower, shares in what are now ‘their’ windmills. (website Ecopower)

Representatives of *Ecopower* stressed the importance of having more and further reaching council decision regarding land expropriation and sustainable procurement, but also acknowledged the political sensitivity of such public decision-making. According to *Ecopower* and *Rescoop* representatives, Belgium lags behind compared to Germany and United Kingdom, both in terms of renewable energy as well as the cooperative movement:

“There is no organization that unites the cooperatives ... in Flanders we ourselves have founded [the organization] Coopkracht... but it is only after 4-5 years of voluntary work that we are now thinking about employing someone to run this organization. A strong federation as they have in the United Kingdom and Germany, we do not have that here.” (interviews 5&6).

As for energy policy; back in 1991, the green lobby in Belgium proposed the German model of the feed-in-tariff. This was not accepted by the Belgian government, which instead implemented the system of ‘green energy certificates’. Currently however, the Belgian government is considering implementing a new approach that resembles the German model of the feed-in-tariff. As a result:

“it is actually a very instable investment climate. When you compare it with Germany – there it is very stable... Stability leads to investments which in turn leads to employment; that is something that we cannot say about Belgium, Flanders and Wallonia” (ibid).

Also there here are hardly any concrete plans to realise Belgium’s EU commitments regarding 20% renewable energy by 2020; “there is not even a task division made yet between Wallonia and Flanders” (ibid). When dealing with Belgium, we have to remember that we are dealing not only with a federal government at the Belgian level, but also with subnational governments of the different regions of Flanders and Wallonia/Walloon. There are considerable differences between them when it comes to policy-making. For instance, regarding the wind ownership campaign mentioned earlier: Wallonia has already decided that each wind project is obliged to offer participation to citizens for 25% and to local governments for 25%, while in Flanders they are still discussing legal issues (ibid).

2.3. The UK Case-studies

National context	Socio-spatial context	Projects / organizations
United Kingdom	Scotland Energy Community	Project <i>Urgha Wind</i>
		Project <i>Udny Community Wind Turbine</i>

Scotland is a breeding bed for community projects including a large number of community owned energy projects. We start our research for the UK energy context with the two frontrunners in community energy, Urgha and Udny Community Wind (. During the scoping of the UK case-studies, representatives from the Scottish government and from Community Energy Scotland suggested Urgha and Udny as successful cases that “survived and succeeded in an unfriendly institutional landscape.” As a result, the exploration of these two case-studies reveals institutional barriers and opportunities faced by the two frontrunning communities when community energy in Scotland was in its infancy. At present, the institutional context has changed with a Scottish Strategy about Community Energy explicitly stating conditions and targets for energy sufficiency and self-reliance.

2.3.1 Urgha Wind Project & The North Harris Trust

Urgha Wind is a community owned wind turbine by the North Harris Community Trust in UK. At a community recycling site, a community group was established in 2003 so as to set up projects that benefit the larger community. North Harris is a sparsely populated area and the community consists of 700 inhabitants. At the beginning, the community recycling site was contracted by the city council. The resources needed to support a healthy community economy however could not be covered by council’s support. Hence, they erected a turbine (10KW wind turbine) that generates electricity (that converts to heat and light) and the excess/surplus of electricity generated not used by the community is fed into the grid. The turbine generates 4000 pounds/year of income. The primary objective of operating the wind turbine is to support job creation. Adjacent to the turbine’s location is a small business district/area. There is a future plan to erect a second turbine.

A recognised and experienced barrier for Urgha Wind is the **risk aversion of banks** when it concerns loans for communities rather than private energy investors. Even though there are funds available and favourable conditions in loan packages for community owned energy projects, the majority of the banks are risk averse and avoid lending to community organizations. Given the changes in the funding schemes, grant funds are not anymore available for community energy projects; therefore if one wants to benefit/apply for feed-in-tariff, different sources of funds need to be explored such as commercial landing, private funding. This brings new barriers given that community projects are seen as of high-risk from banks making them reluctant to grant loans to community initiatives. Another risk to be considered is the **financial viability risk** of the Community’s Trust. In the case of North Harris Community Trust, since the erection of the turbine, the company went bust so the wind turbine was not fully installed (monitoring equipment was not installed). The turbine was operated and generated electricity even without seizing its full design potential. The Trust had to find new sources of money so as to finalize their project.

Additionally, the community trust had to compete for loans and grants with private energy operators in an open market. A tough lesson taught was that in the beginning, commercially owned projects overtaking benefits due to their scale and better marketing-devised strategies. This however changed due to the support given by Community Energy Scotland (see following section).

At the same time, the enforced feed-in tariff scheme creates extra complications rather than an enabling environment for community energy. For the North Harris Community Trust, the grant fund that was awarded to cover the first three years excluded the community operators to apply for and as such, benefit from the feed in tariffs. Another complication concerns the benefit-holders of the community owned energy projects. The existing Planning Law does not specify about the beneficiary of community-owned energy projects (who get the benefit); a fact that creates accountability issues within the group from the community who operates the wind turbine and the community as a shareholder of it.

The **time** that it required from the proposal stage to the operation of the wind turbine creates additional hurdles due to the group stamina it requires to deal with the uncertainty and the ad-hoc demands that were created given that the community groups undertake these activities at voluntary capacity.

2.3.2 Udney Community Wind Turbine in Aberdeenshire

The Udney wind turbine is owned by Udney Community Trust that is a community founded and owned organization. It started with five members of a community (professional engineers and farmers) that showed interest in community energy in order to generate income for the local community. Udney Wind is a leading community project in Aberdeenshire. The installation of wind turbines by the community exemplified how to work towards the outcome for the follower communities.

In the case of Udney wind, a helpful condition was the fact that the local council officers welcomed the idea of a community owned wind turbine and were as helpful as they could to the community group. The council officers recognised that there is demand by community for facilitation and advice and respond to it by working in partnership with community to establish energy projects; they remained available and open to communicate and interact with the community throughout the project cycle.

A barrier faced by Udney community wind was the in-compliant funding possibilities. Udney Community Trust where the rewarded 400,000£ by the national development fund have to be declined since they are considered as double funding after having been granted a bank loan with favourable conditions.

2.3.3. Energy Communities in Scotland

A common feature in the Scottish context is the willingness and tendency of communities to strive for self-sufficiency and independence, an aspect also present in the energy sector. The establishment of a mediating organisation – Community Energy Scotland, with the task to enable communities to undertake initiatives, further reinforces this cultural aspect and aims at succeeding in having community owned energy projects. After the energy strategy by the Scottish government, there were 200 villages that subscribed for community owned projects. The Scottish government responded to this demand by forming a consultancy/support group to aid these villages to become more energy efficient. Community Energy Scotland started as a Highlands and Islands Enterprise and in 2002 changed into the structure that operates today. It shifted from a government-based organization to an economic aid based organization. The different community groups elect directors and members of Community Energy Scotland.

Community Energy Scotland currently is a non-profit organization that helps communities to initiate proposals for community energy projects and to seek support from local authorities. Its role is to empower group initiatives and to respond to community requirements for initiating such projects. Development officers are now placed all around

Scotland to assist communities. It also functions as learning diffusion channels: (a) they transfer lessons learned from operating successful projects (b) good practices and lessons from the interaction between community and banks or other funding

Community Energy Scotland helps communities during the first phase to conduct a report, a feasibility study and to put together a planning application that complies with the Community Renewable Scheme (CARES) of the Scottish government. The process is transparent and adaptable to community requirements and capacity. Different types of support are available: internet sources, publications, general information, RE-toolkit, community-energy toolkit, mentorship program (with one-to-one consultations) training events (on demand and regular) and a practitioners-community conference. organizations (e.g. corporate actors). Recently, the initiation grant for community energy projects is a loan scheme of 150,000 that covers 90% of the funding. Communities seek funding from a number of resources such as private and commercial sectors. The requirement is that 20% of the total cost has to be matched by community's resources. A way to ensure this and to succeed in matching resources is to establish a community share scheme.

Community Energy Scotland is involved in different types of community projects and initiatives such as: (a) community-buildings, where advice is provided in one-to-one basis (via phone talks and consultation) about energy efficiency in community buildings and other broader needs (b) communities generating profits, and the profit is given to the community for benefiting its welfare and wellbeing (not utilized by one person or limited few) (c) community paradigm program where 30 groups are involved in a networking project sharing an agenda for locally produced food so as to reduce carbon footprint of the food chain.

2.3.4. Scotland and the UK

Scottish government and the UK government have positioned energy sufficiency high on the **political agenda**. This is a strong driver for all energy related projects. More specifically, there is a clear direction from the Scottish government to realize the energy ambition of the region to become energy independent mapped out in the Strategy for Energy Scotland ("Energy Roadmap 2020"). Clearly defined targets within the Energy Roadmap 202 are considered useful by different stakeholders because they provide legitimacy, (constitutional) support and an institutional stepping-stone for mechanisms and venues to gain support (financial, policy and organizational). Wind-projects owned by communities were promoted and prioritized as action plans for communities to be energy self-sufficient and financially profitable. Economic development and benefits for communities were triggering motives also communicated by council and government.

In addition to this, the Scottish government provides **financial incentives** for promoting energy projects in Scotland. Existing financial motives include the feed-in tariff and low interest rate loans and the national lottery fund. Grants from councils cannot be used; available grants include the lottery fund, LEADER EU Initiative (EU rural development funds) and loans to support community projects. An office and project for corporate investments on renewable energy is the Energy4All office.

An additional enabling factor is the **availability and mobilisation of resources (time and personnel) for community capacity building**. At present, Aberdeenshire council has an office and appointed officers that provide advice to small businesses and households about energy installations and measures for energy efficiency. Resources were made available for having pilot projects with small-scale energy projects. The councils have seminars to disseminate information and in this way to create and educate the community

with the goal to create/grow the demand side. Seminars targeted housing associations and neighbourhoods for introducing district-heating installations.

A technological and financial barrier common to all community energy initiatives in Scotland is the grid coverage and connection cost. **Grid connection** in remote locations is limited and when available, grid connection cost is a hurdle. After the mediation of Community Energy Scotland, grid operators are invited in community consultations to inform community groups about future (planned) grid operations and installations. Investments in the grid for grid expansion are however not planned and scarce. At the same time, for communities that want to have their energy project, they face the difficulty of grid disconnect. The choice lies at the community's hands to upgrade the grid on their own cost (an amount of approximately 500,000 pounds, based on 2011 estimates and information) before installing any green energy technology. The grid operating company enjoys a monopoly and their interactions with community (when are not mediated by Community Energy Scotland) are slow and not open to information sharing and to creation of informal routes for cooperation (interview 13).

2.4. The German Case-studies

National context	Socio-spatial context	Projects / organizations
Germany	Eco-district Vauban Freiburg	Passivehouse »Wohnen & Arbeiten«
		Co-housing <i>SUSI-project</i>
	Town Schönau/ movement	Company <i>Elektrizitätswerke Schönau</i> (EWS)

2.4.1 Community Housing Projects in eco-city Vauban

Vauban is a district in the German city of Freiburg, renowned world-wide for its eco-oriented and participatory approach to urban planning, which started in the 1990s. A short description of the history and characteristics of Vauban can be found in Scheurer and Newman (2008). The Vauban district is planned to accommodate housing for 5.000 inhabitants and 600 permanent jobs, and was presented as German Best Practice at the 1996 UN Habitat II conference. In terms of energy, Vauban has a neighbourhood-scale combined heat and power station, fuelled primarily with waste products from the nearby Black Forest. This solution has been the result of "local advocacy groups [that] lobbied long and hard for a combined heat and power plant specific to Vauban to allow a much higher scope of self-determination about the district's energy supply (Lange, 1999; Steimer, 1999)" (Schreuer & Newman 2008:7). On the demand side of energy, Vauban is known for its passive houses and plus-energy houses. Already before Vauban, the council of Freiburg had pioneered a city-wide low-energy building standard in 1992 (which was later implemented at the federal level in Germany). However, through the many ambitious and innovative projects in passive houses and plus-energy houses, Vauban has moved 'beyond' this legal standard. According to one of our correspondents – the council has mean while decided that from 2011 onwards, only passive houses can be built for residential buildings.

Another distinct feature of Vauban is that a substantial part of the housing supply is organized by resident cooperatives, in contrast to commercial developers or centralised housing corporations (ibid). This decentralized housing supply resonates with the overall

influence of participatory ownership and planning, which plays an important role in Vauban:

"... the most significant factor in enabling the Vauban model to be developed was the use of the PCP process – a public-community-partnership set up with Vauban Forum. This enabled the sustainability goals to be achieved with both technical and social innovation (...) Such decentralisation in energy production and distribution goes hand in hand with the goal of the Distributed City. (...) The PCP model is a process for creating the distributed city". (Schreuer & Newman 2008:13)

We interviewed residents from two different housing community projects: 1) the *SUSI-project* (interview nr. 14) and 2) the *Passivehouse »Wohnen & Arbeiten«* (interview nr. 12). Our correspondent from *»Wohnen & Arbeiten«* was also an active member of the public-community-partnership *Vauban Forum*.

The *SUSI-project* combines student housing and social housing. The name *SUSI* comes from *Selbstorganisierte Unabhängige Siedlungs-Initiative*, German for 'self-organized independent settlement initiative'. The project accommodates 250 residents, spread out over 4 buildings, a space for 'bauwagen' (self-made trailers) and two grass plots (interview 14). The project is 'self-organized' in the sense the property is owned by an organization whose members are also the residents. To be more precise – the residents formed an association, and this association in turn founded the company that owns the property. This is done in cooperation with the German 'Mietshäuser Syndikat' (literally translated as 'syndicate of tenement houses'), a syndicate that was founded in 1992 in order to facilitate self-governance in the housing sector. This particular legal arrangement serves to ensure that the property cannot be resold on the commercial market³. In terms of energy, the *SUSI-project* itself is mostly focused on the demand side, in terms of saving energy in the demolition and construction of houses and retrofitting houses with various isolation materials (website *SUSI-project*). Furthermore, our correspondent reported that the *SUSI-project* receives its electricity from the energy company *Elektrizitätswerke Schönau (EWS)* and elaborated on the reasons why (see next section 2.5).

The *Passivehouse »Wohnen & Arbeiten«* was constructed between 1998 and 1999 as one of the first passive houses, and is often mentioned as an exemplary project in terms of its innovative heating and sanitation solutions. It reduces primary energy use by 79% for 7% extra building cost compared to a conventional new building, and it is argued that the energy cost savings can pay off the 7% extra cost in 10 to 20 years (website *Passivehouse »Wohnen & Arbeiten«*). The remaining power needs are met by "solar thermal collectors and PV panels, and an on-site micro-CHP plant" (Antonoff 2007).

When asked about the interaction with government, our correspondent reported that the *Passivehouse »Wohnen & Arbeiten«* project – and the *Vauban Forum* initiatives more generally – were both hampered and facilitated by the local government. The main **barrier** mentioned was that at the time when the projects were started, the process was new for the administration, and that as the result of that, the administration was "sceptical to hand over power" to the citizens: "every single good idea that was brought up by citizens was criticized, slowed down, doubted and sometimes hindered by city administration" (interview 12). Citizens did however in the end manage to convince the city council on several urban planning decisions (e.g. location for the market place and position of car garages outside the district), but it often took several years of lobbying to convince the council. Regarding the development of sustainable energy in Vauban, another barrier that was emphasized during the interview was the limited image of co-generation:

³ Based on information from interview nr. 14 and also the description provided by the website of another housing community project: <http://projekt-eschenhof.org/English/Concept>

“co-generation is completely ignored by politicians and energy companies (...) co-generation is mostly hampered by the centralized paradigm (...) grid companies know that they will never be able to compete with decentralized energy” (ibid).

As a **driver** for bottom-up sustainable initiatives in Vauban, our correspondent indicated that – despite of the hampering aspects of the local bureaucracy – there has been considerable support from political council members:

“The Green Party is the biggest faction in the city for years.... Especially council members often help a lot, especially [member x] from the Socialist Party and [member x] from the Green Party (...) Political council can be helpful, but the bureaucratic administration less so: they cannot be creative... because if something goes wrong the person gets blamed by the administration and the public. Therefore they often downplay good ideas, or water it down...” (interview 12).

Another driver that was mentioned concerns the persistence of the citizens involved. Our correspondent emphasized the “seriousness, boldness and perseverance” of *Forum Vauban*, as well as its professional approach in for instance speaking to the press (which were often in ‘their favour’). One of the secrets of *Forum Vauban* was:

“we tried to infiltrate the council and contact each council member... (...) we were often discouraged, we often heard ‘no’... but then we investigated why they say no and discovered that there were no unovercomable obstacles (interview 12)”.

When asked whether the main driver for *Forum Vauban* was this persistence of the citizens involved, our correspondent answered: “yes, but we also had the feeling that our voice would count; the behaviour of the council was giving us hope” (ibid).

Last but not least, another important driver for the projects in Vauban concerns the existence (and legal recognition) of the earlier mentioned housing cooperatives or ‘Baugruppen’ (literally: building groups) – in which groups of citizens act collectively as self-governed developers. In addition to the collective ownership of a building (the most common association with a co-housing arrangement), the Baugruppen also enable citizen collectives to actually design and construct the buildings on their own terms. According to our correspondent these Baugruppen are ‘booming’ in Germany because “people are starting to see that they can save money this way” (interview 12). The earlier mentioned council’s decision that from 2011 onwards, only passive houses can be built, was mentioned as a positive driver for the collective ‘Baugruppen’ because “private citizens do not have the money for the initial additional construction costs, commercial developers don’t care... so then we decide to build in groups [Baugruppen]... it is financially more attractive” (ibid).

2.4.2 Elektrizitätswerke Schönaue (EWS)

Elektrizitätswerke Schönaue (EWS Schönaue) is a renewable energy provider (99,6% renewables and 0,4% cogeneration in 2010) that serves 135.000 electricity users and 8300 gas users across Germany, and in addition has subsidized a total of 2150 electricity production equipment units amongst its customers, including solar units, cogeneration units, biogas and hydraulic power units (EWS Schönaue, 2012). Since 2009 EWS Schönaue has become a cooperative, because they argued that “it is the most democratic and transparent way to organise ourselves” (interview 15). At first there were 650 citizens from Schönaue, who put money together to buy the local grid. At the end of 2012, the cooperative had 2700 members coming from all over Germany (interview 15). Recently, EWS has become involved setting up other cooperatives across Germany, such as EVTN, a new cooperative in Titisee-Neustadt. EWS took a 40% share in EVTN with the commitment that a quarter of the revenues of those shares will go into setting up new cooperatives (interview 15).

One of the main **drivers** for EWS lies in its historical roots in the anti-nuclear movement. In the aftermath of Chernobyl in 1986, a parents' initiative⁴ emerged in the small town of *Schönau* to protest against nuclear energy. They didn't want to wait until the government or energy companies would act, but started themselves. After 10 years of protest and debate with the local grid operators, the citizens in 1997 'took over' the grid and Schönau's community's supply from KWR (now called Energiedienst, a daughter company of one of Germany's four largest energy suppliers EnBW). Still, rebelling against the large four energy companies is an important focus of EWS: 'EWS fights against those forces that want to stop the *Energiewende*' [...] 'The four big energy companies that are losing market share when people start producing their own energy; they hamper the *Energiewende*.' (interview 15).

With this EWS plays into a strong sentiment amongst German citizens. One of our Vauban correspondents describes *EWS Schönau* as "the best known and most famous example so far – it tried to break the monopoly of big energy companies – this was very difficult... but they went to court and won in the end. They got the most sustainable electricity provision in all Germany" (interview 12). Our other Vauban correspondent said the following regarding *Schönau EWS*:

"I went to one of these anti-nuclear power events and there I met people from Schönau. I am very impressed by their independence and courage to organize themselves and do what feels good for themselves. It feels very good to get electricity from them and not from a corrupt company that sells cheap energy." (interview 14).

This leads to the next driver: the ambition to make the energy supply more democratic. EWS grew out of the idea that citizens are too dependent on an oligopolistic energy supply. Developing decentralized sustainable energy is seen as a way to make the energy more democratic: 'Involvement of citizens is very important (...) not only for investing, but also for their voices. In that way we democratize the energy supply.' (interview 15)

A third driver spurring the growth of EWS is the liberalization of the energy market, which made it possible for EWS to supply energy across the country. 'First we thought it would be a threat, but now it's a big help, because it increases the reach of EWS to all over Germany.' (interview 15)

The first big **barrier** for EWS was to overcome resistance from KWR and convince the people of Schönau to buy the local grid. One of the blocking strategies by KWR was to ask a very high price of 8.8 million DM for the local grid, while a taxation requested by the citizens of Schönau provided a number of 3.8 million DM. In response the citizens found sponsors all across Germany to pay KWR's price. 'If we would have gone to court over this, it could have taken years, therefore we decided to collect donations to fund the difference and go to court after buying the grid' (interview 15). In the end two referenda were necessary to be able to buy the grid from KWR.

Another barrier relates to EWS being different from mainstream energy companies. This makes EWS a difficult case for the regulator:

'Since we started cooperating with cooperatives that want to buy back their grids the Bundesnetzagentur (BnetzA)⁵ starts to make trouble and they send the Bundeskartellamt⁶ at us. The BnetzA sets the criteria according to which local municipalities should decide who can

⁴ "Eltern für atomfreie Zukunft e.V." - association of parents for a nuclear free future

⁵ The Bundesnetzagentur or Federal Network Agency for Electricity, Gas, Telecommunications, Post and Railway promotes effective competition in the regulated areas and ensures non-discriminatory access to networks (Bundesnetzagentur, 2013).

⁶ The Bundeskartellamt is an independent competition authority whose task is to protect competition in Germany (Bundeskartellamt, 2013).

be the next concession holder of a local grid when the concession runs out. We feel the BnetzA is setting up the criteria to make it difficult for us to get involved. Right now in Titisee-Neustadt, EVTN [in which EWS has a stake] has bought the grid, all the contracts are signed and afterwards Energiedienst, the former owner, went to the BnetzA to complain because they felt discriminated during the process.'

Regarding the interaction with government, a distinction should be made between local and national governments. EWS cooperates very well with local politicians, the mayor of Schönaueven addresses their annual conference (interview 15). The national government on the other hand, is very close to the large four energy companies, according to the correspondent of EWS: 'The Minister of Economic Affairs is a marionette of big industry, he tells whatever nonsense the industry wants him to say.' (interview 15)

Still, Germany is viewed by all our correspondents as 'far ahead' in the energy transition or 'Energiewende' as the project has become known in Germany after the nuclear exit was decided in the aftermath of the Fukushima nuclear disaster (Bosman, 2012). In terms of policy Germany was described as having a stable investment climate (interviews 5&6). On the other hand, it was also denounced as 'over-regulated' (interview 14), and criticised for its feed-in-tariff policies. But most of all, Germany is celebrated by both German and non-Germany correspondents for the collectivist citizen initiatives:

"in Germany in the past 5 years there have been 500 renewable energy cooperatives started (...) almost every day one is started (...) people there really organize themselves already at the level of neighbourhoods... the step to do that in Germany is less big than in other places... and it is supported by an organization (interview 5&6)"

The correspondent from EWS argues that her organisation is an icon of the Energiewende:

'It really is a success story, it influences how people think about the Energiewende, people know about us across the globe. But also financially it's very successful. [...] Also we have a lot of visitors from the US, journalists, a TV-station from Australia and Japan, after the Fukushima nuclear disaster. Ursula and Michael Sladek⁷ and also myself are invited to talks in different countries, all over the world. (interview 15).

She adds that the Energiewende gives her a reason to be proud of her country: 'What is remarkable is the reaction of people from abroad. People like me from the after war generation sometimes feel ashamed about Germany. New people love Germany because of the Energiewende and we can be proud of our country' (interview 15).

⁷ Founders of EWS Schönaue

2.5. Overview of Drivers & Barriers in Case-studies

Table 2. Overview of Drivers and Barriers in Empirical Case-studies of Community Energy Initiatives

Case-study	Drivers	Barriers
<i>Texel Energie</i>	<ul style="list-style-type: none"> • Strong identity Texel Island • Historical legacy strive for island autonomy 	<ul style="list-style-type: none"> • New/ unrecognised business model (not-for-profit) • Difficulty getting financed
<i>Thermo Bello</i>	<ul style="list-style-type: none"> • Embedment in eco-community Eva-Lanxmeer • Support local government 	<ul style="list-style-type: none"> • National laws & regulations • Dominance of natural gas in Dutch context • Technological complications
<i>Ecopower</i>	<ul style="list-style-type: none"> • Co-operative movement - socio-economic concerns • Liberalisation of the energy market • Legal recognition of not-for-profit social enterprise model • Cooperation with local government 	<ul style="list-style-type: none"> • Instable national political climate > • Lack of vision national energy policy • Lack of organised unity between cooperatives in Belgian context
<ul style="list-style-type: none"> - <i>Urgha Wind</i> - <i>Udny Community Wind</i> 	<ul style="list-style-type: none"> • Local culture & legacy of collective arrangements • Political push and on the policy agenda • Mediating organisation (<i>Community Energy Scotland</i>) • Existing technology at hand (wind energy) 	<ul style="list-style-type: none"> • Risk aversion of banks / financial viability risk • Time-management / project management risks • Grid coverage, connectivity and cost • Incompliant funding mechanisms
<i>Vauban:</i> <ul style="list-style-type: none"> - <i>Passivehous</i> - <i>»Wohnen & Arbeiten«</i> - <i>SUSI-project</i> 	<ul style="list-style-type: none"> • Support from (some) council members (Green Party) • Perseverance of citizen forum • Professionalism citizen forum (e.g. talking to press) • Legal recognition of citizen 'Baugruppen' 	<ul style="list-style-type: none"> • Scepticism local government bureaucracy • Poor image of co-generation as alternative energy
<i>Elektrizitätswerke</i> <i>Schönau (EWS)</i>	<ul style="list-style-type: none"> • Historical roots in anti-nuclear movement • Rebelling against large four energy companies and making energy supply more democratic • Playing into German anti-nuclear and pro-renewable sentiments • Liberalization of energy market 	<ul style="list-style-type: none"> • Hesitation by local citizens to join and chip in • Difficulty for regulator to assess and assure fair competition

3. A Complex Transition Perspective on Community Energy

When looking at the empirical case-studies and the observed drivers and barriers from a socio-technical multi-level perspective, the verdict is obvious: these community energy initiatives are 'niches', i.e. protected spaces that enable and shelter radical innovation from the pressures of unfavourable socio-technical 'regimes' (Geels 2005, Seyfang & Haxeltine 2012). Each and every 'barrier' that is mentioned in and by the community energy initiatives (see overview in table 1) can be explained in terms of regime factors that the niches are confronted with. These are typical barriers of the socio-technical energy regime, which – regardless of its time, place or other context - include established rules and regulations, dominant energy technologies and infrastructures, institutional and financial standards, and so on and so forth. Obviously, a proper socio-technical multi-level analysis of the community energy initiatives under study would require much more sophisticated and detailed historical and context-specific empirical research. This however, is not the aim of this paper.

As explained in the introduction, this paper aims to explore how we can conceptually frame and analyse the empirical community energy initiatives from a complex transition perspective, what this can contribute to the socio-technical multi-level perspective and what kind of policy suggestions/ transition management suggestions could be formulated on that basis. As also explained in the introduction, there is in fact no such thing as 'the complex transition perspective', rather it is an amalgam of various complex transition perspectives plural. Elaborating on all of these is beyond the aim of this paper. Rather, we focus on discussing three specific elements and implications of complex transition perspectives:

- 1) Beyond Niches: the Power of Niche-regimes & Undercurrent Counter-movements
- 2) Beyond Socio-technical System Boundaries: the Socio-cultural Context
- 3) A Multi-level Governance and Framework

In accordance with the complex transition perspective, we address the linkages between dynamics and management for each of these implications, and we discuss action research implications in terms of questioning how a specific conceptualisation may affect the endeavours of the practitioners under study.

3.1. Beyond Niche: the Power of Niche-regimes & Undercurrent Counter-movements

The MLP is based on distinguishing between different levels of functional aggregation within and outside a socio-technical system under study. Aggregation means that theoretically, there are an infinite amount of many more levels between and beyond the niche, regime and landscape. The choice to focus on specifically these three levels has been informed by its demonstrated added value for describing and analysing empirical processes through time (Geels and Schot 2007; Geels 2010). Nevertheless, it remains relevant to keep questioning the focus on these three levels, and whether there are not additional levels to distinguish that have explanatory added value. Loorbach & Rotmans (2010a) have proposed to add two levels to the multi-level perspective, one being the level of 'niche-regimes', the other being the 'undercurrent level'. We now elaborate on these additional levels and what they mean when applied to the empirical community energy cases.

3.1.1. Niche-Regimes in Community Energy

The '**niche-regime**' refers to "a niche that has grown powerful enough to gain a number of new characteristics, most important of which is the ability to attack (sometimes effectively) an incumbent regime" (Loorbach and Rotmans 2010:136, based on De Haan 2010). Avelino (2011) has defined a niche-regime as a group of actors that exercise 'transformative power', i.e. develop new institutions and structures that enable the spread and up-scaling of innovations.

When we apply the **concept of 'niche-regime' to the community energy initiatives** under study, we can argue that many of the identified drivers and barriers can be explained in terms of the formation of niche-regimes; i.e. collective endeavours to develop new structures and institutions that enable community energy. When the formation of a niche-regime is in a further state of development, this is experienced as a positive driver. For instance, in the UK cases, the existence of the mediating organisation *Community Energy Scotland*, was experienced as an important driver. On the other hand, when a niche-regime is lacking, or when the formation is at an early stage, this is experienced as a barrier. The representatives of *Ecopower* emphasised that one of the main barriers they experienced was the lacking development of organised unity and cooperation between different bottom-up energy initiatives in the Belgian context (something which – they argued – is far more developed in the German and UK context). At the same time, board members of *Ecopower* do profit from, and participate in, niche-regime formation at the European and international level, through e.g. an organisation such as *RESCOOP*.

To a certain extent, niche-regime formation is about mediating between the socio-technical regime on the one hand, and community energy niches on the other hand. Smith (2006,2007) already emphasised the importance of the '**translation**' between niches and regime, a role that is often fulfilled by **intermediaries** (Hielscher et al. 2011). Intermediaries can be defined as "organisations and networks that build links between specific community energy groups, and which exist to share experience, good practice, expertise and advice. In some cases, intermediaries also act as a voice for community energy by providing evidence and advocacy to policy-makers" (Hielscher et al. 2011:7).

While intermediaries can be seen as an important factor in niche-regime formation, we would argue that niche-regime formation is not limited to the actions of intermediary organisations, but can also be enacted by community energy initiatives themselves. Cooperatives *Ecopower* and *Schönau EWS*, for instance, seem to have "grown powerful enough to (...) [effectively] attack (...) [the] incumbent regime" (definition of niche-regime by Loorbach and Rotmans 2010:136, based on De Haan 2010). *Ecopower* has grown enough size and credibility to successfully compete with other energy companies in a council tender competition on wind energy.

3.1.2. Undercurrent Counter-movements in Community Energy

With the 'undercurrent level', Loorbach & Rotmans (2010a) refer to social movements, activist groups and niches that 'exert pressure on niches and/or on the regime'. In a study of car dominance, Zijlstra & Avelino (2012) contrast 'dominant landscape trends' that reinforce car dominance against anti-car movements, and they conceptualise these anti-car movements as 'counter-movements' at the landscape level. In that line of argument, the point is to unpack the exogenous black box of the landscape level, by conceptualising the collective power that large groups of individuals can exercise at the landscape level, distinguishing between 'dominant landscape trends' (as the collective exercise of reinforcing power) and '**undercurrent counter-movements**' (as the collective exercise of transformative power) (Avelino 2011, Frantzeskaki, et al 2012c).

In the case of the community energy initiatives under study, we clearly observe that many of them tap into undercurrent counter-movements, such as e.g. *Schönau EWS* into the anti-nuclear movement, or *Ecopower* and various other cooperatives into the cooperative movement. Through the involvement in these movements, the community energy initiatives team up with international networks and lobby-groups at the European and global level, thereby exerting pressure on international and national governments. We would argue that this kind of pressure is not merely bottom-up niche-pressure, but that we can understand it in terms of an undercurrent counter-movement at the landscape level that also exerts top-down pressure onto the socio-technical energy regime. With 'top-down' here we do not mean authoritatively, we rather mean it in terms of a higher level of aggregation. We would argue that the international cooperative movement has a higher level of aggregation than the e.g. Dutch socio-technical energy regime.

3.1.3. Policy & Action Research Implication: Moving beyond the Niche

From the perspective of strategic niche management (Kemp et al. 1998, Hoogma et al. 2002, Smith and Raven 2012), the focus lies on 'protecting, nurturing and empowering niches'. When applied to the empirical case of community energy, the strategic niche management perspective emphasises niche processes of learning, visions and networking for fostering niche growth and diffusion into the mainstream (Seyfang 2010).

When we shift the focus to also include the perspective of niche-regime and undercurrent counter-movements, this has implications for the kind of learning, visioning and networking that one undertakes from within the niche: learning and visioning about what, and networking with whom? Equally important to – and a precondition for – niche growth and diffusion into the mainstream, is the formation of niche-regimes and the playing into undercurrent counter-movements, thereby exercising collective transformative power at various levels to exert pressure on the socio-technical regime. One of the of the main policy implications for practitioners involved in community energy, is then the need to look and operate beyond the boundaries of the community energy niche.

From a critical action research perspective, we should also be aware of the (unintended) societal effects of characterising empirical phenomena as 'niches'. If the purpose of a heuristic framework is (also) to empower individuals to take action towards a desired goal (e.g. sustainability transition), then we should also be aware of the disempowering effects that the MLP might have in terms of boxing empirical phenomena in terms of 'niches' against powerful 'regimes' and exogenous 'landscape' trends. Even though all transitions literature emphasises that these power relations change over time, and that niches may break-through and replace regimes, the inherently long-term perspective on such processes of change can be particularly disempowering in the context of current situations and on-going processes (Avelino 2011). The concepts of the 'niche-regime' and 'undercurrent counter-movements' helps to unpack the MLP levels and, by doing so, identifying how initiatives and actors may already move beyond their niche-status by teaming up with, and operating at, various other societal levels of aggregation.

3.2. Beyond Socio-technical System Boundaries: the Socio-cultural Context

One of the many things that complex system thinking teaches us, is that system delineation is one of the most essential factors in the outcome of an analysis (Pel 2011). In the socio-technical MLP perspective on transitions, the focus is on delineating socio-technical systems (e.g. mobility, energy, agriculture). In the complex transition perspectives, the system delineation is broadened to societal systems more generally, including socio-ecological systems (Van der Brugge 2009, Frantzeskaki 2011), socio-economic systems

(e.g. Loorbach & Lijnis-Hueffenreuter 2013) and urban systems (Loorbach 2009, Roorda et al. 2012, Frantzeskaki et al. forthcoming).

3.2.1. The Socio-Cultural Context of Community Energy Initiatives.

When dealing with the empirical phenomena of community energy initiatives, it obviously make sense to analyse them as part of socio-technical energy systems. Nevertheless, we also have to remain attentive that by doing so, we are not missing out on other system dynamic elements. For instance, when we look of the list of 'drivers' that drive the community energy initiatives under study (see table 2), we see that all empirical case-studies seem to be driven by strong embedment in a socio-spatial and socio-cultural context that favours a cooperative, citizen-led approach:

- *Texel Energie* is embedded in Texel's island culture that is historically prone to strive for islanders' independence from the mainland
- *Thermo Bello* is embedded in the eco-community of *Eva-Lanxmeer*, for which self-sufficiency lies at the core of its raison d'être
- The organization of *Ecopower* is intertwined with the transnational cooperative movement, which has strong agenda regarding socio-economic sustainability
- The community wind projects of *Udny* and *Urga* are embedded in a network of community energy initiatives, as well as in Scotland's historical culture of self-reliance and independence
- The German citizen-led housing projects (*Passivehouse »Wohnen & Arbeiten«* and *SUSI-project*) are located in the *eco-district Vauban*, which is renowned for its strong citizens' participation
- The energy company *Schönau EWS* has originally sprouted in an anti-nuclear movement, which in Germany is strongly intertwined with the civil environmental movement

It thus seems that all the projects in our observed case-studies are part of social and cultural communities that have a strong desire to somehow distinguish themselves from the mainstream, dominant culture. Whether it is an island, a town, an eco-district, a network or a social movement, what they have in common is the strive for independence and self-sufficiency, and/or a strong social critique of established governmental and commercial arrangements. It also seems that these social contexts provide a strong driver for the projects to persist and prevail, despite of many institutional barriers. In summary, it seems that self-organised energy initiatives often occur under a particular combination of the following conditions:

- integration in a 'sub-cultural' context;
- a strive for a socio-economic security and autonomy;
- distrust of existing governmental and commercial arrangements.

The first condition – the sub-cultural context – serves to 'cultivate' the second and third conditions; it offers a shared narrative that enables participants to frame their need for security and autonomy and their social critique in a productive way. Moreover, the sub-cultural context also provides the initiative with a sense of 'community' and/or a sense of 'place', which in turn help participants to persist and insist despite of many institutional barriers, unexpected events and disappointing let-downs.

3.2.2. Delineating the Systemic Context in Transition Analyses

The subsequent question is to what extent the socio-technical system delineation is sufficient for capturing and analysing the dynamics of these socio-cultural contexts.

Understanding this socio-cultural context asks, in the first place, for more sensitivity to geographic and spatial properties. Various authors have already called for a 'spatial turn' in transition studies, calling attention to the geography of innovation (Coenen et al. 2012, Späth & Rohrer 2012, Raven et al. 2012) and urban innovation processes (Loorbach 2009, Hodson & Marvin 2010, Frantzeskaki et al. 2012, Wittmayer et al. 2012). From this perspective, community energy initiatives can be seen as part of a specific geographic system that responds via self-organisation to the pressures unique to the spatial environment. As such, spatially specific cases offer grounds to investigate what constitutes reflexivity in tapping into innovation and foster transitions; avoiding generalisations from spatially demarcated cases.

Analysing community energy initiatives in the context of a particular geographical system may provide a better understanding of the socio-cultural context of these cases, then a mere socio-technical perspective. Moreover, in order to more fully capture the socio-cultural dynamics, it might be necessary to not only take account of the geographical systems, but also of the more physically intangible socio-cultural system consisting of e.g. discourses, communities, identities and ideologies. Obviously, these factors are all already part of a proper socio-technical system analysis and/or a geographical analysis, but then they are seen as dimensions, rather than as societal systems in themselves. The point that we are making here is that if we were to take e.g. the 'transnational cooperative movement' or 'the sustainability discourse' as 'the societal system' to analyse the contextual dynamics of a community energy, we would get a significantly different analysis than if we are to take the socio-technical energy system or a particular geographical system as a starting point.

The ultimate challenge for the complex transition perspective, is to analyse how empirical phenomena under study are part of and influenced by a multitude of societal systems dynamics, including socio-technical, socio-ecological, and discursive systems, all of which have a variety of different scale dimensions, including geographical scales, time scales, as well as scales of aggregation. These scales may coincide, but not necessarily (e.g. a niche is not necessarily local, and a landscape trend is not necessarily global) – so the particular overlap and interaction between different scales is a context-specific empirical question. The community energy initiative *Ecopower* operates at a national geographic level, is part a socio-technical energy system (local/national/European/international), as well as part of the cooperative movement, a highly transnational social movement network and discourse. The question of how and to what extent *Ecopower* as a 'niche' can 'succeed' in growing and diffusing, does not only depend on how it interacts with the socio-technical regime, but also how it sits within different geographical levels (including their respective cultural identities), and how it resonates with the transnational cooperative movement and its political discourses. Moreover – to complicate it even more – the question is how these different 'contexts' interact with one another over time, and how this inter-systemic dynamics affects the timing and resonance of *Ecopower's* interventions.

3.2.3. Policy & Action Research Implications: Beyond Socio-technical System Boundaries

Obviously, the analytical challenge outlined above is highly complex and prone to reach exceeding levels of abstraction. The immediate question that follows from an action research perspective is how and to what extent such endeavour has heuristic value to understand and deal with 'real world problems'.

When we acknowledge that system boundaries are very determining for the outcome of an analysis (and thus for the chosen intervention), while at the same time being inherently complex, subjective and overlapping, one policy implication for the topic of community energy could be that policy interventions in that domain should start by questioning and

discussing which system boundaries are relevant, rather than starting off with a given system boundary (e.g. 'energy' as the given 'socio-technical system' or 'policy field'). If a scientific analysis has the purpose of informing such societal intervention – which it does in the philosophy of action research – than an analytical implication could be that the first step is to reconsider which system delineations are relevant for a particular community under study. In the context of transition action research – where the purpose is to understand and foster (opportunities for) fundamental change – some have argued that the critical challenging of dominant system boundaries and replacing these by alternative system understanding is a necessary and important first cognitive step in that process of fundamental change (Avelino 2011).

Even if a scientific analysis does require a pre-given system delineation (which it often does due to pragmatic considerations such as time constraint and limited data), than it is worth asking whether there are some 'generic patterns' for determining whether some delineations are more productive and useful in a given context than others. If, for instance, in the case of community energy initiatives, an analysts would *have* to choose between either a socio-technical system delineation *or* a geographic delineation, we would argue that the latter might be more useful to understand the observed drivers behind the community energy initiatives (as listed in table 2). After all, the drivers behind these *community* energy initiatives are related to intrinsic motivation of the people involved, which in turn relates to their personal and cultural identity. Overall, people identify much more with a geographic system (e.g. their city, village or country) or a socio-cultural system (e.g. community of practice or social movement), than with a functional, socio-technical system. If one of the purposes of an transition analysis is also to tap into the individual drivers of people to contribute to sustainability transitions, than a logical implication might be that the analytical stories we tell are delineated in such a way that (more) people under study can identify with it (not only policy-makers, but also citizens that are making use of and living within the systems under study). This is also one of the reasons why recent transition management practices and studies have increasingly focus on the urban system focus (Wittmayer et al. 2012, Roorda et al. 2012, Roorda 2012 and Van Steenberg et al. 2012). In the case of community energy initiatives, these are often not part of urban systems, but rather take place in a rural or suburban context. If we to analyse these from an action research and transition management perspective, the challenge then is to analyse these community energy initiatives in the context of particular regional systems (e.g. Henneman et al. 2012).

3.3. A Multi-level Governance Framework

While the transition management perspective is primarily associated with a prescriptive management framework, it also can be and has been used as a descriptive and analytical framework to analyse on-going policy processes (Loorbach 2007, Avelino 2011, Frantzeskaki et al. forthcoming). One of the descriptive and analytical tools in transition management is the multi-level governance framework (Loorbach, 2010) that distinguishes between four governance levels with distinct functions and activities:

1. the strategic level, including processes and activities of setting long-term goals, policy development, planning, vision, values, identity, culture of the city;
2. the tactical level including designing steering activities, programs, funding, establishment of networks and/or partnerships;
3. the operational level including implementing and managing policy action plans, infrastructure plans and assets and
4. the reflexive level with monitoring, assessing and evaluating existing policies and assets and their interaction with citizens.

This framework can be used for diagnosing the type of activities (strategic, tactical, operational and reflexive) that are undertaken by practitioners under study, within and across the multiple governance levels. Moreover, the framework can also be used to identify possible interventions to deal with challenges.

In the case of the community energy initiatives under study, one can analyse the different drivers and barriers (as outlined in table 2) in terms of the different activities that the practitioners involved do or do not undertake at different governance levels. For each driver and for each barrier one can also systematically map out, which activity at which governance level can be undertaken to make better use of the drivers and/or to deal with the barriers. In the table below we have worked out an example of such analysis of some of the barriers as observed in the community energy initiatives under study, translating these in terms of possible interventions at each level of governance.

Table 3. Multi-level Governance Interventions to Deal with Barriers in Community Energy

Multi-level Interventions →	Strategic	Tactical	Operational	Reflexive
Barriers ↓				
<i>“Unrecognised business model (not-for-profit) > Difficulty getting financed”</i>	Envisioning a new, alternative economic system (e.g. ‘green economy’, ‘social/cooperative economics’)	Develop/participate in networks and intermediary organisations working with alternative business models	Starting up e.g. crowd-funding campaign	Critical evaluation of current business models / financing systems – monitoring best practices of alternative
<i>“Lack of vision national energy policy “</i>	Create own vision as a flagship to attract interest and have own message communicated broadly	Develop/participate in networks that share interest in alternative energy, invest in and lobby for it	Use existing community energy projects as icon projects to visualise parts of possible future	Critical evaluation of existing energy policy / collecting best practices of alternative policies
<i>“Lack of organised unity between cooperatives in Belgian context”</i>	Envisioning alternative sustainable future for Belgium + back-casting potential role of organised unity of cooperatives	Creating partnerships, networks and learning alliances between cooperatives	Organising a concrete pilot project in which multiple cooperatives cooperate to reach a tangible project result	Monitoring existing cooperatives and analysing potential added value of more organised cooperation
<i>“Dominance of natural gas in Dutch context”</i>	Create a vision of Dutch energy system where natural gas is absent / not dominant	Develop/participate in networks lobby against natural gas interests and/or lobby for alternative energy	Organising event/exhibition to show-case disadvantages of natural gas and/or advantages of energy alternatives	Provide evidence that alternative systems provide services in a reliable way to create windows of change in existing regime

The table above provides an example of how we can identify different potential interventions to deal with experienced barriers. Beneath the details of each suggested intervention, there is a more overarching policy suggestion, that being that dealing with

the barriers of community energy initiatives (and/or playing into the drivers), requires a combination of all governance levels.

4. Conclusions

In this paper we aimed to expand the transitions perspective on community energy by exploring a 'complex transition perspective' to analyse community energy initiatives in four West-European countries (The Netherlands, Germany, Belgium and UK). By doing so, we contributed to existing transitions studies of community energy, which so far are predominantly focused on analysing empirical examples in the UK from a socio-technical Multi-Level Perspective (MLP). First, we started with the empirical descriptions of eight case-studies of community energy initiatives, describing drivers and barriers in the community energy initiatives, as experienced by the practitioners involved. Subsequently, in section 3, we considered these empirical observations from a complex transition perspective, specifying what the analytical implications are of taking such perspective, how this differs from the socio-technical multi-level perspective (MLP), and what kind of implications it has for action research and policy. We identified and discussed the following three implications of a complex transition perspective:

- 1) **Beyond Niches: the Power of Niche-regimes & Undercurrent Counter-movements.** We expanded the MLP by adding two levels: the level of 'niche-regimes' and the level of 'undercurrent counter-movements'. In the community energy initiatives under study we observed how they operate at these levels to exert pressure on regimes. The concepts of the 'niche-regime' and 'undercurrent counter-movements' help to unpack the MLP levels and, by doing so, identifying how community energy initiatives move beyond their 'niche-status' by teaming up with, and operating at, various other societal levels of aggregation.
- 2) **Beyond Socio-technical System Boundaries: the Socio-cultural Context.** In the energy community initiatives under study, we observed that in each of the eight cases is significantly driven by a strong embedment in a socio-cultural context that favours a cooperative, citizen-led approach (e.g. eco-district, network, social movement). We questioned to what extent a socio-technical system delineation is fruitful in capturing this socio-cultural context, which might be better served by a geographic or socio-cultural system delineation. From a complex transition perspective, the challenge is to analyse how empirical phenomena under study are part of and influenced by a multitude of societal systems dynamics at different scales. However, if an analyst needs to select one system delineation over another, we argued that geographic or socio-cultural delineations might be more identifiable for the individuals actually inhabiting the systems under study, thus making these geographic and socio-cultural delineations more suitable for action research on the transition dynamics of community energy.
- 3) **A Multi-level Governance Framework.** The literature on transition management offers a multi-level governance framework that can be used as a descriptive and analytical to understand governance dynamics, and as a prescriptive framework to identify potential interventions. In the case of community energy initiatives, we can use this framework to identify potential interventions to deal with the experienced barriers, systematically considering the strategic, tactical and operational level, as well as the reflexive level of governance. From a complex

transition perspective, the starting point is that dealing with the barriers of community energy initiatives, requires a combination of interventions at all these governance levels.

The implications of a complex transition perspective, as discussed in this paper, point out various challenges for future research. The two main challenges for future research that run through all of the three abovementioned themes can be distilled as follows. First, to analyse transition processes as a complex interaction between various societal systems dynamics, including socio-technical, socio-ecological, and socio-political systems, all of which have a variety of different scale dimensions, including geographical scales, time scales, as well as different scales of aggregation. Second, to translate the gained insights on complex transition dynamics into opportunities for actions, drawing policy lessons and tools to empower practitioners to smartly play into the complex system dynamics so as to contribute to transitions towards sustainability. With this paper, we hope to have contributed to the framing of some of the remaining theoretical and empirical challenges for future research on sustainability transitions from a complex transition perspective.

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Appendix

Nr.	Function	Organisational Context	Date	Case-study
1	Coordinator renewable energy	Aberdeenshire Council	03.10.11	<i>General: Scotland Energy</i>
2	Professor	James Hutton Institute	05.10.11	<i>General: Scotland Energy</i>
3	Board member	Thermo Bello	23.02.12	<i>Thermo Bello</i>
	Citizen	Eva-Lanxmeer		<i>Eco-district Eva-Lanxmeer</i>
4	Group Leader	Community Energy Scotland	05.03.12	<i>General: Scotland Energy</i>
5	Board member 1	Ecopower	13.03.12	<i>Ecopower</i>
6	Board member 2	Ecopower	13.03.12	<i>Ecopower</i>
		Co-operatives Europe		<i>Co-operative movement</i>
7	Water Expert 1	Watercycle Research Institute	13.03.12	<i>General Infrastructure</i>
8	Water Expert 2	Watercycle Research Institute	13.03.12	<i>General Infrastructure</i>
9	Expert	Several projects in solar energy and eco-construction	27.03.12	<i>General Infrastructure</i>
10	Expert	Technical University Delft	29.03.12	<i>General Infrastructure</i>
11	Board member	Texel Energie	14.05.12	<i>Texel Energie / Island Texel</i>
12	Expert & citizen	Passivehouse »Wohnen & Arbeiten« Vauban Freiburg	14.05.12	<i>Eco-district Vauban Freiburg</i>
13	Energy Officer	North Harris Trust	14.05.12	<i>Urgha Wind / North Harris Trust</i>
14	Member & citizen	Housing Community SUSI-project Vauban Freiburg	24.05.12	<i>Eco-district Vauban Freiburg</i>
15	Public Affairs Officer	EWS Schönaun	10.07.13	<i>EWS Schönaun</i>

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Transition Pathways Towards a Sustainable, Low Carbon Europe Developed by Pupils and Professionals Across 6 EU Countries

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Abstract

There is an *a priori* argument that those who are affected by a decision should have a say in that decision. In terms of intergenerational equity, as well as the need to implement whatever Transition Management (pathways, trajectories) implementation is to take place, young people should therefore be included in the decision-making process, be this for ethical or operational reasons. Given the socio-cultural context, the changing nature of technology etc., Generation Z is likely to have very different notions of their specific future, and the way sustainability and low-carbon lifestyles are evolving within this. This implies the distinct possibility that (older) experts may devise and shape transition pathways towards greater sustainability and less carbon-intensive lifestyles, but may do so without the inclusion of, and in a direction that those who are destined to live (in) these futures may find difficult to accept, let alone actively pursue. In short, not involving young people in the Transition Pathways and Management agenda poses a genuine governance deficit, as well as an implementation challenge.

To understand how young people conceptualise their future in low-carbon sustainability terms, and how they conceive suitable visions of their futures, CRISP (an EU project to CReating Innovative Sustainability Pathways), 24 visioning and backcasting workshops were held in Greece, Hungary, Lithuania, Norway, The Netherlands and the UK. The resulting workshop-level visions, which produced over 1500 ideas and suggestions across the workshops, were then condensed into 3 pan-European Visions yielded three archetypical visions, namely Local Community, I-Tech, and One Ethical World.

Following this, a new methodology was developed and applied in 17 workshops across the aforementioned countries, engaging young people and experts in developing suitable pathways towards the realisation of the above visions. Both phases were done in conjunction with 3 specific sectors, namely household energy, individual mobility and food. After an outline of the visions, this paper outlines the pupils' perception, followed by an exploration of the resulting pathways for the three visions across the three sectors.

Introduction

In a fast pacing world, where the consumption of resources has been amplified, the use of raw materials has been intensified and population continuous to grow, the ability of future generations to have access to the resources and be able to enjoy a comfortable life is at stake. This has been recognised as a major concern and many initiatives are now driven towards sustainable development. The concept of sustainability and sustainable

development has been around for decades, but only relatively recently did it attract mainstream attention and became one of the top priorities of the green agenda. For sustainable development to be achieved, a holistic, integrated and suitable approach is required to better portrait the problem and find a solution that is viable and long-term. This is because, sustainable development is subject to the interconnections between ecological, economic and social-cultural characteristics, and for it to be realised, cooperation of all relevant stakeholders, whether this is government, industries, institutions, communities and individuals, is highly required.

There remains substantial obstacles for a more fundamental change (be this in pace or direction) towards more sustainable living at the individual level, with many common problems that can be divided into lethargy, difficulties in translating ethical behaviours into sustainable activities, the perception of myopic change in the face of the need for global transition, game theory dilemmas, scepticism towards the need for such change, availability of alternatives (and technologies) and a sense of detachment between policy, practice and long-term visions. Therefore, interactions between relevant stakeholders at different levels and the reinforcement of initiatives towards sustainable development are important as it acts as the forerunner in achieving the transition towards sustainability. However, such interactions and subsequent transitions are complex because of the dynamics and interconnections between cultural, social, organisational, economic and technological changes and of the uncertainty of future predictions that affect stakeholders and the society in general (Quist and Vergragt, 2006). Of course, the large the required change, and the longer the time-frame, the greater the uncertainties, and thus the greater the need for greater social inclusion in the deliberations. To deal with this complexity, action to foresee, or at least make sense of, long-term sustainability which then allows to develop visions of suitable future has been proposed (Berkhout, 2005; Rotmans, 2005; Wiek, Binder and Scholz, 2006). Following these visions of the future, transition pathways that describe specific actions towards such future vision have to be developed.

These transition pathways however, are not easy as they have to take into account pragmatically the dynamics and interactions between different levels, actors and niches and the complexity that is associated with them. Only then, transition pathways can provide an efficient and reliable approach towards a desirable and sustainable future. The development of transition pathways typically involves the participation of experts, and relevant stakeholders who have the knowledge and expertise to grasp and deal with the complexity of such processes. However, the involvement of young people in the development of such visions and their transition pathways is of great importance as well - it is their future that will be affected by the pathways, and they will experience the necessary changes for the achievement of a sustainable future. The need for young people to participate in the development of policies and strategies and subsequent implementation has also been supported in many studies (cf. Wyn and Dwyer, 2012).

This engagement empowers young people in being responsible and accountable of their actions, and ensures the inclusion of a wide variety of concerns, insights and reflections, that delivers consistent and well-thought decisions (Carlsson-Kanyama et al 2008). Involving young people also offers a greater chance that they are more agreeable to the changes; they may in fact become more pro-active in contributing to these, or even committed and insightful in proposing new, more drastic ones. Also, the generational gap that underlines the difference in how young people perceive their future as opposed to the elders creates a degree of an uncertainty as to whether the transition pathway will be able to lead society to its future destination. As such, the inclusion of young people to the process of transition pathways development is essential for their successful implementation in the future. However, the unfortunate reality is that those involved with

shaping these futures (older experts) are typically unlikely to live in these futures, and, worse still, *vice versa*.

This paper demonstrates the importance and practice of young people participation in the development of transition pathways by involving young people alongside with experts in the development of pathways towards a sustainable, low carbon Europe. The aim of the paper is to present the pathways developed and highlight the main actions that have to be undertaken for the future visions, that each pathway leads to, to be realised.

Background

For the development of transition pathways, a number of different approaches can be followed. Although, these approaches share some similarities, differences also emerge as a result of the stakeholders involved, the dimensions considered or the steps taken. The most prominent methodologies for the identification of transition pathways towards transition visions, are the backcasting methodologies and the multi-level framework (Smith and Stirling, 2010; Quist 2007).

Backcasting, a methodology introduced in the 1970s, was originally proposed by Amory Lovins as a technique for long-range energy planning called 'backwards-looking analysis'. A few years later Robinson proposed the term 'backcasting' that has remained until today (Robinson, 1982; Quist and Vergragt, 2006; Mander et al. 2008; Kok et al. 2011; Carlsson-Kanyama et al. 2008). Fundamentally, backcasting is a process during which a future end-point is typically defined by a diverse group of stakeholders, which then considers present objectives and ways through which the defined future end-point, or vision can be attained (Figure 1).

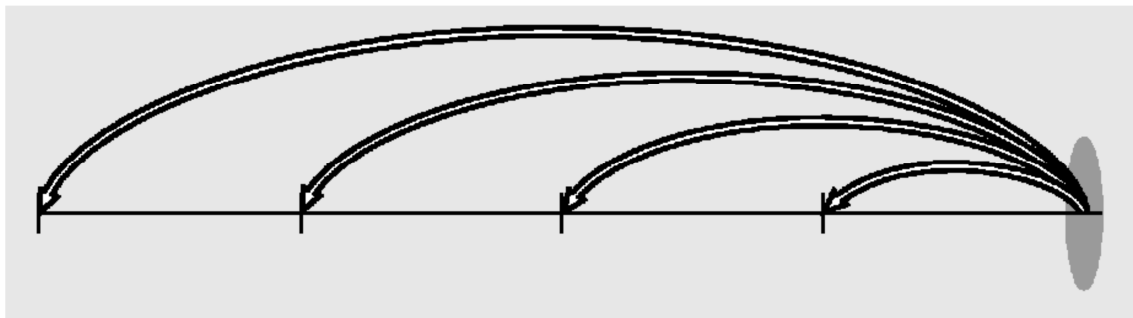


Figure 7: Backcasting representation (Rotmans, 2001)

In the literature there is a long list of studies in which interactive, participatory backcasting is proposed and/or used as a suitable and useful method to explore transition pathways (van de Kerkoff and Wieczorek, 2005; Quist and Vergragt, 2006; van den Kerkoff, 2004; Rotmans, 2001; Jansen 2002; Carlsson-Kanyama et al. 2008). The success of this method relies on its potential to include a broad selection of stakeholders, a variety of visions and a number of participatory and analytical exercises, making it a promising and innovative tool (van de Kerkoff and Wieczorek, 2005; Quist and Vergragt, 2006). However, there is ambiguity as to how backcasting can be translated in different studies as it can constitute a conceptual or holistic level, a level of social or multi-actor processes, a level of an overall approach or a level of specific steps within an overall approach (Quist and Vergragt, 2006). To clarify this, Quist and Vergragt (2006) proposed a five-step methodological framework for participatory backcasting:

- Strategic problem orientation
- Construction of sustainable future visions or scenarios

- Backcasting
- Elaboration, analysis and defining follow-up and action agenda
- Embedding of results and generating follow-up and implementation.

Following a similar methodological framework, van de Kerkoff and Wieczorek (2005) used the experience gained in the Dutch Climate OptiQns for the Long-term (COOL) project and suggested that interactive backcasting exercises are suitable to facilitate exploration of a variety of visions and pathways towards these visions (van de Kerkoff and Wieczorek, 2005). They highlighted that the selection of these visions must be the starting point of the backcasting exercises. Having selected the visions, participants can then work backwards to the present, where the initiation of discussions will be stimulated and directed in formulating the changes that need to be undertaken, the obstacles that must overcome and the opportunities that must be seized for the visions to be realised (van de Kerkoff and Wieczorek, 2005). These authors also suggested that backcasting exercises can enable participants to distance themselves from their daily interests and concerns, while at the same time making them feel involved in the whole process and becoming aware that their suggestions are important and can have an impact in decision-making (van de Kerkoff and Wieczorek, 2005).

In contrast, Carlsson-Kanyama et al. (2008) reported a participatory backcasting methodology used in their study for the development of pathways towards a sustainable everyday city life in the EU although feasible, was lacking comprehension and completion. They asserted that this was primarily due to the lack of involvement of participants with varied backgrounds, expertise and values, which as a result had an effect in the process. They suggested that for the backcasting process to be successful, an innovative approach must be implemented that would enable participants to distant themselves from their concerns and thoughts and become more imaginative, which resonates with van de Kerkhoff & Wieczorek's ideas. This would allow the development of a thorough and well-structured plan for realising the visions and understanding the changes that have to be made.

To tackle the challenges posed by the use of backcasting methodology, Kok et al. (2011) in their study on the development of pathways for dealing with the Water Framework Directive (WFD) in Europe, proposed the combination of participative backcasting with exploratory scenario development. This represents a recently introduced method to deal with high uncertainty and complex problems associated with long-term visions. Kok et al. (2011) used exploratory scenario development based on the Story-And-Simulation, whereas the backcasting framework used, was the one developed by Quist and Vergragt (2006). They supported that the combination of the two methodologies provides a useful and comprehensive perspective, and allows stakeholders to develop a set of consistent scenarios by gaining a better understanding of their future.

The combination of backcasting with other methodologies has also been acknowledged and/or applied by Borjeson et al. (2006), Hojer and Mattsson (2000), Eames and MacDowall (2011) and Mander et al. (2008) among others. More specifically, Borjeson et al. (2006) reviewed and discussed the outputs of different techniques being integrated for the development of scenarios/pathways, and provided guidance as to which methodologies are more appropriate depending on purpose. Further, Hojer and Mattsson (2000) in their study supported that backcasting in combination with forecasting can provide a greater insight output because, as they argue, forecasting not only informs on when backcasting is needed, but also determines the backcasts. This recommendation is shared by Mander et al. (2008) who in their study to support the UK to achieve a 60% reduction in carbon emissions, suggested that combining backcasting and forecasting is

beneficial for the development of transition pathways towards carbon reduction emissions. Another example of the use of integrated techniques is demonstrated by Eames and MacDowall (2010), who in their exploration of transition pathways towards a hydrogen economy, used a combination of participatory backcasting with multi-criteria decision analysis tool called multi-criteria mapping (MCM). These authors supported that the backcasting approach allowed them to engage and explore the varying interests of stakeholders involved in the process, whereas the MCM appraisal was beneficial in getting an integrated perspective on the sustainability of different hydrogen futures. The inclusion of the multi-level perspective across regime, niches and landscape, in their analysis highlighted the importance of social, economic, political and technological perspectives in shaping transition pathways. In conclusion, there is methodological evidence and experience that social deliberation can contribute to the development of long-term plans towards large-scale change. This enhances the possibilities that inclusion of young people (and thus non-experts) in such deliberation is beneficial, apart from the *prima facie* argument that such inclusion is a necessity for reasons of governance, ethics and operational considerations.

The multi-level perspective (MLP) is a recently developed approach that focuses on the analysis of the dynamics of transitions. The term multi-level refers to the interactions between technological niches, socio-technical regimes and landscapes, which constitute the micro-, meso- and macro- levels respectively, of the MLP (Figure 2) (Geels, 2002; Geels, 2006; Foxon et al. 2010; Lachman, 2013). Each one of these levels has a broader meaning. More particularly, the technological niches provide space where learning occurs, and where social networks congregate to support the generation and development of radical innovations. The social-technical regimes are practices, rules and shared assumptions within which the dominant actors interact with each other and with their environment (Landscape), whereas landscape is the wider space, where social, political and cultural values, economy, demography and the natural environment, and institutions evolve (Geels, 2002; Foxon et al. 2010; Lachman, 2013; Geels, 2005; Rotmans et al., 2001). Landscape is a structural factor that can lead to fundamental changes in socio-technical regimes by influencing the regimes and providing opportunities for niches to be established (Markard et al., 2012).

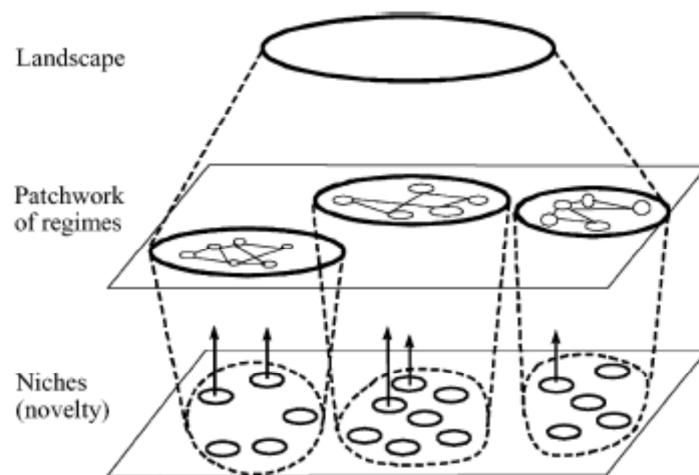


Figure 8: Representation of the multi-level perspective (Geels, 2002)

The MLP has been used for the development of transition pathways by many authors (Geels, 2002, 2005a,b, 2006a,b; van den Ende and Kemp, 1999; Foxon et al. 2010). These studies built, among others, on the work of Kemp, Rip, and Schot (Kemp et al., 2001; Rip

and Kemp, 1998). Geels and Schot (2007b) have elaborated how time and interactions between niche-regime-landscape can lead to different transitions which can follow different types of transition pathways. Further, Foxon et al. (2010) have used the MLP and showed that its integration with technological innovation systems can provide a more thorough analytical basis for the development of transition pathways to a low carbon, electricity system in the UK.

The pathways towards a sustainable, low carbon Europe

Creating Innovative Sustainability Pathways (CRISP) is an EU project involving six countries, namely the UK, the Netherlands, Norway, Lithuania, Hungary and Greece, that aims to develop visions of sustainable, low-carbon lifestyles for Europe in 2030, and viable pathways to achieve these. The development of such visions and their corresponding pathways requires profound and fundamental changes across many aspects of society and lifestyles, whilst in many instances it necessitates radical changes with respect to different practices (household, individual and corporate), networks and infrastructures, structures of governance and decision-making processes, as well as a renewed set of ethical values and cultures.

The theories of Backcasting and Multi-level perspective, described in the background above, have as a result been mingled and used in achieving the development of pathways towards a sustainable and equitable future. Following the principles of backcasting, the first step of CRISP was to define a problem, scope or vision, followed by the objectives, goals and changes that have to be made in order to enable these visions to be realised. This was done with stakeholder fora in each of the participating countries, involving school pupils in their last year of school before being eligible for University. In total 24 workshops were held, with over 50 workshop-specific visions being developed, based on an aggregation of about 1500 individual ideas. These visions were then considered and compared, with a CRISP workshop conducted to synthesise these workshops into a smaller set of overarching end-visions. Three visions were identified and developed, called Local Community, iTech and One Ethical World presenting broad characteristics as follows:

- *Local Community*: Strong regional identity, local production for local consumption, emphasis on social relationships, vegetarianism, social cohesion, individual responsibility, collaborative consumption.
- *One Ethical World*: globalised supply chain, global values are locally interpreted, global healthcare, global governance. Fair trade displaces free trade.
- *I-Tech*: technology and innovation drives everything. Highly competitive world. Risk is replaced by intelligent machinery. Functional food and non-animal derived meat dominates.

A more detailed description of the characteristics of each vision can be found elsewhere. By using the concept of transitions, these visions were then examined under the prism of current and future global and local change, using 2013 as the base year and 2030 as the endpoint, and with focus on mobility, food and household energy (Figure 4). To continue with the social inclusion emphasis, a second round of workshops and seminars were organised – 17 in total - to develop viable pathways towards achieving these visions (Figure 3):

	One Ethical World	Local Community	iTech	Sum
Food	SIFO (Norway) - Expert CEU (Hungary) – Expert CEU (Hungary) - Public	Surrey, (UK) – Expert RUG (Netherlands) - Expert	KTU (Lithuania) - Expert	6
Energy	RUG (Netherlands) - Expert	Surrey, (UK) - Public TNO (Netherlands) - Expert TNO (Netherlands) – Public	SIFO (Norway) – Expert TEI (Greece) - Expert	6
Mobility	Surrey (UK) - Public	CEU (Hungary) – Expert TEI (Greece) - Public	Surrey, (UK) - Public (x2/ parallel sessions)	5
Sum	5	7	5	17

Whilst the majority of the workshops were with pupils of the same age as the first round of workshop, a significant number of workshops were also held with experts in the field of the three sectors. This was done to aid an analysis of the difference between the pathways designed by young people or by experts, as well as their respective views on the process and its outcomes.

After this, the many workshop outputs were grouped into a number of dimensions that aimed to describe and differentiate the changes that are necessary to be taken from a number of different perspectives. These dimensions, namely Structure, Practices and Culture, co-depend in their direction and success and fit within each other following a synergistic behaviour towards each future vision (Figure 3).

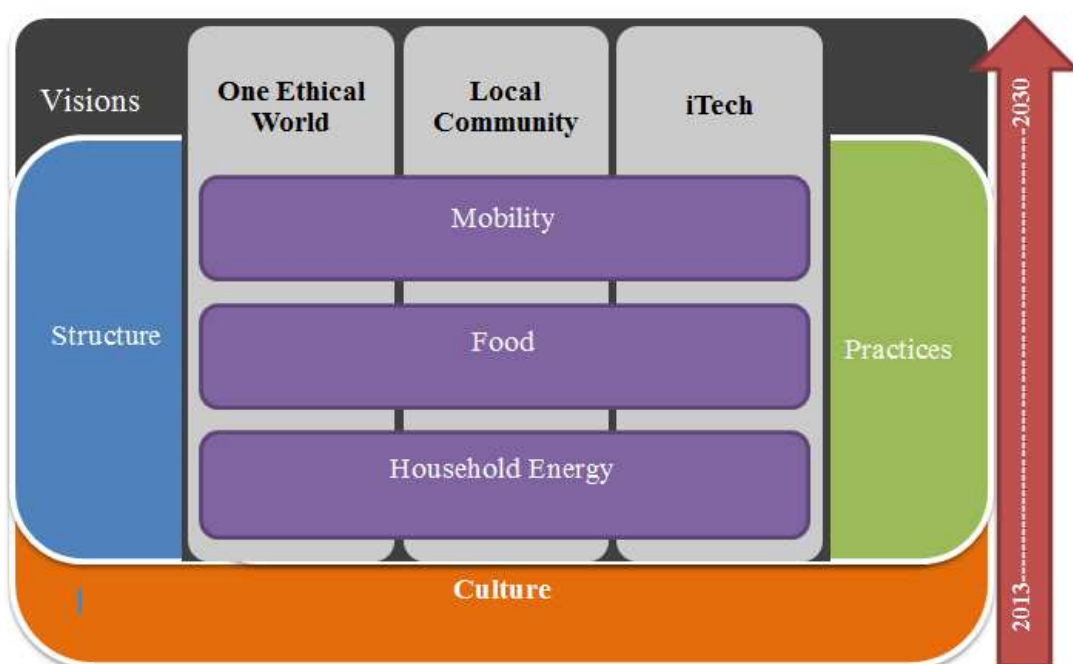


Figure 4: The structure for the visions' pathways

In comparison to the other dimensions, culture is a much more abstract dimension that affects structure and practices and is affected by them in the long-term. The magnitude and direction of the effect of culture depends on history, spatial characteristics, socio-political situation and economic status. Therefore, no specific actions or concepts were distinguished in this dimension as neither a chronological order can define it. This is not to say that culture is irrelevant or meaningless, to the contrary, but it is a dimension that is difficult to “manage” in a deterministic sense, and thus does not sit easily in a task-oriented pathway that features clear delineation and attribution of events with their corresponding effects. Structure and Practices, however, can evolve through time and can be shaped by direct (and directed) interventions. The former dimension has been split into two, with Governance as well as Infrastructure and Networks being the backbone of the realisation and organising of change. Practices represent action and behavioural change towards the achievement of the structured changes, and is influenced by both structure and culture.

Presentation of the pathways

The presentation of the vision pathways based on the three dimensions allows the comparison and assessment of the individual activities of the different pathways. It fosters the analysis of convergent and divergent activities between the pathways and includes the ideas, suggestions and perceptions of the future of professionals and pupils, emerged from the workshop results.

Four phases are distinguished towards the development of the pathways with each phase denoted at a specific time interval. These phases, called Pre-development, Take-off, Acceleration and Stabilisation in ascending order were denoted with a three-year, ten and four-year time interval, respectively, where Take-off and Acceleration was combined for some of the dimensions, notable “practice”. As mentioned, year 2013 was the base year and 2030 the projection year. Based on the common elements between the pathways

from a given time interval, different clusters were formed that contained the homogeneous elements that “fit” the development and stream of change (Table 1).

Table 5 Phases of the pathways and clusters within each phase based on their common elements

Pre-Development		
Governance	Infrastructure / Networks	Practices
<ul style="list-style-type: none"> • Political Support • Principles of behaviour • Support Industry/Innovation • Education • Strengthen Local/Global Community 	<ul style="list-style-type: none"> • Food Infrastructure - Initiation • Transport Infrastructure - Initiation • Energy Infrastructure - Initiation 	<ul style="list-style-type: none"> • Food Practices - Initiation • Transport Practices - Initiation • Energy Practices - Initiation
Take-Off		
Governance	Infrastructure / Networks	Practices
<ul style="list-style-type: none"> • Consolidate/Relocate Governance • Products and Production Reform • Supporting Innovation 	<ul style="list-style-type: none"> • Food Infrastructure - Roll Out • Transport Infrastructure - Roll Out • Energy Infrastructure - Roll Out 	<ul style="list-style-type: none"> • Food Practices - Roll Out • Transport Practices - Roll Out • Energy Practices - Roll Out
Acceleration		
Governance	Infrastructure / Networks	Practices
Consolidate/Relocate Budgets	(cont. of phase 2)	(cont. of phase 2)
Stabilisation		
Governance	Infrastructure / Networks	Practices
Assessment of Distribution Effects	Food, Transport and Energy Infrastructure Integration	Food, Transport and Energy Practices Integration

For the Infrastructure and Practices dimensions, Phase 2 and 3 are seen as one phase that expands into a 10-year time. This is because many of the activities that are necessary in both dimensions cannot be fully attained in a 5-year period – as for instance, the development of a suitable electricity grid that inevitably will take longer than 5 years to implement. The narrative of the developed pathways towards the three visions is presented below.

The narratives of the pathways

One Ethical World

The pathway towards *One Ethical World* requires in the first phase a number of drastic measures to be taken: On the Governance front, it requires the establishment of the principles of behaviour for enabling the development of global etiquette for business conduct, allowing fair and equitable trade principles for underpinning policies and reflecting externalities in food prices. It also needs the regulation of industry to encourage incorporation of global, social and environmental responsibility, as part of a wider effort

to support industry and innovation. Education is a further important aspect to Governance, for nurturing global understanding and cultivating fairness and cooperation at a young age, but also to ensure higher education translates competencies and insights from research towards their application by future graduates.

The strengthening of the local/global community to develop and subsequently enforce common interests across national boundaries is another requirement. On the Infrastructure side, the pathway requires the development and support of food, transport and energy infrastructure. The initiation of this development necessitates the creation of a food system based on fair trade and food security (food), the development of low carbon modes of transport (transport) and of an integrated renewable energy system (energy). These are reliant on the development of new models of business practice and the mobilisation of young people and consumers, all reinforced by people collaboration and networks. On the Practices level, which is governed by food, transport and energy practices, the pathway requires an increase in vegetarianism (food) and in teleworking and teleconferencing (transport), which can both be stimulated by awareness raising campaigns organised by groups of people and networks.

In the second phase and on the Governance level the pathway requires consolidation and relocation of governance through the enactment of strict food quality controls, accountability of governance and land reform. It also requires production companies to comply with the ethical and sustainable measures of production under reformation plans. On the Infrastructure side, the roll out of food, transport and energy infrastructure requires major improvements to be made with food production and storage based on sustainable standards being only one of them. This opens the way for the practice requirements in terms of food, transport and energy to be revisited and reviewed, in order to enable the introduction of meat free days in the public sector catering, the promotion of zero-waste generation in households (food) and the closure of gas and coal power stations by the supremacy of the use of alternative and renewable energy sources. For the realisation of this stage, however, trust must be put upon the international institutions, people and networks.

In the third phase and on the Governance side, the pathway requires the consolidation and relocation of budgets that will bring fiscal reform and budgeting at global level. On the Infrastructure and Practices level, the roll-out initiated in phase two continues as the time-consuming nature of the activities involved in these dimensions means that more time is allocated into these actions.

In the fourth phase, the pathway requires an assessment of the distribution effects by focusing on the fair distribution of resources, enforcing legislations for the wiping out of any remaining unethical practices in the production and provision of goods, and increasing regional specialisation for mutual benefit. These requirements are set on the Governance level, whereas in the Infrastructure and Practices level the pathway requires an integration of the food, transport and energy support, development and performance, respectively. More specifically, in the infrastructure level, an internationally integrated low carbon transport system, that is clean, efficient, reliable, and publicly and privately available (transport), together with an internationally integrated smart grid (energy) are ultimate goals.

Local Community

The pathway towards the *Local Community* vision requires on the Governance side, the implementation of the principles of behaviour, such as policies to incorporate externalities into pricing and support for “local first” guidance on purchasing, and the support to local

industry and innovation to be endorsed, through the promotion of local R&D and the support of local specificity in product design. Alongside this, education is also required in order to foster skills for local sustainable living. An overall strengthening of the local community is required through an effective engagement and devolution of decision-making power, a facilitation of decentralisation and provision of a governance framework for the promotion of well-being, expansion of local production and consumption and widening of the local markets for exchange and barter common. On the infrastructure dimension, the pathway requires the initiation of the development of food, transport and energy infrastructure. The actions involved in this stage, include the development of local food systems and models of business practice at local level (food), investment in public transport and support for car sharing schemes (transport) and development of local renewable energy systems (energy), among others. This initiation incorporates public involvement in local activities and clubs that is motivated by organised groups and networks. On the Practices dimension, the pathway requires the initiation of the food, transport and energy practices. Better food practices, such as buying local and developing products made from energy efficient and environmentally friendly material (food), competent work conditions, such as teleworking when work not close to home (transport), and efficient houses, which retain the heat/cold and harvest rainwater (energy), are necessary. These practices can be implemented by campaigns that aim to raise awareness, stimulate the local reuse and recycling of components and materials, create enthusiasm around local activities (local eBay's, local tree planting, decentralization of materials recycling and reusing initiatives etc.), and inspire intergenerational interactions. This can be seen in the cultural dimension as a gradual appreciation and acceptance of local values espoused in the practices of people.

In Phase two of the pathway, the requirements on the Governance level, include the consolidation and relocation of governance based on which the community develops a plan for the integration of local sustainable food, energy/housing and mobility needs. Further in the Governance level, the pathway requires products and production reform, for making local production and consumption and home energy generation and insulation, attractive to everyone through the provision of incentives. It also requires the development of local power companies in every municipality and the amplification of household renewable energy generation, to support innovation. On the infrastructure side, it requires the roll out of food, transport and energy development. Tariffs based on road use, use of biofuels and fuel cells for transport, increase in household density and rural industry and development of local smart grids are only some of the measures that are to be taken in this stage. The acceptance of these measures will be stimulated through carbon allowances introduced by local communities and networks. On the practices side, the roll out of food, transport and energy practices involves an increase in vegetarianism, home-cooking and household food-growing in terms of food, as well as an increase in mobility by other means than car, working, living and shopping locally and holidaying in the country in terms of transport. In the area of energy, the roll out involves the communalisation of housing, among others. These practices foresee the elevation of collaborative consumption within people and networks, and the sharing of goods and services locally through the use of technological means.

In the third phase, the pathway requires the consolidation and relocation of budgets that will bring fiscal reform and will allow the siting of financial resources at local level, on the Governance platform. On the Infrastructure and Practices level, there is a continuation of the requirements set in the previous phase, due to the slow rolling nature of the activities involved in these dimensions.

In the fourth phase, the pathway requires an assessment of the distribution effects on the Governance level, whereas in the Infrastructure and Practices level the pathway requires an integration of the food, transport and energy development and practices, respectively.

iTech

The *iTech* vision pathway requires on the time interval between 2013 and 2015 the political support, collaboration and will, and the support of industry and innovation that will enable technological development and application for a sustainable living. Alongside these requirements rudiments on the Governance level, is education, which focuses into providing a deep understanding of the development and proper use of technology to the specialists and the public, through the use of social media. On the Infrastructure side, the initiation of food, transport and energy development necessitates the creation of public private partnerships that focus on social responsibility by organised groups and networks, and the development of new technologies through the initiation of strong partnerships between private and public sector that aim to give a rise at technological breakthroughs. Linking the IT sector with transport to increase its beneficial outputs and minimise the impacts of the existing high carbon technology, is a key requirement of the pathway towards a sustainable *iTech* vision. The initiation of food, transport and energy practices sees the development of meat substitutes and food pills to cover the needs of the ever increasing population and the ever decreasing resources wasted for food production, as well as the substitution of mobility for work related purposes with teleconferencing and teleworking. These initiatives, supported by organised groups and networks, foresee to increase awareness of resources security and to limit unsustainable energy use by the use of technological advancements.

On the second and third time intervals from year 2016 to 2025, Governance requirements lie on the consolidation or relocation of governance and the support of product production reform by developing global standards for food safety and imposing legislations for technological development. Also on the Governance side, the innovation support requires encouragement of households to install the latest energy generating and energy conversion techniques, and motivation of the local and national government to not only promote the development of technology for sustainable living but its use, too. The roll out of food, transport and energy infrastructure requires among others the production and testing of new food proteins, while networks promote carbon quotas to encourage the rolling. On the practices front, the roll out of food, transport and energy practices requires cultural acceptance of meat substitutes and demand for food pills (food), a car servicing and user-based systems (transport) and increased awareness to overcome aversion to technology and intensify its use by all, for increasing living standards in a sustainable manner (energy). For this to be achieved a collaboration between people is required to retain the trust of people in public-private partnerships and to succeed in updating the technological functioning of neighbourhoods.

In the final phase, the pathway requires an assessment of the distribution effects on the Governance level, whereas in the Infrastructure and Practices level the pathway requires an integration of the food, transport and energy development and practices, respectively. Particularly in the Infrastructure dimension, the development of an integrated public transport system and of a sustainable and reliable energy system is fundamental, whereas in the Practices dimension the pathway realises sustainability to be integrated into every aspect of everyday living.

Conclusions

The paper started by arguing that there is a *prima facie* case for the consultation, if not involvement of young people in the development of long-term visions and their corresponding pathways. This makes intuitive sense, as young people will live in these futures, and the assumption is that people who are involved in shaping change are often more willing to accept it, or, better still, are more enthusiastic about working towards such change. Such support is even more important when it comes to long-term change, where individuals will be required to change, or where deep, structural or radical change is required. Arguably, the threat of Climate Change and the change necessitated by the wider (and deeper) agenda of sustainable development would fit these characteristics well. From this perspective, new methodologies need to be developed to coalesce the need for expert input – to carry the complexities of the current situation as a basis for a realistic pathway towards future change – and the need for young people – to ensure the vision is actually carried by those who will (have to) live in these futures, or have to suffer the consequences of not attaining sustainable solutions for the “sticky problems” their previous generation will leave.

The paper then summarised the process stages of CRISP, where, firstly, young people from 6 EU countries were involved in first developing desirable futures of low-carbon, sustainable living within the sectors of household energy, individual mobility and food. Secondly, they were then collated and synthesised into three overarching visions. A second round of workshops of pupils as well as experts then produced chronological sequences of Plans of Action to develop viable pathways towards achieving these visions. This novel approach to the inclusive development of transition pathways has a number of significant implications:

Firstly, there is existence value in the transition pathways. They are at first hand no less complex or viable than other pathways that were developed. They may lack detail in comparison to others, such as Kok et al (2011), or Sondejker et al (2006), but the authors found no reason why these visions should be discriminated against as viable trajectories for change. The task given in the workshops was, however, conducive towards wider, societal change, which runs counter to more sector-specific pathways (cf Foxon et al 2012, Eames et al 2010 etc) where greater detail require more technical knowledge. In this sense, brevity was an advantage in the design, but the requisite lack of technical detail may pose implementation problems. However, the project showed that young people were able to develop visions and pathways to attain them, and these workshop outputs were structurally no different from those of the expert workshops. As an aside, the comparison of the experiences between experts and lay people is explored elsewhere. However, pertinent to this debate is that the expert workshops to develop pathways were considerably more difficult to facilitate, primarily because experts' quality (and quantity) of contribution depended substantially on whether they tended to agree or disagree with the vision. Likewise, experts found it much more difficult to “think back from the future”, especially when they were experts in the technical design of the status quo.

Secondly, as it is possible to develop such visions and pathways, the function of a process to develop transition pathways using experts only should be questioned. The paper has started by arguing that low-carbon, sustainable lifestyles requires deep change of behaviour, which poses a *prima facie* argument that social change requires societal innovation and dialogue? If so, the role of experts is a changed one, towards a supportive, information-sharing role that is arguably subservient to the deliberations of others. The problem is, however, that workshops where experts and lay people are to work together very easily transcend into an expert workshop, as the technical knowledge held by experts

can shift the power to deliberate away from young people to their older experts. There are several possibilities to manage this, none of which has been explored.

Thirdly, the transition pathways followed a common dynamics, dovetailing the transition management framework broadly divided into 4 phases. Within this, there were a large number of activities that were shared between the pathways. This opens up two possibilities, one of which is that the visions are not that different from each other, the other is that the pathways that should lead to the visions are more comparable at the level of the proposed actions than the (diverse) visions would indicate. The authors suggest the latter, following reflections from the workshop panels that some of the activities “we should be doing anyway”. If so, the logical conclusion is that some activities are germane to change in the overall direction of low carbon, high sustainability lifestyles, and some activities shape the direction towards specific visions. It is thus likely that the “future we will end up with” is a combination of different pathways leading to somewhat different visions. If so, change becomes a blending process of pathways and visions, and this consideration leads back to the design and original purpose of the visions as crystallisation points for a public debate about which future “we” want, and how we should get there?

Fourthly, and finally, developing transition pathways over a period of only 17 years is a very challenging task. This is less because of timeframe is comparatively short, but because the scale of change at hand requires a fundamental and deep-rooted change which, in the eyes of most participants, is possible, but very radical. The question was raised whether society has the appetite for that kind of change?

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Discussant Contribution

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Introductory remarks

In this contribution I like to present some provocations, instead of mere questions, that were raised by the paper of this session. In my reading, both papers challenge some assumptions of existing frameworks in particular the multilevel perspective (MLP), transition management (TM) and participatory backcasting and with that they can help us to create further understanding and conceptual refining. With that one may say that both papers take some distance from, what can be called – between quotation marks –, the ‘sustainability transitions-regime’, and as such can be seen as fertile ‘niches’ in themselves.

Both papers also relate to what I find to be a crucial element of sustainability transitions, which is not the question *whether* these transitions take place, but *how* they will take place. In other words, sustainability transitions are inevitable in the energy domain, but the question is going to be *who owns them*? Given the depletion of resources and the effects of pollution, we cannot do anything else than change our ways of living and producing. It is my conviction that we are witnessing the start of a struggle over the discursive hegemony about the shape that these transitions will be given. In other words, there are several coalitions that try to connect the upcoming transition with their interests, ideas, norms, and expectations. For instance, companies in the energy domain are trying to find new ways to maintain their economic power, for instance by emphasizing the need to substitute oil and coal by low carbon resources such as natural gas (or shale gas) and nuclear power. In addition, one may see governmental efforts to upgrade the international energy networks for the transport of new forms of energy. A third perspective relates to local initiatives that use decentralized modes of energy production, not only to have eco-friendly forms of energy, but basically as a way to guarantee (some would say restore) the autonomy of civil society over governmental and economical systems that are thought to be too institutionalized and technocratic to warrant the primacy of civil society. This is also reflected in local resistance against the effects of the production and transport of power, just think of controversies in case of wind turbines, shale gas production, and electricity lines. Finally, we may also have a ‘sustainability transitions-regime’ that tries to own the notion of sustainability transitions by emphasizing the need for a decarbonized society, and the preference of small-scale initiatives (‘niches’) over institutionalized activities (‘regimes’).

Main discussion points on the paper by Avelino et al.

The paper offers a welcome deviation from much work in the field of sustainability transitions, which is often top-heavy in theory, while not being counterbalanced by empirical material – which causes the ‘sustainability transition regime’ to have some tendencies that can almost be called esoteric.

The empirical approach of the authors helps to overcome the good-bad scheme that can be recognized in the 'sustainability transition regime'. This scheme instructs us that niches are 'good' in the sense that they stimulate the uptake of sustainable technology, while regimes are 'bad' because they obstruct the uptake of sustainable technology. The cases presented in the paper, however, reveal first that regimes often actually provide drivers for niche initiatives, which proves that regimes are not as monolithic as often is suggested. Second, the cases reveal that niche initiatives do not have to be predominantly based on the stimulation of sustainable technology. Many of the niches that are presented here are motivated by other factors, most notably self-sufficiency, autonomy, and civic empowerment.

The authors introduce the concepts of 'niche-regimes' and 'undercurrent counter-movements' in order to highlight these phenomena. However, I am a bit reluctant whether there is a need for such additional labels, as I argued already, MLP and TM have the tendency to become conceptually and theoretically top-heavy. Sometimes, I fear that their conceptual toolkit obscures our analytical sharpness, and that it would be better to resist the urge to introduce additional concepts. On the other hand, I welcome any scholarly contribution that helps us to improve our understanding of the struggle over who owns the sustainability transition in the energy domain, as discussed above.

Main discussion points on the paper by Wehrmeyer et al.

The question that is (implicitly) addressed by this paper concerns the actual goal of participatory backcasting. My personal idea of backcasting is that it allows communication between regime players. The presence of a long term perspective that does not directly threaten any position can be used as a way to have meaningful interaction between actors with different (institutionally and organizationally given) stakes. This means that backcasting allows overcoming of societal boundaries, which, in turn, allows actors to engage in what is usually called *learning patterns*, while in fact these activities pertain to *unlearning* ingrained modes of thinking and doing.

The project that is presented in this paper turns this line of reasoning completely around. Instead of using backcasting to make people overcome the myopia of their interests, the project uses backcasting in case of people who have no institutional or organizational stakes at all. In other words, backcasting is used with a totally different goal in mind. The question can be raised, however, what the goal of backcasting in this project actually is. I have to say that this is not yet really clear to me. *Three* options may be shortly explored here.

First, the paper starts with the argument that generation Z has to be involved because they are the stakeholders of the future. To some degree, this claim connects to the issue raised at the beginning of my discussion. There are many coalitions that are going to fight over the discursive hegemony of sustainability transition. Most of them are deeply affected by this struggle, but only a few of them will have had a say at the end of the day. Young people can be seen as an additional stakeholder or coalition, possibly even the most affected by the outcome of this struggle, and also possibly the least influential. Hence, involvement of young people can only be seen as a laudable enterprise. The question, can then be posed whether the backcasting approach is the most appropriate method for empowerment. It may be contended that the role of participation in the method of backcasting basically targets learning *instead* of empowerment. This is because empowerment by participation demands some thorough requirements and design choices such as representativeness and the choice between a pluralist and a deliberative method, which backcasting does not

comply with. In short, using backcasting for empowerment may not be the most appropriate choice.

Using backcasting for educational purposes, the *second* option, might be a more legitimate choice (and reading the paper, the route that actually has been followed), however, I reckon that the relation between education and 'unlearning' still needs some further reflection. The *third* option would be to see young people as a 'niche', a societal section not hampered by entrenched interests that can come up with fresh new ideas challenging existing frames of mind.

Discussion Report

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Avelino and Franzeskaki presented ongoing research on the drivers and barriers of community self-organized infrastructure in general and energy supply in particular. They focussed on understanding community self-owned energy supply from a transition perspective. The research had an additional focus on grassroots innovation movements, looking at it through the lenses of the multi-level-perspective and the strategic niche management approach. The guiding question was on how to go beyond both approaches to get to a complex transition perspective.

A core proposal in this regard is to add additional levels to the traditional three in MLP, the niche, regime and landscape. The authors introduced the concepts of 'niche regimes' and 'undercurrent countermovements' in order to highlight these phenomena. Pesch in his commentary challenged the need for additional labels, arguing that instead of introducing more concepts making the analysis more complex there should rather be an attempt to simplify the analysis and make it empirically more powerful and sharp. Avelino and Frateskaki defended the need for both new concepts, niche regimes and undercurrent countermovements, as to be helpful to particularly understand the origins and dynamics of regime changes. e.g. niche-regime or, relating to presentation from before, the individual level. If we want to understand more in depth, what are crucial elements of transitions it is useful to introduce these.

In addition there was debate on the sense of talking about drivers and barriers since both tend to shift depending on the person asked and on the timing in the process. Therefore e.g. the InContext project stepped back from talking about drivers and barriers. Avelino et al argue, that it is true that people may differ in deciding on what is a driver and what is a barrier (e.g. person a claims X to be a driver while b claims X to be a barrier.) and that this was observed in the empirics, too. At the same time this variation seems to shrink the more precisely you focus the question: a driver with regard to what exactly? In addition for the interviewees it did not prove problematic to decide on what is a driver or barrier.

An additional result possibly important to frame future inquiries pointed out the fact that people/ citizens do not relate their initiative to socio-technical systems but rather to sub-cultural systems and along socio-spatial delineations. E.g. they would not talk about their initiative as being part of the Dutch energy system but rather to be part of the citizen self-owned energy movement.

Walter Wehrmeyer presented the CRISP project as well as preliminary findings from it. The project worked with young people in doing participatory backcasting and developing a variety of future scenarios. The presentation started with the insight that past experiences with expert assumptions on the future very often proved to be essentially wrong. Wehrmeyer et al. therefore stress they need to experiment and play around, not focussing on one particular vision of the future alone, and backcasting is a means to do so in a structured way. Involving young people in backcasting and scenario development thereby follows at least to reasons: on the one hand there is an ethical argument to involve

young people as they are particularly the ones that are going to be alive during the time scenarios are made for. They should be able to influence discussions and proposals. The second reason is related to this but more practical: Involving young people in backcasting about the future may lead to them owning results and behave in accordance to them.

A core part of the discussion focussed around the notions of desirability and plausibility of developed future scenarios. Trying to provide an answer to why sustainability transitions actually may or may not come about. Wehrmeyer put forth that although developed scenarios may be plausible they are not realized since they are not desirable enough, e.g. from the perspective of vested interests. An anecdotic insight reported was the strong reluctance of experts to work out scenarios that they did not feel were valuable, i.e. which they don't like themselves. This led to challenging the basics and logics of these very scenarios. To the contrary young people were far more open to think through every kind of scenario.

A second focus point of the discussion as sparked by the comment of Pesch was on the key aims of the backcasting practices, be it learning or empowerment. Particularly he questions the adequacy of backcasting for aiming at empowerment of participants; rather learning would be a result more frequent in backcasting.

In his response Wehrmeyer pointed out, that one of the key advantages of backcasting is the social inclusiveness of the process, which makes the implementation of the pathways somewhat easier. However, there is also the difference between actual empowerment of decision-makers, and the feeling of empowerment individuals may gain from the backcasting process. It is right to suggest that empowerment would only be an outcome if the backcasting participants are actually also decision-makers, as opposed to the general public. Under this condition, learning is a more likely outcome in backcasting than empowerment, as many workshops are engaging with individuals or groups who are not necessarily in a position to enact their power towards change. Though Wehrmeyer made clear that he has no empirical evidence whether learning is a more frequent outcome than the feeling of empowerment.

W

Working sessions

3a

**Bottom-up
participatory
methods for
visions &
scenarios**

Stakeholder participation if there is nothing at stake?

Scenario workshops for raising the quality of participation in Climate Neutral Urban districts

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Abstract

Sustainable development poses demands that are usually not met by dominant patterns of political decision-making. Scenario workshops can be used as a method that allows policy decisions to be made according to the demands of sustainable development, which involve the attendance of a long-term future, the implementation of new technologies, and the participation of a wide range of stakeholders. To develop further understanding about the efficacy of scenario workshop, a simulated scenario workshop was held in which policymakers in sustainable urban planning were engaged in a role play.

Introduction

Sustainable urban development appears to be complicated by dominant approaches of local (and also national) forms of policymaking. Existing patterns of decision-making in the policy realms have difficulty with the demands that are posed by sustainable development, which, among others, involve the combination of a long-term future orientation, the implementation of new technologies, and the cooperation with a wide range of stakeholders. This paper will propose scenario workshops as a method for local policymakers to meet the demands of sustainability in relation to urban development. Such workshops allow the attending of long term futures, they make it possible to take divergent social and technological developments into account, and they also enable the inclusion of public and stakeholder participation in local decision making.

We will first pay attention to regular patterns in public decision making. It will be shown how contingency is an elementary characteristic of decision making, which makes it hard to take a wide range of uncertainties into consideration. Subsequently, we will introduce the scenario approach, and we will describe how these scenarios can be used to overcome the effects of contingency and group think. To elaborate on these claims, we will present how a simulated scenario workshop on the fictional city of Clueburgh that was prepared and organized by the authors.

Contingency and the demands for sustainable development

Contingency in the policy domain

In policy analysis the messy and unpredictable nature of the policy domain has been acknowledged since Charles Lindblom claimed that this academic field can be seen as the 'science of muddling through' (1959). Lindblom depicts policymaking as a piecemeal and fragmented process, in which policy makers do not act, and cannot act, rationally and comprehensively. The findings of Lindblom have been corroborated by work on policy formulation and implementation, for instance by Wildavsky (1964) who described the political processes that characterized the establishment of a governmental budget, later followed by his work on policy implementation (Pressman & Wildavsky, 1984).

Another strand of research that is relevant here concerns the study of the organizational processes that lead to policy formulation. Cohen, March, and Olson (Cohen, March, & Olsen, 1972) coined the notion of 'garbage can model' to describe the process of policy formulation. These authors claim that most policy models are built on the following false assumptions: a) the formulation of policies is connected to a knowledge of alternative solutions for a problem; b) the formulation of policies is built upon the presence of knowledge about the consequences of choices; c) the formulation of policies is based on a consistent order of preferences; and d) there are clear rules for policy formulation. In reality, however, the policy process does not work this way. Building on Herbert Simon's account of 'bounded rationality' (1997), these assumptions can be said to fundamentally overestimate the time and information which policy makers have. Moreover, they neglect the fact that preferences may change as a result of the policy choices that are made, as well as that policy rules are only followed upon very loosely.

Opposed points of departure for describing the policy process that are proposed by Cohen et al. are 'ambiguity' and 'organized anarchy'. Ambiguity pertains to the knowledge that an organization has about its goals, about the information over which it disposes, and about its own history. Organized anarchy can be seen as a result of this ambiguity and relates to the presence of inconsistent preferences, unclear working processes, and a fluid involvement of people who contribute to the policy process. Instead of seeing the policy process as a rational endeavor, it is better to see it as a 'garbage can' in which problems and solutions are dumped by participants that happen to pass by. A decision can be seen as the result or an interpretation of a diversity of more or less independent streams that are present in an organization.

Kingdon (1984) specified the garbage can-model by identifying the different streams that are present in the decision-making context, in particular in relation to the phase of policymaking in which an issue is set on the political agenda. This agenda-setting process is described as the simultaneous occurrence of a salient problem, an available solution, and hospitable political conditions. In other words, Kingdon distinguishes three 'streams' in the policy domain. The first of these is the 'problem stream'. The rationale behind this stream is that a given situation has to be identified and explicitly formulated as a problem or issue, before it has the slightest chance of being transformed into a policy. The second stream is the 'solutions stream', which is concerned with the formulation of policy alternatives and proposals. The third stream is the 'politics stream', which is characterized by political events, such as an impending election or a change in government, but could also relate to the general political mood or the availability of political resources. These three 'streams' are perceived as largely independent entities; their emergence follows different social patterns, which makes their coincidence largely a fortuitous event, which takes place when there is a so-called 'window of opportunity'.

Group think

These findings from policy research imply that it is better not to represent the policy process as a rational process in which a well-considered balance of goals and means leads to a certain decision, but instead that it is better to see policymaking as a fundamentally contingent process in which coincidence and dependency on a specific history as well as a specific institutional and organizational context play a decisive role.

This contingency not only pertains to the phases of agenda-setting and policy formulation, but also to the legitimization of a policy proposal. The policy domain is characterized by a separation of functional responsibilities. Obviously there is the legislative branch of parliament and the executive branch of government, which both have their distinct place and role in the decision-making process. However, the division of responsibilities and roles goes much further than this bipartite division (for the time being, ignoring the judicial branch). We have different ministries, different levels of authority, etc. which basically means that different organizational sections have to *compete* with each other for resources and for the possibility to pursue its own plans and ambitions.

This division of tasks has great implications for the way policies are made. It implies that the development of a successful policy plan is mainly based on acquiring *support* for a particular policy plan. A coalition of advocates has to be forged which bears enough critical mass to eventually pass the highest executive and legislative levels. One may say that the game of policy-making is one of conflict and conviction, that works its way up from the 'inside' to the 'outside' (Stone, 2002).

In terms of the quality of decision-making the main problem of this mode of working is that it gives rise to *group think*, which is seen as the most common explanation for policy failure. The notion of group think was introduced by Irving L. Janis in 1972, and it was used to explain painful fiasco's in US foreign policy, such as the disastrous preparation to the Pearl Harbor attacks, the escalation of the war in Korea, the failed invasion of the Cuban Bay of Pigs, and the unwanted intensification of the American involvement in the Vietnam war (Janis, 1972). In each of these cases, the group of decision-makers in charge were pursuing consensus and harmony inside of the group itself, leading to the negligence of crucial information, to the failure to formulate policy alternatives, or the reluctance to take such alternatives seriously. Also when the group was confronted with news about recent, undesirable, developments, the group persevered in its chosen policy course.

The demands of sustainable development

How does this fundamental contingency of the policy process affect the ambitions of policy makers to pursue sustainable development? For sustainable development, we may find the following demands that have to be fulfilled in order to effectively pursue this goal (Mulder, 2006).

- Sustainable development requires a long-term perspective
- Sustainable solutions usually involve the application of new technologies
- The societal acceptance of such a new technology requires broad stakeholder engagement.

Though each of these demands is pursued separately in the policy domain, the contingency of policy processes makes it hard to comply with the *combination* of demands. Let us elaborate on this claim.

To start with, urban planning usually takes up a long-term orientation, however, it seems that this orientation is usually established by a top-down form of planning that contradicts the third demand (Boelens, 2010; Grunwald, 2000). One of the reasons for this is that such a long-term orientation is a difficult one to take by the general public or by stakeholders. They often have problems in imagining a consistent future, and they often have immediate demands or problems to be solved.

One may also see that local authorities are quick to take up new, promising technologies, they often do so in order to be considered frontrunners, very much driven by group-think processes in which for instance the reputation of a city is brought in as the main argument to do something, can be leading to a neglect of possible alternatives, budget overruns, and policy failures (Bruzelius, Flyvbjerg, & Rothengatter, 2002).

Stakeholder participation is also no new feature in urban decision-making, however, what usually happens is that a policy plan that is already formulated is presented to the public in a consultation round (or perhaps a referendum). In general, the role of the public is then limited to making small adjustment or refusing the package deal altogether (leading to great frustration among the policy-makers). Deviant voices that may be present in the public are not given the opportunity to be raised (Bogner, 2012). According to Bruzelius et al. (2002, p. 5), the relation between participation and technological projects can be sketched as follows:

In large scale projects, political parties, government administrations or various lobby groups often tend to promote or to try to block specific technical solutions. It is argued, for instance, that a tunnel and not a bridge should be built, or vice versa, or that it should be a connection for trains only and not a road and rail link, or vice versa, etc. The pro and con positions tend to be based on only aspects of the problem, and rarely take all features into account. This is quite natural because a more full picture of a proposed project cannot normally be formed at an early stage of the process. But it is in this early stage that the interested and involved groups make up their minds in ways that often do not change later, even if better and more relevant information is made available.

The question is how to combine these distinct demands of sustainability in order to pursue sustainable urban development? We will propose scenario workshops as a method that is able to bring these demands together. It enables the involvement of stakeholders, a long-term orientation, as well as a critical reflection on the position of new technologies against the background of the goal of sustainability.

Scenario workshops

Scenarios

Scenarios for facilitating learning processes among stakeholders have been most elaborately developed in the framework of constructive technology assessment, which is an approach that aims at broadening design, development, and implementation processes of new technologies (Parandian, 2012). The traditional use of scenarios can be extended to user- and citizen involvement. However, traditional scenario use takes a rather 'static' approach to processes of urban development, while especially in case of the implementation of new technologies a more 'dynamic' approach is desirable, in which stakeholders actively participate in the planning process. After all, the working of new technologies can only be assessed in actual practices – which, in turn, are predominantly the result of the interaction of different stakeholders in society. Scenario workshops can

be seen as a micro-cosmos in which these societal interactions are simulated, so that practices which would arise in societal reality are incorporated and accommodated in the workshop, which can lead to a more effective design, development, or implementation process.

The reasons for using scenarios, opposed to more traditional forms of forecasting, are that:

- The dynamics of various important factors are non-linear. It implies that small changes at specific moments lead to irreversible pathways in a development. For instance, as a famous urban legend claims, the width of current railway tracks is still determined by width of the classic Roman carriages.
- Not all changes are external: we create the world and we are not passive spectators. So our foresight partly depends on our own actions.

The consequence of the first reason named above might be to claim that the world is unpredictable. However, the same railway gauge example teaches us that there is quite a lot of predictability; the gauge has remained identical for centuries. Only there are 'forks' in history, not everybody might take the same direction at the forks, and how to foresee the consequences of the options? Scenarios might help to foresee the forks and the impacts of options.

In thinking about the future, it is useful to make a distinction between changes that are outside our reach (that are just happening, and we just need to adapt our plans to them) and the changes that we are creating by our plans. For both changes, we might use scenarios, but they are of a different nature:

- *External scenarios* span a 'future space' in which the plans that we make should be effective and efficient. Exploring this space makes sense in order to find (all) options open to the planner. Workshops on external scenarios lead to discussions regarding 'robust' options and precautions for 'the extreme'.
- *Internal scenarios* represent the main comprehensive strategies that could be implemented. These scenarios can be evaluated for their consistency, and lead to discussions regarding their 'success in meeting predetermined targets', and for their 'other impacts' under the various external scenarios.

So scenarios can figure as an important planning tool. But they might be more. Scenarios that present a comprehensive strategy might also create an interesting storyline that allows for a far better quality of interaction with, and between stakeholders. Often stakeholders have problems in imagining a consistent future: they often have immediate demands or problems to be solved, and it might be hard to make them think in a long term perspective. With that, it is hard for many actors to articulate the way they relate to a certain policy plan, which affects the efficacy of their contribution. In other words, the use of scenario's figures as a potential a tool for improving the quality of interaction with stakeholders.

With relation to choosing between technological alternatives, scenario workshops might be helpful because the interplay between competing sustainable technologies can be used as one of the narrative elements of the internal scenarios. This forces participants to go further than just supporting a specific technology, by making it necessary how this technology relates to the overall goal of sustainable development, as well as how it relates to other sustainable technologies.

Constructing storylines: Dilemmas and uncertainties

Although there is no fundamental reason to choose for a certain range of scenarios, the most convenient number is four, which allows a clear plotting on two axes and keeps the number of alternatives manageable. Moreover, a juxtaposition in a coordinate system helps to illustrate the antagonism that is pertained by certain policy choices – which, especially in relation to internal scenarios, can be seen as an important asset. One can represent different policy alternatives as *dilemmas* with which policymakers have to deal.

Subsequently, the main ingredients of the construction of the scenario storylines are given by the *uncertainties* that are at stake at a given sustainable alternative (Nekkers, 2012). The forks of future developments can be found in several domains of uncertainties, which include changes in the following domains:

- Demography
- Technology
- Culture
- Economy
- Politics/institutional contexts

Identification of uncertainties in these domains can be based on desk research, brain storm sessions, and participation of symposia and conferences, but particularly by expert interviews.

The juxtaposition of different storylines based on dilemmas shows that certain choices might create specific types of future dependencies between actors and technologies, that, in turn, might raise problems with respect to the overall goal of sustainable development. By showing these dependencies via scenario storylines, policymakers can be made more aware of the effects of their choices, also in relation to their sustainability ambitions. Moreover, the scenarios can be used as input for a discussion on stakeholders, so that also the relation of ambitions, interests, and outlooks of other affected actors can be taken into account.

In sum, the demands of sustainable development appear to be covered by the method of scenario workshops, which makes it a promising option for broadening the horizon of policymakers. At the same time, it has to be added, that this method of scenario workshops will not replace existing modes of policymaking. The basic contingency of the policy domain is still fully acknowledged, what a scenario workshop does is to enlarge the understanding of policymakers about the validity, acceptability, and as such the feasibility of a specific policy plan, in relation to the broader goal of sustainable development.

A simulated scenario workshop

The method of scenario workshops has been applied in a simulated form in the context of the CLUE-project, which is an Interreg-funded project in which eight European cities aim to develop climate neutral urban districts by exchanging best practices and by cooperating with three universities to apply state of the art monitoring methodologies – of which the scenario method approach is one. In March 2013, a workshop was held in Edinburgh, in which we presented and tested our scenario approach. The scenario workshop was attended by 25 participants: 15 policymakers from the different cities and 10 people from different universities. The scenario workshop that was held as a role play in which the case was based on the fictional Dutch city of Clueburgh.

External scenarios

The workshop was held in two rounds, one on external scenarios and one on internal scenarios. These external scenarios had been established on the identification of the main uncertainties. In the external scenarios, we focused on two elements that each relates to a combination of these factors. First, there is the future of energy, which predominantly pertains to economic, political, and technological factors. Second, there is the future of population pressures, which pertains to demographic, economic, and cultural factors.

Two axes were used to prepare the scenarios of this workshop. On the one axis, low energy pressure versus high energy pressure were represented. This axis related to pressure exerted by issues in the energy domain, such as availability of fuel, energy prices, the impact of CO₂-reduction policies, etc. The other axis represented low population pressures versus high population pressures. This second axis dealt with issues such as population growth or decline, immigration, aging, consumption patterns, etc. This juxtaposition led to the following four scenarios:

High energy-high population pressures

In this quadrant, both the issue of energy and population may lead to severe problems. For instance, climate change connected to increased CO₂-emissions may have direct observable consequences for cities (draughts or floods, urban heating, etc.), due to a shortage of both fossil and renewable resources, energy prices may have become so high that it threatens the economic and social stability in society. The severity of these problems may be increased by processes of urbanization, leading to crowded cities, which may also be caused by mass immigration due to the effects of climate change in poor countries.

High energy-low population pressures

Another possible future may be that the energy situation gives rise to serious crises, but do not lead to an increased pressure of agglomeration. For instance, because cities lose their capacity of attractive economic hubs, or that because of the decrease of birthrate and average increase of age, Europe becomes less populated.

Low energy-low population pressures

the production of unconventional fossil resources or the breakthrough of renewable energy systems might take away the current pressure caused by energy issues. Moreover, the demand for energy might decrease because of the fact that the peak of population growth, at least in Europe, lays behind us.

High energy-low population pressures

Despite the decrease of population size and socio-cultural dynamics, our patterns of energy consumption are not brought down, but still follow their upwards trend. The severity of the effects of climate change may lead to new, highly restrictive forms of legislation, demanding cities to drastically reduce their carbon footprint.

These external scenarios, which are probably the most familiar form of scenarios, have a rather instrumental function in the scenario workshop we propose. It is basically used to set the stage, to make participants realize that they all have their own specific outlooks, while other participants may have other ideas about the future.

Internal scenarios: dilemmas of technology

The core idea on which the construction of the internal scenarios is based is the juxtaposition of two dilemmas that can be associated with specific choices for certain sustainable technologies. The first dilemma is constituted by the opposition between developing an urban district by implementing a system based on renewables and developing such a district by increasing the efficiency of resource use. The essence of this dilemma is based on the conjecture that the investment of constructing a renewable energy system has to be retrieved, which takes away the incentive to become more energy-efficient. The second dilemma is constituted by the choice between using space as intensively as possible and the use of space as extensively as possible. On the one horn of this dilemma, we can find notions like that of the 'compact city', which propagates the clustering of activities and functionalities in order to increase the systemic efficiency. On the other horn of the dilemma, we can find ideas for instance about 'greening' the urban environment. The two dilemmas could be further plotted on two axes, as renewable systems can be expected to be associated with a condensed urban context, while a more extensive spatial orientation leaves more room for becoming more energy-efficient. For the further substantiation of the internal scenarios, the same set of uncertainties was used in order to construct the external scenarios. The different domains of uncertainties were used to identify developments that could be used as pivotal points in each of the scenario storylines.

Table one depicts these pivotal points for our four scenarios, which are based on the implementation of the following forms of sustainable urban development: geothermal heating, passive housing, compact city, and green city. The first column presents the fields of uncertainty, the second column give the uncertainties that pertain to all scenarios. The other four columns provide issues that are specific to a scenario. In the appendix, the full scenarios can be read. Furthermore, roles were allocated to the participants. The roles that had to be played related to a range of stakeholders that covered the relevant societal domains: local authorities, housing corporations, banks, residential organizations, and environmental NGOs. Furthermore, each of the scenarios was presented by one of the participants.

Findings and reflections

Upon the basis of a simulated workshop in which roles were played by policy makers and academicians, it is hard to come to real conclusions. This has also not been the ambition of this workshop, it was mainly used to test the format. Nevertheless, some general impressions can be made. First of these is that one may recognize the tendency of policy actors (who were in the workshop also played by policy actors) to come to a consensus standpoint. This hints at the propensity of group think. After the workshop, these actors found the lack of an solution-orientation a bit awkward, which basically tells that the aim to prevent group think is successful. It testifies that the people are forced to do something differently than they usually do (cf. Kahneman, 2011). Second, the divergence of stakeholders (even in spite of the real-life homogeneity of the participants) did open up the discussion to a considerable extent. New arguments, standpoints, and visions were raised during the debate. Especially the diverse ideas about what sustainability actually

means in relation to the project at hand became a topic of discussion. With that, it can be expected that the frame of reference for policymakers about sustainable developments can increase. However, it has to be acknowledged that the timeframe of 2,5 hours in addition to the unfamiliarity of some of the role players with their roles appears to be too short to really open up the solution space, as it is intended by the method of scenario workshops.

Scenario workshops promise to be an appropriate method to overcome some of the main problems of the policy domain related to the pursuit of sustainable development. This method allows to open up the solution space, it allows to include the perspectives of a range of stakeholders, and it allows to take future developments into account. Nevertheless, one also has to consider some of the potential shortcomings of the method. First, the method is very much oriented towards 'opening up' the decision-making process, but it should not be forgotten that the ultimate goal of the policy domain is to come to conclusive decisions. In other words, the process has to be 'closed down' as well (Stirling, 2006). Second, one may expect that a singular workshop is not sufficient to have an effective interaction between stakeholders. One of the main goals of a scenario workshop is to have 'mutual learning', however, such learning will, in all probability, demand several events in which stakeholders can exchange their world views, preferences, conditions, etc. With that, however, the threat of group think may recur: people who get to know each other, have the psychological tendency to seek for consensus. In sum, the promising method of scenario workshops, in the context of sustainable urban development, still requires a considerable amount of testing and fine-tuning.

Table 1: Main uncertainties in four axes on sustainable urban development

	General	Geothermal	Passive housing	Compact city	Green city
Demographic factors	1) Aging population lead to different patterns of heat consumption 2) Immigration changes dominant patterns of heat consumption			Ghettofication	
Technological factors		1) Chances are that drilling is unsuccessful 2) Contamination of (toxic) fluids 3) Drilling is still a technology with a high learning curve	1) Installation of balanced ventilation technology is difficult, in many ways it contradicts the ingrained patterns of installation technicians 2) New isolation techniques are still in development	Creation of new technological lock-ins, such as in the case of transport	
Cultural factors	It takes another way of dealing with heating		People use their living environments differently, due to working more at home	People may not want to live in a compact city, so that only lower social classes will come to live in it	
Economic factors	1) A low price of energy reduces the return of investment 2) Crisis in housing market threatens the economic viability	Not profitable, because of low energy consumption			
Political/institutional factors	1) Role of housing corporations 2) Balance between owners/renters of houses				
Users/residents		Fear of earthquakes	People like to let fresh air into the room		Parks may give the sense of unsafety for residents

Appendix

Clueburgh

Clueburgh is a city in the vicinity of Delft. It has 500.000 inhabitants. It aims to renovate one of its neighborhoods in a carbon-neutral way. Like any city, Clueburgh has to deal with a specific national context.

A first specific element of the Netherlands is the role of housing corporations, which are organizations that construct, manage, and rent affordable residences without making profit. These organizations are nowadays mostly private, their public assignment is guaranteed by governmental regulation and budget allocation. In the Netherlands, about 30% of houses are owned by housing corporations, in Clueburgh this percentage is about 40%.¹ Especially in neighborhoods in which lower social-economic classes live, most houses are owned by corporations. Since the 1990s the system of housing corporations has been subject to criticism.

- Many corporations extended their activities: they started investing in office buildings, educational buildings, event centers, etc. With that, managers of building corporations began to take large entrepreneurial risks, while most basically fulfilling a public function. Moreover, the salaries of these managers became higher and higher, raising a lot of public controversy.
- In its mission to make housing affordable, housing corporations do not take account of the income of tenants, which means that tenants are being subsidized to live in a cheap house, even if they could easily afford a more expensive house.

A second important element here is that private possession of houses is supported by government, and stimulated by having tax-deductible rents on mortgages. *De facto*, this means that people will pay more for a house than they would have been able to in a free market. In combination with the shortage of houses, and the limited opportunity to build houses in a condense country like the Netherlands, this led to a huge increase in prices of housing. Since the financial crisis of 2008, banks have been much more stringent in their granting of new mortgages, which led to a price fall of 19%. Making it very undesirable to buy a new house, 'locking' the housing market, even though the shortage of houses still exists.

The third element is that the Netherlands is one of most densely populated countries in Europe. Especially the central part of the Netherlands in which Clueburgh, like all major cities in the Netherlands (the so-called 'randstad'), can be found, is very populated, with a density of more than 1200 inhabitants per square kilometer. In this area, Clueburgh is the most densely populated city with almost 6000 inhabitants per square kilometer. One side of the city has the North Sea as its natural boundary. South of Clueburgh is the agricultural area of the 'Westland'. North of the city is natural area of woodlands and dunes. The Eastern boundary exists out of a highway, behind which other municipalities can be found. Earlier Clueburgh has appropriated land from some of these municipalities to construct a new residential area. Related to this issue of sparse space is that also in terms of car traffic, Clueburgh is a problematic case. Two highways basically end in the city center, after which there are only a few roads that have to accommodate all traffic, leading to huge problems in the domains of congestion, parking space, and air quality.

¹ <http://www.cbs.nl/nl-NL/menu/themas/bouwen-wonen/publicaties/artikelen/archief/2011/2011-3520-wm.htm>

Scenario 1: Clueburgh geothermal

In the early 2000s, geothermal heat had been introduced as a promising technology. The core of the Earth provides a constant flow of heat and by pumping up warm water from the subsurface, houses could be heated in a carbon-neutral way. Originally, it was also thought that geothermal heat could be used to provide green electricity, just by pumping water from such depths that its temperature would be over 300 degrees Celcius. 'Go Geothermal Energy' was an organization that had been established in 2002, which brought together experts and policymakers so to stimulate the development and implementation of geothermal energy.

In the greenhouse area of the Westland, close to Clueburgh, there had been some successful projects. Individual greenhouse owners had drilled a well to provide heat for their greenhouses. This helped to convince the municipality of Clueburgh that geothermal heat might also be a good source of urban heating, and as such helpful to reach the city's goal of being carbon neutral in 2050. In the Southwest part of Clueburgh, a residential area that had to be restructured was designated as a potential case for geothermal-based district heating. Another important occurrence here was that NEO, the company that provided heat to the city, had to invest in its boiler installations. NTO, a leading Dutch expertise organization, was asked to provide knowledge about the subsurface. Also the energycompany Conene was by the municipality of Clueburgh asked to join the project. Conene is an organization which showed great interest in sustainable development and moreover an organization of which a significant percentage of the shares were owned by the municipality of Clueburgh. A final set of partners that were asked to participate were three housing corporations, which owned most of the residences in the area to be restructured.

In 2010, a well was drilled and 3000 houses were connected to the geothermal net. Now 20 years later, we may say that the project has been relatively successful – although there have been severe financial setbacks. On a wider scale, geothermal energy never realized its initial promise: it has never become a widespread source of urban heating nor of electricity production.

To finance the project, a joint venture was made in 2008 between the municipality of Clueburgh, three housing corporations, NEO and Conene. With that, financial risks were spread along the partners. A business case was made to research the risks and benefits of the project, including such factors as heat demand, gas prices, costs of drilling, management of pumped water (which is often polluted). Although investigations showed that the risks were quite severe, and the price was much higher than initially expected (15 million Euro instead 6 million Euro) the rewarding of a European subsidy of 3,4 million Euro and the persuasive skills of the alderman who was driving the project, made it possible for all parties to join the project.

Initially, some residential resistance had to be overcome, as some tenants were unhappy with the drilling site in the middle of the city, and with the closing off of streets that was necessary to construct the heating infrastructure, but in the end, residents were successfully informed and convinced about the benefits of the project.

The drilling commenced in 2010. An exciting moment for the project owners, as the uncertainty of success is quite high. First, there is an 80 to 90% chance of pumping a warm water, which may be considerable for actors from the petrochemical industry, but which is

considered to be very risky for a public or a not-for-profit organization. Second, it is uncertain whether the temperature of the water that is pumped up is high enough for the project. Third, it is uncertain which kind of dangerous materials are brought to the surface, such as gas, arsenic, radioactivity, etc. Fortunately, the well, that was drilled at 2300 meter deep, proved to be successful in all respects.

At the same time, the banking crisis of 2008 led to a deep crisis in the Dutch housing market. This implied for the project that a huge amount of the envisioned houses that had to be connected to the system would not be build. Instead of 6000 houses, only 3000 houses would now be heated by geothermal energy. The contracts that were closed between the six parties obliged the housing corporations to buy a fixed amount of geothermal heat, however, with the reduction of houses, it proved to be impossible for the housing corporations to fulfill the aspired demand, leading to sincere fines. In all, each year the corporations lost millions of Euros on the project.

It was far from the only problem that the housing corporations were confronted with. The bubble in the housing market of the early 2000s led to risky forms of entrepreneurship and overconfident management. In the 2010s, the big housing corporations came in deep financial trouble. The housing crisis was not only propelled by the housing corporations, but also by the tax deductible mortgage rents. The system proved to be untenable. The tax deduction of mortgage rents was fully abolished halfway the 2010s, and the housing corporations were collectivized again. The three corporations that participated in the geothermal project were taken over by Clueburgh, which had to take a huge financial loss.

The mission of the now municipal housing corporation was to provide affordable houses only for the lowest social-economic classes. Most residences were sold to tenants and private owners. The bulk of houses, however, because buying a house came of be out of reach for most people, were bought by market parties, which now asked rents that were in line with market prices. The municipality kept possession of most houses in the geothermal district. Houses were quite small and not that attractive to well-off people. Despite all attempts to make the housing market dynamic again, people who lived in this area kept living there, basically for the rest of their lives.

Following the American success in the production of shale gas and shale oil, European countries like also invested heavily in this fossil fuel. The new flood of cheap oil and gas, led to a steep decline in energy prices, which produced an additional financial setback to the project. In the end, the project never led to any financial gain. Clueburgh and the two energy organizations simply had to take their financial losses.

On a larger scale, geothermal energy was never applied widely in the Netherlands. The enthusiasm for extracting warmth from the subsurface had been diminished since the increased number of (minor) earthquakes in areas that had been subjected to gas and oil mining. Licenses for new sites became very hard to acquire. Public resistance against drilling projects was massive. The costs of drilling also remained to be very high, over 10 million Euros for a system that has many inherent uncertainties, and discouraged most potential investors.

Moreover, passive housing has come to be the standard for newly build and renovated houses. The Energy Performance of Buildings Directive of the European Union that was passed in 2009, imposed that all new houses had to be nearly zero energy from 2018 onwards.² Construction companies, project developers, municipalities came to be accustomed with passive housing. Though the European Directive meant that renewable heating systems are allowed, there simply is no need any longer to invest in such systems.

² <http://www.pass-net.net/why/index.htm>

Passive houses are cheaper to build, their functioning is proven, and people know how to construct them and how to live in them.

At the same time, the residents using geothermal heat are quite happy with the system. People that live in the residential area are now usually quite aged, they liked their rooms to be a few degrees than average. Geothermal heating allows raising the thermostat with only a mild financial penalty – also the municipality of Clueburgh is happy with some additional heat consumption in order to at least earn back some investment costs. Moreover, the provision of cheap heating provided by a radiator gave people the sense of old-fashioned warmth, instead of having a constant flow of air with an even temperature. Nevertheless, in a couple of years, when the houses have to be reconstructed, or in most cases, torn down, the geothermal system will be ended. The new and the renovated houses, like most houses will become passive.

Scenario 2: Passive Clueburgh

The Tasman Quarter is a residential area in Clueburgh that has been constructed in the early 2010s. With the application of passive housing, the municipality of Clueburgh tried to contribute to its goal of being carbon neutral in 2050. Moreover, the municipality was well aware that in 2018, all newly build houses would have to be nearly zero, which basically meant that for the construction of most new buildings, passive housing would be the obvious choice, as not all buildings cannot be easily connected to the infrastructures that are necessary in case of renewable energy provision.

A passive house means that buildings will only consume 15 kwh/m² per year. They do so by having very good isolation and for instance by having a balanced air circulation system and a ground heat exchanger. Biomass and solar panels may also be used to provide energy. In terms of heating, a passive house will only have a demand for warm water, there is no additional demand for heating the building itself. Even in 2010, the concept of passive housing was not very challenging in terms of technology. It basically integrates existing technologies, of which the functioning had been proven.

The Tasman Quarter was aimed at the high end of the market, most notably for well-off people that wanted to live in a 'green' way. The project was instigated by one of the largest project developers in the Netherlands, Stalladam. Although being a very experienced company, the Tasman quarter was the first passive housing project that it constructed. Also outside Clueburgh there was not much experience with passive building. At that time, certification and standards were simply lacking, which meant that Stalladam did not have much guidance to go by – which unfortunately showed in the construction of the residential area.

The crisis in the housing market led to budget costs and hiring inexperienced subcontractors. The first thing to go were the sunscreens on the façade of the houses. In the Netherlands, sunscreens are not standard on a house, so the contractor thought it no problem to not apply them. Obviously, the installation of a balanced ventilation system requires a certain level of understanding of how the system works. The installation crew however did not have this expertise. For instance, the tubing has to have a minimum of bends in order to function well. However, the availability of flexible (ribbed) tubes was taken as making it very easy to install the tubing system, enabling a lot of twists and bends without much difficulty.

The new system was unfamiliar not only for construction workers, but also for the new residents, who, in spite of all their environmental friendliness, had some problems with their new houses. Some of these were the result of wrong construction. A first problem was noise. The tubing system buzzed, driving some residents mad. Some of them even cut the wiring, just to get rid of the noise. A second problem was the excessive indoor heat, because of the lack of sunscreens. A more severe problem was caused by bad ventilation. The insufficient circulation of fresh air led to a lot of complaints about headaches and nausea among the residents.

Some houses were put on sale, but given the crisis in the housing market and the bad press the neighborhood received, it is no surprise that there was not a lot of interest in buying a house in the Tasman Quarter – giving rise to even more chagrin. Others residents simply installed windows that could be opened. Another problem was that people started to use their house differently than expected. People who bought houses in the Tasman quarter often worked from home, office workers, a possibility created by the internet. Often they worked from their bedroom, which however, was subjected to another climate regime as the living rooms. In other words, it was not really comfortable to work in your bedroom.

A number of home owners started an association, *Activepassive ownership*, that went to court to compel Stelladam to repair the shortcomings of their houses. The defense of Stelladam was that there is no certification of passive houses, so that the company was not liable: there are different understandings of what a passive houses exactly is, the understanding of Stelladam had not been better or worse than the understanding of the home owners. Despite this defense, the judge granted the complaint of the home owners. He said that Stelladam sold its houses as passive, and that it should have known better what this concept implied. Stelladam had to repair the shortcomings. The downside of this development was that it discouraged Stelladam and other building companies to invest in new passive houses. The upside was that it led to national certification and quality control. With that, there were less new passive districts, but the district that were build did satisfy the norms of passive houses.

The uptake of passive houses was also slowed down by the decrease of fossil fuel prices, which was caused by the availability of oil from the arctic, tarsand, an shale. The decrease of prices of fossil fuel also led to a renegotiation of the Member States on the Energy Performance of Buildings Directive. One of the arguments that was given by the Netherlands, one of the strongest opponents of the new directive, was that the directive would obstruct the economic resurrection of the building sector. More cynically, it has been claimed that the cheap prices of oil took away the sense of urgency to make the transition towards a carbon neutral energy system. Moreover, the Netherlands had been slow in its uptake of renewable forms of energy. The end result of the renegotiations was that the directive would only be implemented 5 years later, at the same time the stringency of the norms was considerably diminished.

In 2010, passive housing was introduced as a big promise. 20 years later, we may say that this status has stayed the same. It still is very much a promise, as we are still waiting for the previously expected rise in energy prices to happen. In the meantime, people in the Tasman Quarter are very happy with their houses. The absence of radiators allows them to have more spacious houses. The architecture remains state of the art, even 30 years later. After the long dip in house prices, the market has been restored since the late 2010s. The houses in the Tasman Quarter nowadays belong the most desirable real-estate in the Clueburgh area.

Scenario 3: Compact Clueburgh

Different problems in the early 2000s challenged the municipality of Clueburgh. First of these was the burden caused by car traffic. Not only congestion was a problem, also the air quality was very bad. After a monitoring system was installed, one street in Clueburgh acquired the label 'dirtiest street in the Netherlands due to the high concentration of particulate matter. This relatively small street basically was an extension of a highway, and as such obstructed the flow of traffic immensely. Given the height of the buildings, exhaustion gasses had nowhere to go. At the same time, the area in which this street lies, the *Purgedistrict*, was highly impoverished, landlords offered cheap, but lousy, housing, which were especially inhabited by poor immigrants.

An integral plan was made that tackled traffic, and that created public and cultural facilities, as well as interesting architecture. In this way, the municipality hoped to break down the downward spiral of ghettoization. By attracting people with an interest in culture, such as artists and young professionals who worked in the city, and as such were not dependent on cars, Clueburgh aimed to revive the Purgedistrict. Moreover, the city aimed to make the district as environmentally friendly as possible as well by having a 'green' sewerage system and by using carbon-neutral energy, most notably by installing PV-panels, and by developing a biobased district heating system.

The masterplan consisted of the following elements. First, the central square of the district was to be restructured, by building a new city hall, a museum for modern art, and a new theater that would come in the place of a cinema, a dance theater, and a music hall. Second, blocks of houses had to be purchased in order to be renovated or rebuild. Third, the traffic infrastructure was dramatically altered. Large sections of the district were closed off for cars, and only accessible for buses and bikes. Other traffic was redirected via a 'traffic circulation plan', which concerned the development of a ring road around the city center so that traffic would not drive straight into the city any longer. In order to further public transport, a plan was made to construct a tunnel for trams. Obviously, the realization of this plan would take a long time and a lot of money, but on the other hand, it would make the center of Clueburgh a highly attractive area, combining all the benefits of city life, without its disadvantages.

The restructuring of the central square started with the construction of a new city hall. This new building included the state of the art-technology to deal with its energy challenges. On the roof a large collection of PV-panels was constructed, and the heating was provided by the district heating system. The museum, which was established in the old city hall, was also connected to these energy systems. Both buildings were seen as big successes. The construction of the new theatre, however, was subject to many problems. First, the construction of a new theater led to public resistance, as the existing theaters that could already be found at the square were only a few decades old. Local residents accused the municipality of squandering money. The city council still agreed with the construction, one of the arguments being that such construction was necessary to support the building sector, who were in big economic trouble because of the financial crisis. A condition that the city council posed was that construction workers had to be unemployed workforces from the Clueburgh area. Another consequence of the financial crisis was that the budget had to be reduced, which meant that some of the most challenging assets had to be given up. The aspiration to have a carbon-neutral building was one of these. In the end, the theater became a rather conventional building, which nevertheless took a long and difficult time to construct. Fraudulent practices among contractors were manifold, most notably in relation to the hiring of unemployed workforces, for instance, lists of non-existing people were used. The unmasking of such practices in the media led to even more

resentment of the local population. Nowadays the theatre is finished, still there are problems such as leakage and a lack of appeal.

The revival of the residences in the Purgedistrict was done in several phases. Houses were bought of landlords who were neglecting their property, in many cases their tenants were illegal immigrants living in bad circumstances. Quite some hemp plantations at attics and cellars were found. Other residences were owned by housing corporations, with whom the municipality could make agreements and covenants. The general idea of the restructured district was to diversify the area. Some blocks would be demolished, some would be renovated. There would be a lot of space for galleries and small shops, as well as for ateliers. Some blocks would be sold cheaply to people who were given the opportunity to fully design their own interiors. The reconstruction of the energy and water infrastructure was in the hands of the municipality.

It was not the idea to evict people from their houses, apart from illegal immigrants. First, that was not necessary, as there was quite a high degree of vacancy. Moreover, it was thought that the coming of new, open-minded, people would contribute significantly to the socio-economic integration of immigrants.

Nowadays, in 2030, we are well aware that in terms of integration, the Purgedistrict cannot be considered a huge success. Although there is no friction between different groups, a clear watershed between different societal segments can be observed. On the one hand, there are the rich professionals, generally well-educated, who work as artists, civil servants, consultants, etc. They usually have a Dutch background. On the other hand, there are the second, third, and sometimes even fourth generation immigrants. In general, their economic position and their education is low. Both groups appear to be quite satisfied with living in the Purgedistrict, even though their disposition towards their habitat is completely different.

For the rich professionals, living in the Purgedistrict means living close to their job, close to cultural facilities, and living amongst many of their peers. Their children go to so-called 'white schools', which are surprisingly homogeneous, given the multi-cultural character of the district. These young professionals often see themselves as 'green', and they are proud to make use of the environmentally friendly facilities that are offered to them. Then again, it has to be admitted that their ecological footprint is far from small. The one thing they miss in their neighborhood, space, can be easily found elsewhere. Many families have a second house outside of the city, these homes are usually not connected to carbon-neutral energy networks, and they often consume quite a lot of space. Moreover, the young professionals are used to having quite a number holidays every year, some of lasting only a couple of days. Such holidays include, almost without exception, travel by plane.

The inhabitants of Purgedistrict who have a foreign background do not have a lot of interest in being environmentally friendly. Most people are still very much relying on their cars. In fact, if there has been any kind of friction in the Purgedistrict between different groups of residents, it is due to having people park their cars outside parking spaces. Also in adjacent residential areas, there have been protests against people from Purgedistrict parking their cars over there. Children who have immigrant ancestors go to so-called 'black schools', which obstructs the integration of children from different backgrounds, as well as obstructs the integration of their parents. The reason for this segregation of schools lies in the law on free schools in the Netherlands, that prevents governmental interference in school policies. It is simply prohibited to distribute children to certain schools. Another issue is that people with a foreign background have different patterns of energy consumption. There appears to be at least some credibility in the stereotypical descriptions that these people like to have big flatscreen television sets, and they like to

have their homes a few degrees warmer than Dutch people. There have been quite a lot of people for whom the district heating system just does not give enough warmth. To solve this problem, they used electric heaters, so that the net electricity demand of the Purgedistrict vastly exceeded the supply by carbon-neutral sources. Nevertheless, if one would calculate the respective ecological footprints of the two groups of residents, it is not completely evident whose footprint would be the largest.

The third element of the Purgedistrict masterplan was the reduction of traffic and the stimulation of public transport. The traffic circulation plan meant a great reduction of car traffic in the district. Air quality was sincerely improved and congestion was very much limited (or displaced to other locations). This made it safe and comfortable to use bicycles, which a lot of people came to do, especially among the young professionals. As said, the use of cars remains to be common among people with a foreign background, sometimes leading to frustration about the lack of parking space on the one hand, or the occupation of space by cars on the other hand.

The public transport system has been an expensive one to construct, especially in case of the tram tunnel. The costs of the construction were twice as high as planned, and the realization of the tunnel took four years more than was scheduled. The tunnel was plagued by subsidence and severe leakage. However, nowadays the consensus is that the tunnel is aesthetically attractive as well as functioning satisfactorily.

A problem that only emerged in the late 2020s is the rise of clean and smart car traffic. Electric cars that are now able to 'communicate with each other' promise to make individual traffic available without the shortcomings of pollution and congestion. More and more, we see that people who are well-off buy cars that are smart and green. Making car use attractive again, even for environmentally friendly people. The question is what will happen to Purgedistrict when young professionals lose their interest in living there, because their cars cannot be parked over there. It may be that the district becomes an area again troubled by petrol-fueled old-fashioned cars, the only ones that can be afforded by the people who cannot easily leave the neighborhood.

Scenario 4: Green Clueburgh

For years, Clueburgh wanted to build in the dune and woodlands area in the Northern part of the city. Environmental groups always obstructed the realization of these plans. Around 2010, Clueburgh decided to change its strategy. Instead of fighting with the environmental organizations, it realized it might be more sensible to work together. The municipality started to organize meetings in order to find out under which conditions would it be possible to build residences in the dune and woodland area. Architects and urban planners were invited to think about approaches that could harmonize the standpoints on urban development and ecology.

A number of binding principles were formulated and signed by all parties involved and gave rise to the design of a district that should grow out to be the standard of reconciliation of ecology and urban planning, which would be given the name of *Sandytown*. A first condition was that the district should be carbon-neutral in terms of energy. Second, the natural surroundings would have to be protected, and open space and forest should be respected as much as possible. Third, the visual impact of houses had to be minimal, and as much as possible in line with nature. Fourth, the district should not become only affordable for rich people. Finally, the design of the district would be done by the continuous engagement of environmental organizations.

Not all environmental organizations joined the process, while the *Natural Conservation Foundation*, the largest environmental NGO in the Netherlands, fully cooperated with the municipality of Clueburgh, *Ecodefense* did not want to participate in the process. But as Ecodefense was a much smaller organization than the Natural Conservation Foundation, Clueburgh was not much discomforted with this.

The final design was one in which larger and smaller houses were blended in the natural environment. With that, the aesthetic challenge was achieved. Other elements of the design however proved to be much harder to realize. In many respects, the conditions that had been set up in the beginning of the process led to difficult questions.

For instance, how would people get to their houses? Parking space would be regarded as visually obtrusive. Buses and trams were also not acceptable, and digging a tunnel would be too disruptive for nature. For the more expensive residences, underground garages could be constructed. However, for the cheaper residences a number of larger parking spaces at the outskirts of the district were considered to be the most preferable option. Parking near the house was only for loading and unloading. It was expected that the people that wanted to live in such a natural environment would not mind walking a bit from their car to their house. Unfortunately, they did. Not just because people did not want to, however, many women felt quite unsafe walking home, especially after dark. In 2018, rumors about a rapist in the district led to the common practice that residents parked their cars next to their houses. That meant that they destroyed the underground, so in the end, the municipality had to make paved parking spaces.

The second big issue concerned the production of energy. Where to get the carbon-neutral energy? The Netherlands has limited ways to produce renewable forms of energy, wind and solar power are basically the only viable options. The Clueburgh municipality pushed the wind energy option, which implied the construction of wind turbines. At that time, wind turbines were subject to controversy. They were thought to spoil the landscape and they were claimed to kill many birds. Obviously, this meant that they could not be erected in the vicinity of Sandytown. The Natural Conservation Foundation was willing to have wind turbines elsewhere: a few kilometers to the west of Sandytown was a polder that was very suitable for having turbines, and it was thought that the visual appeal of that location was not negatively affected by these turbines. Ecodefense thought differently and went to court. Eventually, the Supreme Court found that Clueburgh contradicted its own appointments about the minimization of visual impact of the project, and prohibited the construction of wind turbines.

This meant that another source of carbon-neutral energy would have to be found. As the installation of PV-panels was also considered to have negative visual impact, the only solution that could be thought of was the import of green energy certificates from abroad. The problem of such import is that it is merely a paper transaction, the energy that is actually used is still fossil-based, but by buying certificates it is made sure that somewhere else green energy is used. This practice of green energy certificates has become quite controversial, and as more recent research has shown, it does not contribute significantly to the reduction of the use of fossil fuels.

These events led to negative media coverage, affecting the legitimacy of Sandytown as a project. It also led to a loss of credibility of the Natural Conservation Foundation. Many people thought that this organization had been compromised by participating in a project that was bound to fail from an environmental point of view. These people agreed with Ecodefense that of Sandytown is that a valuable natural area has been sacrificed for residential development. People living in Sandytown however are still very much satisfied with their neighborhood. The environment and the architecture is found to be attractive.

As an effect, the prices of houses have risen considerably. Even the residences that were meant to be affordable are now out of reach for most people.

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Exploring the transformative potential of communities

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Abstract

This discussion paper engages with the transformative potential of communities, meaning the potential of communities to transform themselves and their surroundings so as to address persistent problems (i.e. societal challenges) and to contribute to a sustainability transition. Through a review of sustainability transitions and social innovation literature as well as two case studies of transition management in local communities we explore this concept further and propose six elements that make up the transformative potential of communities, namely: 1) a shared and acted-upon perspective on the present and a desired future which integrates diversity; 2) (inclusive) networks across actor categories, domains and levels, 3) a learning environment, based upon experimentation and/or reflexivity and accompanied by empowerment, 4) needs of the community are met now and in the future, 5) alterable social relations in an environment of participation and direct action, and 6) access to resources (e.g. money, time, power, networks, political will).

Introduction

The field of sustainability transitions has to date focused on policy domains such as energy or water (e.g. Grin et al. 2010, Markard et al. 2012) and to a lesser extent on regional or urban development. This also holds for the field of transition governance, where transition management (Loorbach 2010, 2007) has mainly been applied and researched on a sectoral level (Zijlstra & Avelino 2012, Frantzeskaki et al. 2012, Verbong & Loorbach 2012). As part of a three year European research project, InContext, the transition management approach was contextualized for use in local communities. InContext not only had the aim to better understand the contexts that influence the ability of individuals and local communities to deal with societal challenges but also to facilitate processes that enhance their transformative potential. For this reason an action research approach was chosen which followed the so-called community arena methodology which is based on insights from transition management, backcasting and social psychology (Wittmayer et al. 2011).

This discussion paper focuses on the outcomes of three years of action research employing the community arena methodology in three communities in Austria, Germany and the Netherlands. It has a twofold aim: a) to explore an understanding of a transformative potential of communities from a transitions perspective and b) to address the extent to which and how the transformative potential of communities in addressing societal challenges and persistent problems can be enhanced.

Doing so, the paper is structured as follows. First we establish an understanding of the transformative potential of communities as an analytical frame. Secondly, we outline two cases of transition management at a community level aimed at enhancing this potential. Based on these cases, the discussion explores how transformative potential of communities can be understood and enhanced by adopting a transition (management) perspective.

Transformative potential of communities: Drawing up an analytical frame

Before analysing two cases of action research employing the community arena methodology, we draw on literature of sustainability transitions as well as of social innovation to establish an analytical frame regarding the transformative potential of communities.

Sustainability transitions, as defined by Grin et al. (2010: 1) are “radical transformation towards a sustainable society as a response to a number of persistent problems confronting contemporary modern societies”. In taking this perspective, scientists have to date mainly be looking at transitions in sectors (e.g. water, energy) to the detriment of fundamental changes on more local level, such as e.g. in communities in neighbourhoods or villages. By focusing on the latter in the context of persistent problems and societal challenges, one of the questions that arises is whether communities have the potential to transform themselves (community transformation) and their surroundings (system transformation) so as to address these problems and become more sustainable. This relates to questions of agency, which in the sustainability transitions literature is mainly dealt with under the denominator of ‘transition management’ (Loorbach 2010, Grin et al. 2010). Transition management is studying ways (and translating them in governance prescriptions) in which transitions can be influenced so as to contribute to sustainable development. It is based on a number of principles, which are derived from complexity theory, governance and sociology (Loorbach 2007, 2010). To name a few: long-term thinking as the basis for short term policy, thinking in terms of multiple domains (multi-domain), different actors (multi-actor), different levels (multi-level), learning as an important aim for policy (‘learning-by-doing’ and ‘doing-by-learning’) orient governance towards system innovation besides system improvement, keeping options open, and exploring multiple pathways (Loorbach 2010, 2007). In revisiting these, we can formulate a number of elements composing the transformative potential of communities based on a sustainability transitions perspective, namely:

- a shared perspective of the present and the future (i.e. a vision of a sustainable future)
- a diversity of perspectives with regards to pathways
- an attitude connecting short term actions and long term vision
- (inclusive) networks across actor categories, domains and levels
- an environment that is supportive of learning, experimentation and reflexivity

While the transition management perspective is marked by a linkage of innovation and sustainability (Frantzeskaki et al. 2012), it is also rooted in the field of socio-technical innovation and functional systems (e.g. sectors) (Grin et al. 2010). Turning to the field of social innovation can counterbalance this focus and account for more social aspects as well as the local level (Moulaert et al. 2005, 2010). These authors stress three dimensions of social innovation, which are 1) the satisfaction of human needs (content/product dimension), 2) changes in social relations, especially with regard to governance and participation (process dimension) and 3) increasing the socio-political capability and

access to resources needed to satisfy needs and participation (empowerment dimension). These can be translated into elements of a transformative potential of communities in the context of sustainability transitions, namely:

- needs of the community are met now and in the future,
- alterable social relations in an environment of participation and direct action,
- access to resources (e.g. money, time, power, networks, political will),
- an emphasis on empowerment and learning.

These nine elements taken together describe characteristics of a community with transformative potential in the context of sustainability transitions: the potential of communities to transform themselves and their surroundings

Case Studies

Having established an understanding of what we mean by transformative potential of communities, we now turn to an in depth description of two case studies, namely Rotterdam Carnisse, and Finkenstein. After having outlined the research context we outline for each case study first the local context, followed by the implementation of the community arena process and the outcomes thereof. Doing so we focus on elements that might help us to better understand the transformative potential of these communities and how this can be enhanced.

Research context

InContext is a three-year EU-financed FP7 research project aimed at identifying the framework conditions that enable a societal transition towards an ecologically sound, economically successful and culturally diverse future locally. In doing so, the project developed and applied innovative methods for dealing with societal challenges. The quest of InContext in supporting sustainability transitions in local communities was twofold: First to better understand how factors internal to the actors, at individual and group level, interrelate with their external context (within InContext this was referred to as the inner and outer context of behaviour). Second, it aimed to understand how the transformative potentials of local communities could be unleashed.

Table 1: Overview of the Community Arena methodology (underlined are the participatory meetings)
(Source: Wittmayer et al. 2011)

Phases of the Community Arena		
	Key activities	Key output
0. Pre-preparation	A. Case orientation B. Transition team formation	A. Initial case description for each pilot B. Transition team
1. Preparation & Exploration	A. Process design B. System analysis C. Actor analysis (long-list and short-list of relevant actors) incl. interviews D Set up Monitoring framework	A. Community Arena process plan B. Insightful overview of major issues/tensions to focus on C. Actor identification and categorisation + insight inner context D Monitoring framework
2. Problem structuring & Envisioning	A. Community Arena formation B. <u>Participatory problem structuring</u> C. Selection of key priorities D. <u>Participatory vision building</u>	A. Frontrunner network B. Individual and shared problem perceptions & change topics C. Guiding sustainability principles D. Individual and shared visions
3. Backcasting, Pathways & Agenda Building	A. <u>Participatory backcasting</u> & definition of transition paths B. <u>Formulation agenda and specific activities</u> C. Monitoring interviews	A. Backcasting analysis & transition paths B. Transition agenda and formation of possible sub-groups C. Learning & process feedback
4. Experimenting & Implementing	A. Dissemination of visions, pathways and agenda B. Coalition forming & broadening the network C. Conducting experiments	A. Broader public awareness & extended involvement B. Change agents network & experiment portfolio C. Learning & implementation
5. Monitoring & Evaluation	A. Participatory evaluation of method, content and process* B. Monitoring interviews	A. Adapted methodological framework, strategy and lessons learned for local and EU-level governance B. Insight in drivers and barriers for sustainable behaviour

To address these questions, an action research methodology (referred to as the community arena methodology) integrating insights from transition management, backcasting and social psychology was developed and implemented in three communities (Wittmayer et al. 2011). The community arena process is a co-creation process where the tacit knowledge of engaged citizens is integrated with the scientific and process knowledge of researchers and experts to result in a long-term sustainability vision and agenda, as well as in immediate action within the community in question. By reflecting on the process and its outcomes, new methodological and theoretical insights have been gained. The aim was threefold, 1) to learn about the InContext quest, 2) to lead to reflection processes at the individual and group levels allowing for the emergence of new more sustainable strategies, as well as experiments with innovative practices as alternatives to established ones and 3) to gain theoretical and methodological insights into an iterative process.

The community arena methodology (as outlined in Table 1, Wittmayer et al. 2011) was implemented in three European communities (see Figure 1). Like in other TM processes, here we also refer to geographical markers: Rather than starting from the concept of a community that is defined by shared values and experiences, we focused on ‘spatialised’ communities and their administrative boundaries. It is implemented by a transition team consisting of the InContext action researchers and locally relevant persons. This team not

only prepares, documents, analyses, monitors, co-ordinates, manages, facilitates and evaluates the whole process, but also selects participants. It brings together the various parties, is responsible for internal and external communication, acts as intermediary in discordant situations and has an overview of all the activities in and between arena meetings. After having done some preliminary analysis, the transition team brings some 15 people of the local community together for a participatory, searching and learning co-creation process. These change agents hold divergent worldviews and are brought together to meet several times in the community arena setting. Throughout this deliberative process, the change agents discuss the current status quo (what is the problem and what are the current sustainability challenges?), envision a sustainable future in about 30-50 years from now and then follow a backcasting methodology to come up with pathways and milestones. The process results in a change narrative and immediate action points, the transition agenda. Subsequently the agenda is put into practice through a number of experiments or projects.

Figure 1: Overview of InContext pilot projects (Source: Wittmayer et al. 2013a).



Case 1: Rotterdam Carnisse, The Netherlands

Local Context

Carnisse is a neighbourhood of the harbour city Rotterdam, the Netherlands. In 2007, Carnisse (as part of Rotterdam South) was listed as one of the 40 neighbourhoods nationwide that the national government labelled as 'neighbourhoods of extra interest' ('aandachtswijken'). These neighbourhoods are all seen as having problems in multiple domains (social, physical and economic) and receive special attention and funds from the national government.

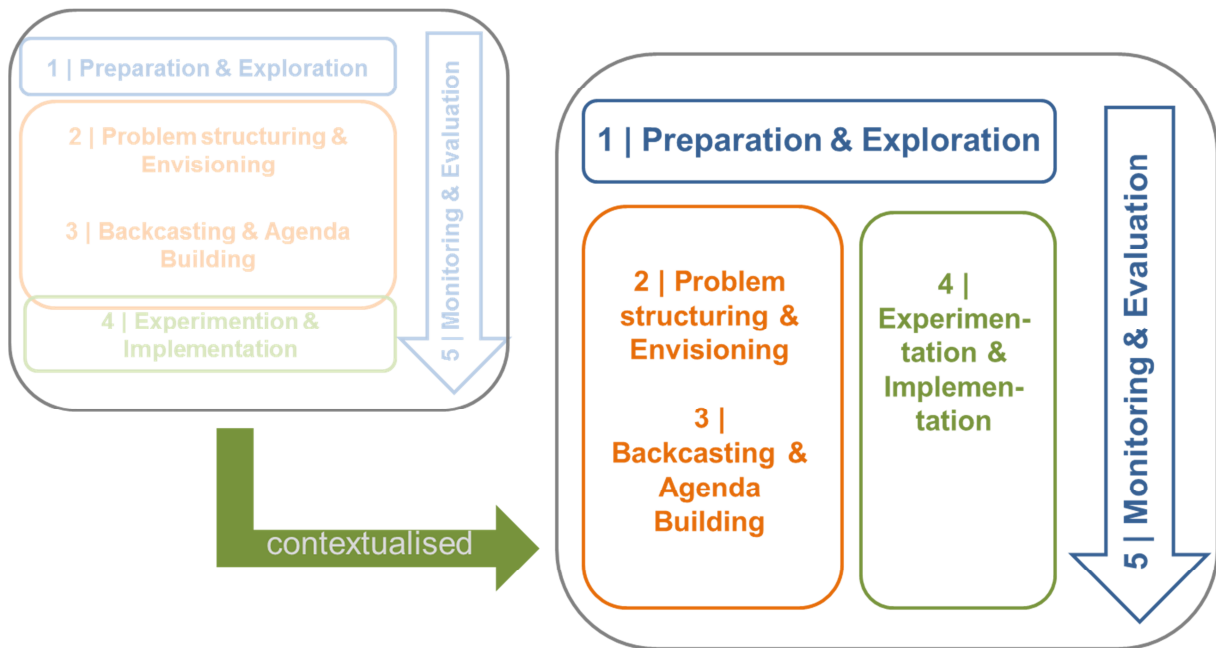
The context of Carnisse in 2011 was strongly influenced by the current economic crisis, which led to huge government budget cuts and a withdrawal of the welfare-state. Although old welfare structures were being dismantled, there remained a high level of (non-) governmental activity, as well as a long history of local participatory processes and interventions by professionals and/or researchers. The inhabitants of Carnisse who took part in the Community Arena process (either through interviews or as arena participants) expressed their frustration with the above, but were also eager to relativize the picture of a deprived neighbourhood by pointing to the many initiatives that were arising from within the community..

Process

The Community Arena process started in August 2011. In the period until February 2012, the transition team was doing the system and actor analysis (including interviews, attending meetings, getting acquainted with the locality), which led to a selection of potential participants for the arena process, as well as a problem description based on interviews, observations and secondary data. On the basis of the system analysis, which also pointed to a weariness of participatory processes in the neighbourhood, the final process design was informed by a meeting with five frontrunners from Carnisse in November 2011 (a 'pre-arena meeting'). This resulted in an adjusted process design: deliberative participatory meetings (as suggested by the methodology in phases 2 and 3) and a more action- and implementation-oriented experiment (as originally suggested in phase 4) were started simultaneously in February 2012 (see Figure 2).

During the first meeting, held in February 2012, the problem analysis (i.e. system analysis) was presented and the main topics of interests were identified through a group discussion: powerful/-less policy, rich and turbulent history, government cuts, diversity, connections, and the maintenance of housing. In the two following meetings in March and April 2012, participants explored their needs with regard to the community centre (the focus of the action-oriented trajectory) and drew up a vision for the neighbourhood in 2030 in which the community centre plays an important role. The vision is called 'Blossoming Carnisse' and includes the following topics: 1) ...to living with each other, 2) ...to a green sustainable oasis, 3) ...to diverse housing styles, 4) ...to places for everybody, and 5) ...to working together for blossoming. In May 2012, a forth Community Arena meeting was held with a focus on backcasting and developing pathways from the future vision back to the present. After having discussed and reached an agreement on the vision, three small groups worked on exploring pathways for the six topics of the vision. These were, together with activities that already took place, described in the final vision document. In November 2012, the vision was presented to a broader audience in the neighbourhood during an official community forum organized by the district municipality of Charlois where the vision was put on the agenda and attracted twice as many attendants as other community forum evenings.

Figure 2: Contextualisation of the Community Arena Methodology for Carnisse (Source: Wittmayer et al. 2013b)



As outlined earlier, a more practice-centred process was started in parallel with the deliberative meetings of the Community Arena (see Figure 2). The community centre, which ultimately closed in January 2012 due to the bankruptcy of the welfare-organization running it, served as a clear symbol for the changing landscape and context of Carnisse (budget cuts, the dismantling of old welfare structures and a lack of social cohesion). It was the object of four meetings that took place in February and March 2012 where a local action group was formed to work on its re-opening. Afterwards, the core of the local action group stayed in contact through Email and telephone, and worked on a number of strategies. It drew up a business plan, reached more than 300 people through a petition and lobbied different representatives of the sub-municipality, the welfare organization and the larger municipality. When the group felt that they could take it over themselves, the researchers withdrew from the process after two more broad meetings. Currently the foundation, supported by the professional, is managing the community centre, fulfilling all daily tasks through volunteer work from the board members and continuing the dialogue with the municipality. The latter has accepted ownership of the building and is now in the phase of negotiating the rental sum with the foundation.

In February 2013, an evaluation meeting took place where the participants evaluated the process and the outcomes and formulated future ambitions.

Outcome

In this section we look into the dynamics within the groups that were formed through the process, as well as their relation to the political and wider societal context, before considering empowerment and learning as aspects of such processes. In Carnisse, we can distinguish between the community arena process and the experiment focusing on reopening the community centre. The latter shows clear signs of leadership. In the course of a one-year process, a group of three women emerged and established a foundation,

which is now formally responsible for operating the community centre. However, the community arena itself formally ceased to exist after the facilitated meetings. There were no attempts by the participants to keep this structure alive through regular formal meetings.

With regard to the political context, the community and policy makers are rather tired of participatory processes. These processes are mainly initiated by the municipality and are meant to inform rather than to consult or to involve the public. Previous participation processes were often seen as being unsuccessful or at least judged critically by residents. Recent municipal budget cuts increased these sentiments. Therefore, the pilot process was eyed with suspicion because both local policy makers and inhabitants of Carnisse were sceptical of whether the arena process could deliver the concrete results they were seeking. In this context, the community arena methodology was perceived as unique by the participants: a process with an open agenda that was to be set by the participants and was not initiated by the municipality. The local municipality, on the other hand, perceived the openness of the arena process as problematic; especially that it could not be controlled in terms of output and outcome. Overall, because of the weariness of previous participatory trajectories and other projects, there was a low level of trust between the different parties involved. The participants could not all adapt to this new form of participation and at times fell into the roles which they were accustomed to from previous municipality-led participatory processes. The participants, for example, saw the realisation of the vision as being closely connected to actors from policy, business or housing. Some participants put these actors in the driver's seat in hope that the municipality, district municipality, housing corporations or similar actors release funds for investments in Carnisse so as to realize the vision of 'Blossoming Carnisse'.

In Carnisse, the relationship between the transition team and local decision makers ranged from disinterest to rejection because of the interplay between transition activities and political decisions: it was dynamic and changed over time. Reservation and scepticism against the transition team in the beginning, turned into support in Carnisse, but could have also turned out the other way around. This very much depends on targets and their linkages to current policies, but it is also strongly influenced by the specific local political culture and current local challenges (e.g. shrinking budgets).

Additionally, in Carnisse the dynamics between those actors that aimed to re-open the community centre and the local government or political actors changed drastically when the time came for tangible action and the possibility of funding through subsidies or other mechanisms. Participants involved in the reopening of the community centre were looking to these actors for financial support, but instead they were kept at a distance and both policy and political actors were sending contradictory responses. This led to an increased indecisiveness on the part of all involved. The lack of transparency and the lack of trust mentioned earlier resulted in a lengthy implementation process with mutual conflict and frustrations, in spite of the best intentions of all actors involved.

For discussing the relation of the group with the wider context, we turn to the relation of those in the community arena group, i.e. the frontrunners, and those who were not invited. Frontrunners were identified as those individuals who were passionate about the neighbourhood and were active in it (rather than using the criterion of simply living in the neighbourhood), with new ideas and creative actions. Next to demographic criteria, it was important that the group should be diverse in terms of background (inhabitants, artists, local entrepreneurs, public officials, etc.). It was possible to get people involved with less formal education and/or low incomes, but it proved to be challenging to include people from a variety of ethnic groups. The arena group, consisting predominantly of so-called 'white Dutch natives', had indicated throughout the process that they miss diversity and

the perspectives of others that also live in the neighbourhood, e.g. people with Turkish, Antillean or Moroccan roots (almost 60% of the inhabitants of Carnisse are of ‘non-Dutch descent’). Their voice was partly brought in through the initial interview round, but none wanted to take part in the arena group itself (although some joined an incidental session). The integration of participants younger than 25-30 years was also challenging. Nevertheless, the transition intervention was successful overall in creating a new communicative space and in diffusing and translating paths for ideas.

Empowerment and social learning, both explicit aims of transition management approaches (Avelino 2011, Loorbach 2007), can also be taken to be outcomes of the arena process in Carnisse. Especially the open-ended agenda of the process gave people the feeling of being able to choose what to put on the agenda and that no certain policy agenda was “imposed” on them (which they feel is often the case). This gave them a sense of choice and, because they could put forth topics important to them, a sense of meaningfulness, both aspects of intrinsic motivation (Avelino 2011). For participants in Carnisse, this also positively distinguished this project from other processes carried out in the neighbourhood in recent years. People followed the invitation to join the process so as to gain a better picture of the whole context in which they were living and working or very specifically to keep the community centre open. Engaging in the arena was described by some even as part of their responsibility as a citizen. Exchange and discussions in a diverse group created a fruitful atmosphere for collaboration and learning. The latter was reported by participants in terms of knowledge about the neighbourhood or specific skills (e.g. speaking in front of a larger audience) as well as a change in perspectives.

Case 2: Finkenstein, Austria

Local context

Finkenstein am Faaker See is located in Austria, on the border to Slovenia and Italy. It is one of the largest communities in Carinthia (one of the 9 Austrian Länder) with regard to population and area. About 8,500 people live in Finkenstein - distributed over about 28 villages and settlements and divided into a Slovenian-speaking minority and a German-speaking majority. The main economic sectors are tourism and (small-scale) industry; agriculture also plays a role. The focus of the community arena process was on quality of life. The process was co-financed by the municipality and the vision has been realized through action-oriented projects or deliberative processes in a number of Working Groups, e.g. on economics, sustainability and social issues.

Process

The pre-preparation phase consisted of desk research and around 65 personal and telephone interviews. This provided the basis for the system analysis and the identification of frontrunners. After a press release was published in local newspapers, a kick-off meeting was held in January 2012. High attendance (over 100 participants) demonstrated a keen public interest in the initiative.

The concept of the transition team was filled in differently in Finkenstein. Rather than driving the process, which was done by the researchers, the transition team was made up by stakeholders representing the community from a variety of dominant institutions and political parties. They first met in March 2012 to clarify members’ expectations and discuss the project process. Shortly thereafter, during their second meeting, the team

decided to set up two working groups with broader community participation to follow up on two of the main themes (e.g. economy) arising from the scoping and visioning phase.

The community arena – fifteen community members from diverse backgrounds in terms of place of residence, age, gender and professional or educational background – was convened between March and June 2012. Using the dynamic facilitation method, the main topics of interest were identified: environment, energy, mobility/tourism, economy, agriculture, local supply, social topics and population. The arena's second meeting focused on vision building. It resulted in a collage of pictures representing Finkenstein 2030, as desired by the participants, a theatre play, a fictional interview with a local newspaper and the definition of a set of core statements for the vision. The third meeting started with a discussion between arena participants and transition team representatives over possibilities for citizens' involvement in political processes. In response, more space was given to the envisioning process, during which abstract long-term visions are separated from short-term wishes and demands. By the end of the meeting, visions for Finkenstein's sustainable and liveable future were drafted. These were then combined into a shared vision at the beginning of the fourth community arena meeting which also served to determine what measures were to be taken in order to achieve the joint vision using the backcasting methodology. In addition to the guidelines for the vision, a logo was created representing the joint vision. The words used to formulate the vision were chosen to represent some of the values central to the community arena members – translated from German it says: "We shape Finkenstein for the benefit of citizens and nature in freedom, with joy and love of life."

Eight thematic working groups were then formed to develop measures fitting the vision and one to two participants were recruited to coordinate them: "Sustainable Economy" (with three subgroups covering tourism, local businesses and local retailers); "Environment and Sustainability"; "LifeEnergy" / "Lebensenergie" (systemic perspective); "Social Affairs"; "Participation"; "Energy supply" (later merged with the WG on 'Environment & Sustainability'); "Culture"; "Kanzianiberg" (integration and traditions); and "Mobility" (later merged with the WG on 'Environment & Sustainability').

A public event in early August was used to disseminate the common vision, pathways and agenda. Expanding the transition network was the other key purpose of the meeting and a world café (each table hosted one working group) was held for community members to join the working groups and provide feedback on the work done so far. To further extend public involvement in and knowledge of the project, a short report and a call for participation were published in the community newspaper. During the summer, the working groups were busy organizing themselves and discussing which topics they should focus on. Finding a suitable way to work together (How many meetings? Who will lead them? How to take decisions in the working group? etc.) took quite a lot of time and energy for some of the groups. In September, the researchers organized a meeting for all people involved in the project. The aims were as follows: connecting the activities carried out by the different working groups, stimulating communication between them, identifying where support was needed and raising motivation. After an extended round of updates from all working groups, the remaining time was used to discuss and agree on how to work together and how to organize communication within as well as between the groups. The need for more trust and thoughtfulness was often expressed, especially concerning concrete actions and measures.

After this meeting, an intense working phase began, characterized by several meetings within the working groups, as well as the development of measures and efforts to integrate more community members. A password-protected space was created on the project website, making available all working group minutes and documents, and a

newsletter was sent out in October, which reported on the past and upcoming activities of the working groups. In November, the researchers organised and facilitated the next project meeting that started off with an exchange of information on the proceedings of the working groups; discussions and project ideas were shared among participants. The focus was on making decisions about possible measures, which were presented and checked for consistency with the common vision. Measures considered to be incomplete were returned to the appropriate working group for revisions. Table 2 presents a selection of approved measures. Most of them have been implemented; some are still in progress.

Table 2: Selected measures in Finkenstein (as of June 2013, Wittmayer et al. 2013b)

Title	Working group	Description	Status
« Town reporter » / « Dorfjournalist »	Participation	The participants of these workshops should acquire basic knowledge about writing articles for the community newspaper. The aim was to write the community newspaper in a more participatory way with contributions of a higher quality.	Completed: workshops held on 18 January 2013 and 1 March 2013
« Hello Neighbour » / « Hallo Nachbar »	Social Affairs	This meeting takes place once a month and aims at closing the gap between people who grew up in Finkenstein and those who moved in later. For this reason, people from the working group « Social Affairs » invite some neighbours to an informal meeting in an inn or restaurant and encourage them to invite other people along as well (snowball effect).	Ongoing: monthly meetings
“Terra amicitiae – application for a climate and energy model region “ / “Terra amicitiae – Bewerbung zur Klima- und Energie-Modellregion”	Sustainable Economy (Energy)	In collaboration with the neighbouring communities Arnoldstein and St. Jakob im Rosental, Finkenstein forms a region that aims for energy independency and for improving sustainable transport.	Completed: application was accepted, measures in progress
« Event Series Sustainability » / « Veranstaltungsreihe Nachhaltigkeit »	Environment and Sustainability	Six public talks from experts on main topics in the area of sustainability (nutrition, mobility, housing, etc.) should be organized. Through this measure awareness of topics concerning sustainability should be increased and best practices should be publicized throughout the community.	In Progress: First talk planned for mid-2013

Outcome

In the following we look into the dynamics within the groups that were formed through the process, as well as their relation to the political and wider societal context, before considering empowerment and learning as aspects of such processes.

After the end of the facilitated group meetings, participants articulated their need for someone to take over a portion of the research team’s tasks (e.g. internal and external communication, organisation of meetings, etc.). Those actively involved in the project

elected eight representatives to comprise the ‘coordination team’ in a ‘sociocratic election’. It is noteworthy that the election process was organised and facilitated by participants of the community arena themselves (which in itself is connected to group empowerment). The research team was only consulted on minor issues. At present, this elected coordination team leads the process of realising the vision for Finkenstein 2030 and organizes primarily the interplay of the working groups for the coming two years. Again each of these working groups is led by one person on a voluntary basis – the resulting structures show a high degree of organization.

As well as the co-funding by the local government, the direct involvement of local political actors and decision makers in the community arena was different than in Carnisse. Similar to other (particularly rural) areas in Austria, Finkenstein currently hardly knows participatory governance. The curiosity and interest of the community in such a process was immediately clear during the well-attended public launch event, where the research team outlined the process and goal. This meant that the participatory approach was a new experience for the community arena participants. Also, during the process interest by local policymakers and politicians was so high that the methodology was adapted and the transition team received a different function (see above). In this team, they could be given a role in the process. During the arena process, some people from within the municipal government and administration started to act as important contact persons for citizens in Finkenstein. Overall, the relationship between local government actors and the community arena was perceived as a positive one. Government actors were supportive during the implementation phase. However, there was scepticism in the beginning by the conservative and rather right-wing parties (three of them exist in Finkenstein). The co-funding had to be approved by the city council and it did not pass by a particularly large margin (51%). Conservative and right-wing party members remained critical throughout the process, with only one exception.

In relation to the wider societal context, the research team made an effort to identify and select engaged citizens for the Community Arena who reflected the diversity of Finkenstein, while not being representatives of the predominant political or institutional system. Although it was difficult to achieve an ethnically mixed group in Finkenstein, groups were quite diverse in terms of age, gender, professions, etc. The participants appreciated this diversity, as it gave them the possibility to gain new perspectives and unconventional insights, a very important condition for social learning. The implementation of the community arena methodology led to new local networks with unique compositions and was identified as being very important by the participants themselves. A participant described the networks as offering a platform for discussing ideas and worries about the shared living space: “Through the process the group got stronger than the sum of its single members.”

In terms of empowerment, community members were generally interested in co-creating their environment in order to increase quality of life – some participants even described this engagement as part of their responsibility as a citizen. Asked during the evaluation phase, participants generally believed that they could have an impact on the local environment, though some were sceptical of such claims mainly due to their high expectations about the process that involved large segments of the public and lead to too many measurable outcomes. These concerns were addressed through the learning process, which emphasized that transitions occur in small steps and need time. The wish to have an impact on the community also led to an increased interest in local politics – some of the arena members organised themselves as a group to participate at a local council meeting (“we want to know how this works”). Additionally, two participants decided to stand as candidates for the local council.

Participants reported that they learned about their possible impact, their roles and the roles of others in the project. This increased awareness led many participants of the community arena to change their attitude towards the future. They stated that they could encounter future developments in a more relaxed way and put a greater focus on the present after experiencing that can actively influence developments. Participants also reported an increased self-reflexivity and attention through contact with other, formerly unknown people. Some participants described themselves as being more open and having fewer prejudices in interactions with others. These second order learning processes are complemented by more first order learning processes, which centre on concrete skills, e.g. facilitating meetings and working respectfully together in diverse groups. Trust-building processes were successful and guaranteed a safe space for fostering second order learning. Participants explicitly reported some surprises ('eureka moments') they came across during the project, e.g., the insight that some apparently individual worries (but also ideas) are shared by others or that social cohesion is not very strong among the long-established population in Finkenstein.

Discussion

In this section we explore an emerging understanding of what a transformative potential of communities stands for and to what extent and how it can be enhanced. We do so by referring back to the analytical frame drawn up in the beginning and by comparing the two cases. The analytical frame contained nine elements which taken together describe characteristics of communities with transformative potential the potential of communities to transform themselves and their surroundings. These characteristics are:

- a shared perspective of the present and the future (i.e. a vision of a sustainable future)
- a diversity of perspectives with regards to pathways
- an attitude connecting short term actions and long term vision
- (inclusive) networks across actor categories, domains and levels
- an environment that is supportive of learning, experimentation and reflexivity
- needs of the community are met now and in the future,
- alterable social relations in an environment of participation and direct action,
- access to resources (e.g. money, time, power, networks, political will),
- an emphasis on empowerment and learning.

In the following we discuss the case studies along these nine characteristics so as deepen our understanding of the transformative capacity of communities in the context of sustainability transitions.

We propose to cluster the first three elements for this discussion: they relate to the shared and acted-upon perspective on the present and a desired future which integrates diversity. In discussing these elements a number of questions arise, most prominently is the question with regard to who are the ones to share a perspective on the present and the future. In the case of Carnisse there had been a vision drawn up in 2009 under the guidance of the municipality, district municipality and housing co-operations. But only a minority of interviewees were pointing to this vision in the very beginning of the involvement of the InContext researchers in Carnisse. In Finkenstein there was no vision for the community drawn up to date that involved inhabitants.

The community arena process resulted in a shared problem perception and vision, including a number of pathways for both communities. Shared by whom is also the question here: In Carnisse it was a group of about 15 people drawing it up. A much smaller group out of these 15 felt ownership for presenting and disseminating it further in the neighbourhood and to actually acting upon it. The action in turn, amongst others the re-opening of a community centre has an influence on the whole neighbourhood. In Finkenstein, the ownership was felt much broader, including political actors in the transition team – which opens the opportunity of the vision, or its underlying principles dripping into and influencing local policy making.

Having a shared understanding of the present and the future results into a group of like-minded people who have aligned their thinking and reasoning about the life of the community and build a new network. This brings us to the next element, inclusive networks across actors, domains and levels. Such a network has not been deliberately build earlier in the two cases. The networks that existed included people who knew each other, amongst others through sharing personal or professional interests, or from living close to each other. These networks could be politicised in terms of party political affiliations in Finkenstein, but not in terms of sharing a well-founded deliberately reached perspective on the present and a vision for the future.

The latter is an outcomes of the community arena process, namely the creation of new action-oriented networks sharing a perspective on the present and the future. Especially in Finkenstein the network shows a promising potential for broader networking activities and an intensified exchange of ideas towards sustainable developments, i.e. the realization of the visions that the communities drew up (more on this below under social relations). These networks comprise people from a variety of perspectives and backgrounds that have not interacted previously and now meet in an open and trustful atmosphere. This leads to an enhancement of the social capital of the community (in terms of establishing new relations within and between groups).

The following element, an environment that is supportive of learning, experimentation and reflexivity, can be discussed together with the emphasis on empowerment and learning. Both touch upon the importance of learning in general, based upon experimentation and/or reflexivity and accompanied by empowerment.

Based on evaluation and monitoring interviews (to enhance reflexivity of the process) that have been held at the end of the community arena process, the participants self-reported that the process contributed to an on-going learning and empowerment process in their communities. Through the processes, the participants' belief that they are able to direct their actions to desired ends could be strengthened. Participants of all pilot projects reported several learning experiences, including first as well as second order learning (Argyris & Schön 1978). In Carnisse as well as in Finkenstein, people reported that they learned about their possible impact (see below) and their own and others' roles in the project. A very important learning experience shared by all pilot project participants was the experience of working together in a respectful and constructive way even with previously unknown people and in a very diverse group. All learning experiences mentioned so far can be defined as second order learning processes. They all touch upon underlying values and assumptions – about the roles of different actors in shaping the local environment, ways of collaborating with different people and, subsequently, attitudes towards the future. Second order learning processes of this kind are crucial for transition processes as they open windows for behavioural changes and help deal with increasing uncertainty and complexity. These second order learning processes are complemented by more first order learning processes, which centre on concrete skills. Examples for these are: speaking one's mind in public and in front of a large group of

people (e.g., 100 people); facilitating meetings; working respectfully together in diverse (e.g., intergenerational) groups.

Defining empowerment as increased intrinsic motivation, the community arena process had positive effects on all four intrinsic task assessments outlined by Avelino (2011): choice, impact, meaningfulness, and competence. The fact that the process had an open agenda contributed greatly to the participants' feeling of self-determination: they could choose what to put on the agenda and no specific policy agenda was 'imposed' on them. In both Carnisse and Finkenstein, most of the participants stated that they can have an impact on the local environment. Others were more sceptical, an attitude mainly resulting from the high expectations of participants in terms of the process (e.g. it should involve a large part of the public and lead to many measurable rather large-scale outcomes). These expectations were addressed through the learning process, emphasising that transitions occur in small steps and need time. Participating in the process also led to a heightened interest in local politics and in becoming a candidate in the local council elections in Finkenstein. The link between a project's goal and the ideals of individual participants is assumed to have an empowering effect. In both cases, participants stated that topics important to them have been tackled throughout the process. The last task that was assessed was the gaining of competences, which is closely related to social learning. Participants gained competence in a number of skills (e.g., speaking in front of many people, working together) and also changed some underlying values and assumptions (i.e., related to people with different backgrounds). All of this strengthens the perceived competence and therefore has an empowering effect. This points to the importance of taking into account different levels where transformative potential can reside and be brought into play: in transforming the individual, in transforming the community and in transforming the wider surroundings.

From learning we turn to the element of the needs of the community which should be met now and in the future. Discussing needs asks for the definition of what is meant with needs. Mouleart et al. (2010) refer to the basic needs of humans. Within the context of InContext, the concept was used in terms of the conceptualisation of Max-Neef (1991), who differentiates between the following ten abstract needs: subsistence, protection, affection, understanding, participation, idleness, creation, identity, freedom, and transcendence (Schäpke and Rauschmayer 2011, Rauschmayer et al 2011).

Meeting the needs of the community as the content dimension can be discussed by first analysing the system analysis of both communities where unmet needs are part of the puzzle. Further we can look at the different measures that have been implemented in both communities, as well as at the visions drawn up by both communities. These reveal needs and associated values such as belonging, economic security, entrepreneurship, or environmental values, all underlying the transformative potential of the communities.

The following element to consider are alterable social relations in an environment of participation and direct action. Important to scrutinize here is the local contexts and the differences between the cases. In Finkenstein, neither the inhabitants nor policy makers had a lot of experiences with participatory processes, thus no difficult reference experiences existed. In Rotterdam-Carnisse, on the other hand, previous experiences with participatory processes overshadowed the process especially in the beginning, but also had its repercussions during the presentation of the vision to the neighbourhood.

The changes in social relations can be traced in Carnisse and Finkenstein when looking at the relations of the community arena and the political context. Recalling the processes outlined earlier, we can distinguish between different development trajectories of such a community arena group:

- The community arena group selects a ‘coordinating team’ from its participants, which organizes the different working groups that have been created to realize the group’s vision, i.e. Finkenstein;
- The community arena group ceases to exist formally after the facilitated meetings, while the working group on a specific experiment evolves into a formalized structure, i.e. a foundation as in Carnisse.

These trajectories each show a different degree of formalization of leadership (or social relations). What distinguishes the foundation from the sociocratically elected coordinating team are the legal and financial implications of the former. Alternative practices and structures are part and parcel of a sustainability transition. In this respect, the Finkenstein trajectory is interesting: Holding a sociocratic election can be seen as experimenting with a new way of decision-making that does not fit the current majority vote system. Through this election, Finkenstein is also pioneering new practices and roles with regard to decision-making and participation, as well as emphasising different underlying values. Taking the context into account, establishing an inhabitant-led foundation can clearly be seen as a social innovation in Carnisse, re-ordering the relations between ‘inhabitants’, politicians and policy officers – a long and intense process where all actors struggle with filling their new roles.

Overall, Finkenstein had a more intense process resulting in a number of working groups and including network meetings. The latter aimed at bringing together the transition team and the community arena. While in Carnisse, the transition team was much more operational, in Finkenstein it involved stakeholders representing the community from a variety of dominant institutions and different political parties. Both cases are part of a vivid discussion about whether these kinds of interventions should be of a temporary nature (disperse and spread the vision narrative into individual networks) or formalised and integrated into pre-existing legal structures. Based on the findings, the less local governments or political actors are involved, the more independently the community arena can operate. This means that the outcomes of the arena (e.g. the vision, the local agenda or the experiments) are less influenced by policy agendas. This, however, can be perceived as both positive and negative. Less policy or political interference also implies more pressure on local communities to deliver results or undertake actions themselves. On the other hand, it also contributes to a stronger feeling of ownership and empowerment. But what are the consequences of a more intense and positive relationship with policy or political actors? The case of Finkenstein shows that this can lead to more support and decisiveness in the implementation phase, which relieves the community arena participants of their (time and/or financial) investments and responsibilities. All in all, the involvement of policy and political influence in a community process is a balancing act for both the local government and arena participants. The choice to go for more or less involvement depends strongly on the described context and historical relationships and projects, as well as on the motivations and aims of the participating frontrunners and community actors. In the cases at hand, the co-financing through the local government also played a role. In Finkenstein some political parties were very critical and considered it a waste of money, while others were very positive.

The latter point also needs to be taken into account when thinking about the access to resources, in terms of access to power networks. In terms of financial resources, the aspect of co-funding is interesting in both pilots. Co-funding creates opportunities for a more intense process (both in terms of commitment and interest of actors, e.g. political actors as well as of number of meetings) and for increased exposure. Through the co-funding and governance context, political actors in Finkenstein showed a high level of interest and commitment. Co-funding might increase the relevance of the process and its

outcomes, as well as its embedding in on-going processes and institutions. It can also lead others to join into the process of change and adopt (part of) the systemic perspective that the group worked on or it can provide the organising team with additional resources in organising the process. At the same time, co-financing might also introduce power imbalances or political tensions, money-oriented interests or dependencies, and influence the way others perceive the research team. It increases the need for accountability (not only to the additional funders but also to other stakeholders) and the possibility of critique as the process might be seen as the playing field of different interests.

Synthesis: Individual, community and system transformation

In this paper our aim was to explore an understanding of the transformative potential of communities and whether and to what extent it can be enhanced. In this section we synthesise the discussion and put forth some elements of the community arena process that more generically can be seen to enhance transformative potential of communities.

From applying the analytical framework to two cases, we can adapt the understanding of transformative potential of communities that we brought forth in the beginning and which was based on insights from the literature on sustainability transitions (management) and social innovation. This adaptation concerns two aspects.

1. When referring to the transformative potential of communities, we focus on the potential of communities to transform themselves and their surroundings so as to address persistent problems (i.e. societal challenges) and to contribute to a sustainability transition. From the discussion above, we are inclined to add another dimension, namely the potential of communities to create space for the transformation of its individuals, next to their potential to transform themselves and their surroundings.
2. The nine elements brought forth in the beginning for constituting transformative potential of communities from a sustainability transitions and social innovation perspective, can be merged to result into the following six elements:
 - 1) a shared and acted-upon perspective on the present and a desired future which integrates diversity
 - 2) (inclusive) networks across actor categories, domains and levels
 - 3) a learning environment, based upon experimentation and/or reflexivity and accompanied by empowerment
 - 4) needs of the community are met now and in the future,
 - 5) alterable social relations in an environment of participation and direct action,
 - 6) access to resources (e.g. money, time, power, networks, political will),

The case studies and the interventions (in form of the community arena) discussed, where based on the same sustainability transitions perspective as is the explorative understanding of transformative potential. This brings with it that the elements of transformative potential as put forth by the sustainability transitions perspective are also elements and goals of the community arena process – which asks for some more critical reflection. Using insights from social innovation literature, which has to date not been connected to sustainability transitions, shows overlap in terms of empowerment and learning but also valuable additions, such as the view on social relations and access to resources. These latter two are helpful in gaining more insights into how communities can use their potential to transform themselves and their surroundings.

This transformative potential can be enhanced through outside interventions that create an open, diverse and emancipatory space for societal learning. This space can enhance the transformative potential of communities in a number of ways:

- 1) provide direction (i.e. sustainability)
- 2) support the creation of networks for people who feel the need for change
- 3) emphasize learning and reflexivity (including reflections on values, beliefs and assumptions)
- 4) increase a feeling of impact, choice, meaningfulness and competence of individuals and groups (i.e. empowerment) in addressing local needs
- 5) support changes in social relations of individuals, organizations and institutions (i.e. create networks, change role activities)
- 6) offer access to resources through e.g. third-party funding, establishing new networks.

Overall, the transformative potential of communities in the light of societal challenges can be enhanced through empowering processes such as the community arena methodology. Change-minded people are coming together in an open and diverse setting and, by thinking about the future, they not only reflect on their own perspectives and values, but are also confronted with those of others. The process aligns perspectives, while nourishing diversity. Envisioning the future in images, texts and emotions supports this individual and group reflection and opens heads, hands and hearts. Linking this vision to the tangible present provides a space for the inner and outer contexts to interact: the process provides levers to participants for enhancing their transformative potential as a community. The extent to which such a space can be created very much depends on the local context (e.g. history with participatory processes) and the skills of the researcher and/or facilitator.

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Discussion Report

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Moderator: Katharina Umpfenbach, Ecologic

The discussion, moderated by Katharina Umpfenbach, started around the 'group think' phenomena, with participants raising the issue of how people interact with each other in groups in either scenario building or visioning exercises, the main themes of this working session. 'Group think' tends to have a negative connotation, but perhaps there's a more positive side to the coin? The main thrust of the Pesch paper is that people like to reach consensus in a group, but in some cases the goal may not be to reach consensus but rather to show that different scenarios are possible, and that there are diverging scenarios. Methods used will depend on what goal we wish to achieve, a point that we returned to later in the discussion.

The question of culture and personalities came up, or how people from different countries and contexts, and with different personalities can come together in a workshop. Culture is also significant when determining how to design a workshop, for example when working with a community that is known for being 'at risk', it would be important to not play up that factor in a future scenario – to avoid people feeling defensive or boxed into a stereotype. This should not be the starting point. But at the same time you must also take into account history, getting people to understand how they got to the present, before thinking about the future.

In visioning, different creative methods can be used, such as interviewing someone from the future, or creating a theatre play or collage. A discussion ensued over the fine line between letting people project different imagined futures, being realistic about what is possible, and limiting the ideas to those that are 'sustainable'. This leads to the question, who decides what is 'sustainable' and for whom? One way of dealing with this is to pose questions, to impart systems thinking, to raise the ecological consequences of certain decisions, asking what is the consequence of your decision? Why do you think it is important? In some cases, it's good to let things go, while in others you want people to be aware of the different connections. Again what is important is the goal you are trying to achieve. This could be a distinction between visions and scenarios: scenarios are more practical, while visions may be valuable in bringing people together from different domains. Scenarios may be for groups who have a shared function and purposes, which are more homogenous.

The Wittmayer et al. paper was about understanding what is meant by the 'transformative potential' of local communities. When asked about the question of scale, the main author responded that there could be three layers: the individual ability to change, the community itself changing, and the community coming together towards change on a wider scale. One issue that was raised with this form of 'action research' is that we actually can make a difference as researchers, and what does this mean in the long-term? The consequences can be negative or positive, and in a sense we may be responsible for a 'Frankenstein' effect. Certain projects may be creating new elites for example, that are supposed to steer communities but that can also exert power over them in their own personal interest. There can be an accelerator effect, but projects can also backfire. One solution is to be explicit about roles among members of the community. When discussing process design, there are many questions from 'participants' regarding the role of researchers, i.e., 'who are you, what is it that you do'. In one situation, the community members came up with their own definition for the researchers, calling them 'activated researchers' playing on the term 'activist', which made sense to them. In an ideal situation, you would want to give the community the tools in order to conduct their own visioning or scenario building, but the learning curve can sometimes be quite high. Communicating between the groups helps towards transparency. On a local level this is relevant, but also on a more urban and national level. The issue is accountability but also follow up. If you take people out of a context to play a different role, what are your ideas for people who go back to that context? Do you expect some change to happen? Where does it lead to in the future?

Selecting participants is central to the methodology. You can do interviews with people prior to the process to have an idea of where the person comes from, his or her role in the community. The issue of transparency is very important, as well as reflexivity. In certain disciplines, such as anthropology, researchers are always reflexive, pondering on their role as researchers and their 'impact' on 'the field'. This relates to the observer effect in physics, whereby the mere act of observing entails modifying what you are observing. Another proposition was that an ethics committee could be established (perhaps at the level of the funding agency?) to address issues related with 'action research' or the potential of transforming communities.

One of the successes of visioning and scenarios is that ultimately, they are becoming more accepted as a methodology. There is more openness to these approaches, based on work with policy-makers. This is particularly true in relation to societal elements which policy-makers find difficult to apprehend. These tools can help explain the heterogeneity of social life and divergences in society, in a policy context that tends to bring together people with similar backgrounds towards 'consensus' and 'status quo'.

3b

**Backcasting,
scenario analysis
and pathway
development**

Pathways to sustainable change in organizations

The role of participatory back-casting in ensuring workers' autonomy and control as well as transference of practices between life domains

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Abstract

As a key practice of everyday life, work is a place and space where the sometimes contradictory demands of economic profit and environmental sustainability meet and are negotiated, with the resulting effects on work practices, energy consumption and greenhouse gas emissions. As people spend an important part of their lives at work, within a community of values, norms and everyday practices, it is also the place where identities are negotiated, where individual values are transformed and where sustainability-related behavior is either promoted and rewarded or hindered and discouraged (Brown, Kirpal & Rauner, 2007).

Furthermore, large-scale organizations are responsible for a high amount of greenhouse gas emissions and at the same time are contexts where interventions for change can be implemented successfully and potentially translated to other domains of life. The LOCAW project has set out to research the barriers and drivers to sustainable practices in organizations and the conditions and pathways for transitions to sustainable lifestyles both at work and beyond. To reach this objective, it has studied six large-scale European organizations, both private and public, in six different countries and has used a mix of empirical research and simulation approaches to create a comprehensive account of the determinants and pathways for transitions to more sustainable organizations in Europe.

The present paper presents the backcasting methodology used within two of the studied organizations in the LOCAW project, in order to design sustainable scenarios for the future and define the pathways to reach them. We present in detail the role of the back-casting methodology within the project, the approaches used and the results obtained, as well as comment on the implications they have for policy.

Keywords: sustainable practices, large-scale organizations, back-casting, future scenarios.

Introduction

Large organizations in Europe are responsible for a high amount of greenhouse gas emissions. Estimations have shown that the potential contribution of large organizations to global warming over the next 100 years will be highly significant: 72 % CO₂, 18 % Methane, 9 % Nitrous Oxide (Emission Database for Global Atmospheric Research, 2000). While there have been achievements in the cleaning of production processes, the reductions derived from changing practices and behaviors in the workplace have not been sufficiently targeted.

As a key practice of everyday life, work is a place and space where the sometimes contradictory demands of economic profit and environmental sustainability meet and are negotiated, with the resulting effects on work practices, energy consumption and greenhouse gas emissions. As people spend an important part of their lives at work, within a community of values, norms and everyday practices, it is also the place where identities are negotiated, where individual values are transformed and where sustainability-related behavior is either promoted and rewarded or hindered and discouraged (Brown, Kirpal & Rauner, 2007).

In their everyday life, people move constantly across areas of life in which they occupy different positions, inhabit different environments and activate different parts of their identities as they take on different roles. LOCAW has aimed to study the barriers and drivers of sustainable practices in organizations, but also those affecting the transference of practices from one life domain to another, especially home and work. Our results show that the configuration of levels of worker control and autonomy over areas of practices are of particular importance in determining practices as well as in allowing or not for transference of practices among life domains. The level of control over one's own behavior and over the work environment, and the level of autonomy of action within the organization are key variables in going towards sustainable change in organizations. The structuring of participation and communication processes is one of the factors influencing control and autonomy.

LOCAW has used participatory back-casting in four case-study organizations (University of A Coruña, Spain; Aquatim, Romania; Enel Green Power, Italy; Municipality of Groningen, The Netherlands) with a two-fold purpose: to create scenarios for the future with the input of workers at different levels of the organization and to design reasonable pathways for sustainable change that could then be tested in a simulated environment. Due to space limitations, only two of the cases will be reported here.

Theoretical bases of back-casting

Back-casting scenarios constitute a relatively new methodology in the field of sustainability and climate change. Despite its appearance and theorization in the decade of the '70s, it is only recently that it has become widely used as an instrument in helping decision-making processes in policy-making. The back-casting scenarios methodology

appeared in response to the discontent with the traditional methods of trend extrapolation in energy forecasting, where it was assumed that energy demand would increase gradually and renewable energy technologies and energy conservation efforts were ignored (Vergragt & Quist, 2011).

In future and sustainability studies, back-casting scenarios are defined as a methodology that allows us to envision and analyze different types of sustainable futures and develop agendas, strategies and pathways to reach them (Vergragt & Quist, 2011). It has a strong normative component, as it starts from desirable future states or set of objectives and then analyzes the steps and policies that are needed to get there, in order to be able to design agendas that can be implemented and that normally require cooperation and communication among different types of actors in complex socio-economic and political environments. It is considered a useful tool in going toward alternative futures in issues of climate change (Giddens, 2009).

A literature review on back-casting scenarios shows a few important on-going debates on the methodology, which have informed our decisions in LOCAW on how to structure the back-casting scenarios development workshops. The first important debate refers to what should be given more attention in scenario development. Target-oriented scenarios (Höjer et al., 2011) centre more on the development of several endpoints or images of the future states, and more space and time is allocated to this than to the actual definition of measures and strategic pathways to get there. Process-oriented scenarios (Robinson, 1990) are more centred on the ways to structure the process of the creation of scenarios, in order to ensure effective participation of stakeholders and to produce, besides images of desired end-states, possible pathways to reach them and specific agendas for their implementation. One study investigating whether solutions and policy measures proposed in the back-casting scenarios have any impact 5 and 10 years after their proposal showed that the area of implementation is not well covered and that more research is needed in order to ensure that measures are put into practice and that adequate monitoring strategies are also developed (Quist, 2007). LOCAW has taken into account that the process needs to be participatory, qualitative and inclusive and worked on framing it in this direction.

Organizations have an important role in making the necessary changes and in implementing the measures needed to achieve a reduction of GHG emissions. Structuring a good process is likely to ensure higher-order learning (Quist et al., 2011; Brown & Vergragt, 2008) for both the researchers and members of the organization and will also provide the conditions for more involvement with low-carbon objectives, thus contributing to the incentives for promoting measures or performing the systemic changes necessary in the transition to more sustainable organizations.

Another important debate in the domain of back-casting for sustainability centres on the question of who should develop the future vision. Some argue that future visions should be created by experts, while others are strong supporters of involving stakeholders in defining both the future visions and the strategic measures needed to get there (Robinson, 1990; Robinson et al., 2011), as it creates learning, a stronger attachment to the goals, and a stronger feeling of empowerment. In the case of LOCAW, it seems rather obvious that it is necessary to involve stakeholders in the creation of the vision, as well as in the definition of the complex pathways to make it possible, as participation in the establishment of goals is fundamental in personal identification with those goals and thus an important determinant of the willingness to put it into practice. Also organizational stakeholders hold relevant knowledge on the constraints their organization will face in the future and the conditions under which it is likely to have to operate. LOCAW has used a combination of stakeholder and researcher input to generate the images of the future or

desired end-states. Recently, Robinson et al. (2011) has used back-casting scenarios in which intense stakeholder participation was combined with sophisticated tool development providing instant feedback on the effect of the proposed policies on the desired objectives, yielding interesting and useful results as a tool of democratic policy development. In LOCAW, instant feedback is not possible, as constructing the agent-based models will require time and data from other sources within the Project, but feedback is provided in a second stage, in which stakeholders can see how their proposals work in a simulated environment and formulate suggestions for correcting policies in an iterative process.

Methodology

Phases of the back-casting process

In the back-casting scenarios of LOCAW we used a combined approach, using a methodology of focus groups to develop the scenarios, inspired in part by the one used by Svenfelt et al. (2011) in their study on decreasing energy use in buildings but significantly adapted to fit the objectives of LOCAW; and the stepwise approach of Kasper Kok et al. (2011), to orient the process and help stakeholders in getting disengaged with the present, and being able to create truly innovative visions of the future, one of the hardest aspects of back-casting scenarios both with stakeholders and experts (Svenfelt et al., 2011).

The two back-casting exercises followed a different structure, as their objective is different. The first part deals with scenario development and this has been achieved in two workshops. The first one had the objective creating visions of the future for the organization, and the second one dealt with defining the strategic pathways to reach them and the social actors that should be involved. The second part is focused on providing feedback to participants on how policy measures function in a simulated environment and having the participants propose corrections to their initial proposals and to the model design.

Developing visions of the future

Stakeholder analysis

In order to ensure a good process, the number of participants in the first scenario development workshop was maintained between 8 and 12 members of the organization. For the scenarios to be useful and to have the potential of being translated into effective measures within the organization, the project partners undertook a careful stakeholder analysis. The aims were to ensure the presence of members of the organization who have detailed knowledge of the organization, its present policy trends, and of the forecasts on relevant expected or possible changes in the wider policy and market environments; and also to have people in management positions involved, as they have the highest potential to make change happen. Also, based on information from previous stages of the research, care was put into ensuring that the participants did not have significant conflicts among themselves that would have potentially undermined the participatory dynamic intended.

Facilitation

Careful attention was also given to the facilitators' role and training. A training workshop was undertaken at the University of Corunna, in order to ensure that facilitators became familiar with the back-casting methodology and prepared for the challenges that might arise in the process. Facilitators kept participants on track and contributed to maintaining

a future focus in the workshops, as it was observed that participants tended to sometimes be caught in the extrapolation of present conditions to the future. Facilitators also contributed to moving the process along when it became stuck, by highlighting the common ideas and attracting attention to the less-covered areas.

Preparation of the visioning workshops

In order to prepare for the first workshop, the research teams summarized each organization's specific limitations and decided on how many groups should be involved in the workshop, as it is very important not to invite in the same group people with large status differences in the organization, as this might limit the participation and lead to a one-sided vision, defined by just a few of the participants.

It was decided that participants should receive brief information on the method and what was expected from them, in order to diminish the potential anxiety that might arise. Also, they were announced in advance that this is a participatory methodology and that we are interested in their opinions and imaginative ideas, and not so much on their exact knowledge about future trends.

Finally, the teams took care that the environment in which the workshops were undertaken was appropriate. Where possible, the participants were invited in an informal environment away from the organization, in order to facilitate perspective-taking and diminish constraints on the free expression of ideas. A recent study has shown that different social settings have a different impact on scenario development, with "warm settings" yielding better results (Robinson, 2011).

Results

University of A Coruña, Spain

Visioning workshops

The University of Corunna produced three different scenarios for 2050, each becoming more ambitious in the targets they set and the change they suppose. The scenarios are described as narrative accounts of the University in 2050.

A conservative scenario for the University in 2050

The University of Corunna stays in the same place (several campuses) and uses the same infrastructure, although improved and optimized. This vision assumes the necessity of both technological and human changes that would lead to emissions reductions.

The University will have more flexible infrastructures, organized functionally. The buildings have better insulation systems and exterior spaces are adequately maintained. Each building is self-sufficient in terms of energy, having own energy generation system based on renewable sources. In each building, measures for energy efficiency have been implemented, such as interconnected temperature detection sensors based on number of people and movement across spaces. The schedules of university staff have changed and have adapted to the seasons and the corresponding exterior temperature.

The University is self-sufficient and consumes own products. The food consumed in cafeterias on campus is ecologically produced, and respond also to educational objectives (as they are practical activities for different degrees. The menus in cafeterias respect health and educational criteria, are vegetarian, are based on local consumption (when the

university's production is not sufficient, cafeterias buy from local producers who are certified as ecological across their production chain). Prices are just, including the environmental cost of products. The University has fewer cafeterias and promotes return recycling. Furthermore, each building has its own recycling center and reaches an objective of 0 waste, by generating subproducts. Green contracting is implemented at all university levels and the cost of products is generally calculated by including ecological parameters.

Paper does not exist in the University anymore. Water provision is self-sufficient.

The majority of both staff and students use public transportation and bicycles to reach the university. As most students live in student residences they can walk to and from the university. Car use is only common for a minority and is not well seen at the University.

A de-growth and de-localized model of the University

The University has been moved to the city and the different communities around it with small and multi-functional rooms in each neighborhood, as support for virtual teaching. This vision assumes a mixed model of education which involves some important technological changes.

The University is represented by these rooms which have state of the art technology for online teaching, as well as individual and group study rooms. The buildings in which these rooms are hosted are completely adapted to their environment (through passive architecture) and their level of emissions is almost 0. These rooms can be used 24/7 hours a week, and possess efficient energy systems which are adapted so as to ensure the minimum consumption possible. All the rooms possess systems of energy self-generation, sensors to detect temperature and adapt it to the numbers of users at any moment.

As in the previous scenario, each room has its own recycling center, and transforms waste into subproducts. Return recycling is also promoted and dangerous materials are adequately processed. Green contracting is implemented at all university levels and the cost of products is generally calculated by including ecological parameters. Each room has its own small cafeteria, which serves vegetarian menus, with local products and at just prices.

Paper does not exist in the University anymore. Water provision is self-sufficient.

The majority of both staff and students use public transportation and bicycles to reach the university. Many walk to and from the university. Car use is only common for a minority and is not well seen at the University.

A virtual and centralized University model

The University as an autonomous institution does not exist anymore. All teaching is done online at different European universities, using advanced technology. This vision assumes important technological and human changes related to this new form of learning and interacting.

It also assumes important political and social changes in a sustainable direction. Universities are few; they teach in one language only and have very good teaching systems, with a competitive international profile.

Each person can learn across the whole life-span and from home. Technology is accessible to everybody and implies access to full interaction from home, through the use of holograms, video and e-conferences. Research is undertaken in European laboratories coordinated through the entire European Union. These new technologies are also allowing

interaction to feel real, as all sensations are reproduced very closely to those experienced in direct contact.

Local policies have contributed to reducing the waste to 0, as recycling centers are easily accessible, subproducts are generated and return recycling is part of the culture of all institutions and services. The number of vegans and vegetarians is bigger, and the prices of any product or service reflect the environmental costs they incur in.

Education-related mobility is reduced to 0. For health promotion, technology for exercising at home is available, such as desks adapted to include running tracks.

Back-casting workshop

First Scenario:

Targets

The first scenario developed for in the visioning workshop was a conservative scenario, in the sense that targets went in the same direction as already existing in the European Union and also in the member countries, including Spain. The first part of the discussion focused around refining the target goals for this scenario, on the basis of the previous workshop and also on estimate emissions reductions calculated by members of the Spanish LOCAW team and presented to participants.

As mobility accounts for approximately 50% of all University emissions, a lot of the discussion focused on establishing targets for work-related mobility. A reduction of car use to 20% of university staff and students was considered worthwhile and feasible for 2050. Within this scenario, 80 % of the university population would use more sustainable means of transportation: 20% would come on foot; 30 % would use bicycles, and another 30 % would use public transportation such as train or bus.

In terms of waste, targets focused mostly on the reduction of paper and water. For paper, a reduction of 80 % of the actual use is intended, while the rest should be recycled paper only. For water, the target is of 0 waste, or complete re-use of all water. "Superfluous" or "choice" plastic such as water bottles would be reduced drastically as well and plastic used in machinery and other necessary devices would be recycled. A target of 30% of meals being vegetarian was established. In terms of energy, a reduction of 30 % was established.

2012-2020

By 2020, public transportation would probably not be drastically improved, due to shortage of public funds and public expenditure, as a result of the economic crisis. Due to this fact, it is likely that mobility emissions would not be reduced drastically, although the plans for a student residence exist and will start building in a few years. Also, the existing plans for bicycle use on campus and increased use of bicycles in Corunna due to a public rental scheme put in place by the local government will likely reduce car use, albeit by a narrow margin. Plans for car sharing will be put in place by then.

Paper will still be used by 2020 at a similar rate to that which is common now, but recycled paper will be supplied as an option and will be purchased by approximately half of the staff on a regular basis. Existing levels of water waste will not be significantly reduced as they depend on investments for changes in existing systems. Options for purchasing glass water bottles and return recycling of glass from machines and cafeterias on campus will be provided and educational and awareness campaigns stimulating the use and return of glass bottles will achieve a 20 % reduction in the use of plastic bottles. This

will also be a consequence of the larger use of water fountains present on campus, as a result of a better signaling and information system which would allow people on campus to know where they are located.

2020-2030

As the economy will start to recover by 2020, and recovery will come from higher investments in research, innovation and technology, it is likely that between these years public transportation will improve. This will be done through a collaboration of local, regional and university planners, which will include a system of on-ground metro or train, which will connect the city with its campuses, as well as with surrounding communities. Coupled with making transportation very cheap and awareness-raising campaigns, around 40 % of present-day users of private cars will start using public transportation. Also the number of online-only scientific events and webinars will increase, contributing to a reduction of 30 % in work-related mobility, including airplane travel, with the consequent reduction in GHG emissions.

By 2030, the university will have a very convenient car-sharing scheme for those still using the car, and the University will have acquired a few electric vehicles, which will be used for car-sharing when going to scientific or academic events for which other form of public transport is not available. The University will have a very easy-to-use online system that would facilitate car sharing and will use incentives such as a system of acquiring points which can then be exchanged for free entrances to cultural events in the city. Also, the university's main campus will reduce the available parking space by half by 2030, by building the campus center (a social networking and studying space previewed in the university plans), and other green areas facilitating social sharing. These measures will make the campus the center of the social life of university staff and students, thus reducing needs for mobility to other places.

Paper consumption will be reduced by 50 % of present use, as higher investments will make possible the changing in formal university procedures to electronic ones (by acquiring the necessary technology). Other efficiency measures will be implemented for energy use, such as presence-detecting lights in all buildings, better insulation where necessary, and possibly infrastructure changes in some of the buildings, including the change in main sources of energy to renewable ones and installing differential control over temperature settings. Feedback systems will be put in place, allowing individual workers, departments and entire buildings to monitor their energy reductions and the significance it has on GHG emissions reduction. Warnings will be sent if a certain level of energy use is passed, thus allowing the person to adjust her use.

Some investments in system changes for the mitigation of water waste will be made. Also, systems for water re-use will be installed in 40 % of the buildings. The use of plastic bottles will further achieve another 30 % reduction, reaching a total of 50 % reduction of the present use. This will be due to awareness-raising, but also to restrictions imposed on providers (as part of green contracting) to campus cafeterias on plastic use.

2030-2050

As public transportation systems are increasingly becoming more efficient, and there is a generational change with today's youth coming into adult age (assuming that their environmental awareness and practice with sustainable practices are higher), acquisitions of private cars will stop being something desirable, and thus a reduction of private car use

to move between home and the university of 80 % of present day users will be achieved. At the same time, besides considerable improvements in public transportation, in terms of frequency, commodity and price, the government, as a result of hybrid and electric vehicles becoming cheaper, starts making some investments in public transportation that is hybrid or electric, thus further reducing GHG emissions related to mobility. Private car users are also increasingly buying “greener” vehicles. Also, due to a re-appreciation of family and community life, measures for working from home are implemented, reaching a reduction of transport needs by a significant amount. Also, as online classes will become more widespread, students will also reduce their need for travelling.

Further acceptance of online-only events will make these more popular among academics, together with the wider investments in technologies that make this possible. Up to 50 % of scientific and academic events will be online-only.

Paper will disappear progressively from use. Only electronic procedures will be used. In terms of energy use, feedback will become more instant with the use of energy-detecting bulbs that turn red when a certain level of energy has been reached. These will be implemented both at the university but also in people’s homes (in the sense of their use becoming more common and desirable), and thus practices of reduced energy consumption will become habitual. The university will be completely self-sufficient in terms of energy by 2050. Progressively, the university will set higher reduction targets for energy among its staff and introduce more efficient technology, and progressive investments in renewable sources of energy.

In terms of water re-use, a target of 100 % re-use will be reached by 2050, with the progressive change in water provision and recycling systems across all university buildings. Plastic bottles use will be reduced to 0, with progressive restrictions on providers, awareness campaigns, and the widespread use of water fountains and glass bottles. Waste recycling will be further improved promoting intense return policies and collaboration schemes among responsible staff. As the vegetarian menus will progressively become more varied and health concerns (especially related to obesity) will become more salient, up to 30 % of the meals of every person will become vegetarian. Compost will be produced from the organic waste of the entire campus

Responsible actors: UDC mainly, but also local and regional government.

Third scenario

The third scenario developed was a more radical one, assuming a model of entirely virtual and more centralized university. Targets for emissions reductions were more radical than in the first scenario. Work-related mobility would be reduced to 0, as the university as a physical institution would not exist anymore. More generally, private car use would be reduced as cities would become more compact and local community life would be enhanced.

In terms of waste generation, discussion in the group did not focus on targets for this, as the idea was to establish reducing targets for the university. As the online university would mostly generate electronic waste, the targets focused around improving recycling of electronics, re-use of materials from computers and other machinery and establishing some wider goals for the reduction of waste at the level of community and personal homes. Same was true for paper, water, energy use and reducing consumption of meat.

This scenario requires a gradual transition to very different forms of interaction, as well as teaching and learning. Participants thought that this transition needs to be done gradually,

through sensitive policies which would ensure acceptability of these new forms of learning and interacting. They also thought that some of the trends present in this scenario are driven by technology and somewhat unavoidable. This implies that the function of policy becomes one of mitigating or correcting for some of the negative effects these trends might provoke, as well as of taking advantage of these trends in order to advance action on objectives such as the mitigation of climate change.

The first part of this gradual transition refers to measures to make technology cheaper and to put in place mechanisms that would provide sufficient funds for the necessary technology. These could include borrowing schemes, possibilities for renting at low prices or a system of donations to lower-income persons. It would also involve that the virtual universities would implement all the necessary technology and train and involve faculty in these new forms of teaching and interacting. Participants considered that their training is key in ensuring adequate coordination among them and with students. The group also raised an important concern which needs to be addressed if this future scenario were to be used as a roadmap, which is the expected loss in direct human contact and the effects that might derive from this, such as increased rates of depression, less quality of training for a profession, or the loss of personal and professional enrichment and development that come through contact. To address this concern, they proposed to create the possibilities of attending classes a-synchronously (through the recording of classes and lectures) without completely eliminating human contact, by using visual materials.

This scenario thus involves several stages of implementing these new technologies and allowing people time to adapt to this new reality, by introducing it progressively. Also, in the initial stages, this scenario involves a lot of training for teaching staff in order to increase technological knowledge. This training should be considered a priority by the governments and direct support for it should be provided. Also, this implies the in-depth understanding of how to motivate people to assume such radical changes. Also, governments should support innovation in technologies that create the sensation of human contact or that promote closer to direct human contact.

Another issue that occupied discussion time had to do with the necessity to create mechanisms through which powerful economic actors with opposing interests could be motivated to assume these changes, by, for example, including environmental costs in prices. Reducing GHG emissions in general would require this change in prices. The University as an institution can become one of the actors generating innovation in environmental policies as well as in efficient technology development and smart buildings.

Finally, participants worried that a full virtualization would not be desirable nor feasible for some disciplines or careers, but argued that these could design flexible plans that would include assisting to some group meetings or laboratories during the year, and mobility could be made as sustainable as possible.

The Municipality of Groningen (The Netherlands)

The back-casting exercise at the Municipality of Groningen was aimed at developing several narrative paths to a desirable future state for the organization, within a sustainable, low carbon Europe.

In February 2011, the Municipality has formulated her ambitions concerning this topic in a so-called “Masterplan”. This Masterplan was defined by the council in collaboration with a broad group of key energy experts from the region. They followed a similar method as the back-casting approach used in the other case study areas to create a vision for a sustainable future of the municipality. The pathway and steps described in the Masterplan

all concern structural changes in the organisation. In order to complement the already defined Masterplan of the Municipality and really add value to the LOCAW project and complementing the other case studies, the Dutch team has made attempts to organize a backcasting exercise around the human changes necessary for the organization to become more sustainable. They have encountered resistance on the part of the Municipality, as managers had the idea that theory-driven scenarios for human changes can be implemented and these would be more effective than actually talking to employees about their visions for change. Given the limitations imposed by the organization, theory-driven scenarios were defined based on theories on social and normative influences. These different policy scenarios targeting key factors can and will be tested for effects and plausibility using the simulations from agent-based modelling and if necessary modifications can be implemented based on the results. This will provide valuable insights to the Municipality of Groningen to further promote low carbon emissions at work.

Based on the Masterplan and theory, we created the vision for the Municipality, the pathways to reach that vision and the possible scenarios.

Visioning

The municipality has developed a fundamental vision to become CO₂ neutral by 2035 (Master Plan Groningen, 2011).

- Their aim, as specified in the Masterplan, is to fully rely on renewables and sustainable energy sources rather than fossil fuels.
- Still energy related behaviour will be highly important, because energy related behaviour needs to be kept at a minimum to be able to provide the necessary renewable and sustainable energy in an efficient way. Thus a decrease in direct energy use as well as in indirect energy use and CO₂ emissions resulting from transport and waste disposal related behaviour are important. Therefore, the second aim is to decrease total energy consumption at the workplace.
- In the context of the Municipality of Groningen, spillover is especially important. In particular the spillover from pro-environmental behaviour in the workplace to pro-environmental behaviour at home is important, because the energy use of employees at home is indirectly also part of the coverage of the Municipality as many employees live in the Municipality in Groningen. Their aim is to create a positive spillover effect of energy saving behaviour from the workplace to home.

Backcasting

Structural changes. To realise the ambition to fully rely on renewables and sustainable energy sources rather than fossil fuels by 2035, the Municipality will develop its own energy company that aims to meet all energy related needs for municipality buildings. The municipality will have solar installations on all suitable buildings and install a heat network to produce the renewable resources required. This means that the environmental impact of energy related behaviour would be strongly reduced. To enhance the efficiency and reduce costs of such a renewable energy system, it is important that overall energy demand within the workplace is significantly reduced as well.

Strengthen biospheric values. Based on theory we argue that the first pathway to decreasing total energy consumption is strengthening biospheric values of employees.

People who are concerned about the environment and endorse values beyond their immediate own interests, that is, biospheric values, are more likely to engage in pro-environmental behaviour (e.g. De Groot & Steg, 2007, 2008; see Steg & De Groot, 2012, for a review). These values are relatively stable over time. Yet, to be influential, these values need to be accessible in specific situations where environmental choices take place. The accessibility of these values varies due to situational cues. For example, situational cues present in the context indicating the importance of certain values, such as principal support for corporate environmental responsibility initiatives, will strengthen these values. Based on the theory we argue that strong biospheric values will lead to more pro-environmental behaviour in different domains: a decrease in direct energy use, a decrease in indirect energy use due to waste disposal and a decrease in indirect energy use with regard to transport related behaviours. Hence, a pathway to less carbon emission at the Municipality of Groningen is to create situational cues where environmental choices take place, indicating the importance of less (direct and indirect) energy use, so that biospheric values become more accessible.

Strengthen environmental self-identity. A second pathway to encourage energy savings at work is strengthening the environmental self-identity of employees. The environmental self-identity reflects the extent to which you see yourself as a type of person who acts pro-environmentally (Van der Werff, Steg, & Keizer, 2013). Based on the theory we expect that a strong environmental self-identity leads to pro-environmental behaviour in general and that a strong environmental self-identity is a requirement for the spillover effect. The environmental self-identity is first of all formed by individuals values. To be more specific, strong biospheric values are associated with a strong environmental self-identity. This means that environmental self-identity is stable to some extent, and therefore potentially a stable predictor of energy-savings, as far as the environmental self-identity is strong. Second, environmental self-identity is formed by previous behaviour, which implies that it can change over time to some extent. Especially when individuals realised that they have engaged in difficult and unique pro-environmental behaviour, or when they have engaged in a wide range of pro-environmental behaviours, their pro-environmental self-identity will be strengthened. This means that reminding people of their previous pro-environmental behaviour or making people aware of their previous pro-environmental behaviour will result in a stronger pro-environmental self-identity. This in its turn will lead to a (further) decrease in energy consumption.

Create autonomy. The third pathway follows from the previous one and involves securing autonomy of choice. As stated above, environmental self-identity is particularly likely to be strengthened when individuals engage in difficult and unique pro-environmental behaviour or by engaging in a wide range of pro-environmental behaviours. Structural changes implemented by the organization or non-autonomous behaviour imposed by the organization is not likely to strengthen environmental self-identity and may even weaken it. Therefore, in order to decrease energy use by employees and increase spillover effects, it is essential that the structural changes facilitate behaviour changes yet secure that people have the perception that their actions are autonomous.

Scenarios

Scenario 1: Structural changes and no impact of behaviour. The Municipality will implement all the interventions indicated in the Masterplan that all reflect structural changes. This means that CO2 emissions and the impact of energy related behaviour will be strongly reduced. Employees will not change their behaviour to reach for the

envisioned future, the environmental self-identity will not be strengthened and there will be no spillover effect of pro-environmental behaviour from the workplace to home.

Scenario 2: Structural changes and possible impact on behaviour. The Municipality will implement all the interventions indicated in the Masterplan that all reflect structural changes. This will again mean that CO₂ emissions and the impact of energy related behaviour will be strongly reduced. Then, if the Municipality can show that the organization is sincerely concerned about the environment this could be a cue or prime increasing the accessibility of biospheric values, thereby strengthening employees' environmental identity and encouraging energy saving behaviour at work.

Scenario 3: Structural changes and behavioural changes top-down introduced. Besides implementing structural changes, the Municipality will also implement interventions aimed at reducing energy use at work. The different interventions will be introduced by the management of the Municipality, which means a top-down implementation. Top-down decision-making can be a quick and effective way of implementing interventions. Yet, in this way the impact of the behaviour and the behaviour itself will be changed in a non-autonomous way. This implies that the environmental self-identity will not be strengthened and a spillover effect will be unlikely.

In the implementation, we argue that it is essential for higher-ups to support the interventions and confirm themselves to the rules. For example, consider the current policy of the Municipality to discourage car use. This policy states that there are only a few designated parking places, which are solely offered to employees carpooling, and to those driving energy-efficient cars that emit less CO₂. It is important that managers and supervisors do also comply with these rules, because when the organization imposes pro-environmental behavior, managers and supervisors are seen as standing for these policies prescribing pro-environmental behavior in the organization. Deviating from these policies, by this group, is a clear sign that these policies are not important and will weaken the motivation to comply among the other employees. It will result in a particularly strong negative effect on energy savings among the employees.

Scenario 4: Bottom-up behavioural changes introduced. The Municipality will implement structural changes so that only renewables and sustainable energy sources are used instead of fossil fuels, but realises that behaviour changes are needed to increase the efficiency of the system. For example, it will still be important for employees to recycle their waste, and turn off their lights as to being able to provide the necessary renewables and sustainable energy in an efficient way. Then the organization will cooperatively implement interventions aimed at behavioural changes. Employees will be involved in the decision making process and management will support bottom up initiatives. Also, energy saving behaviour is facilitated. Bottom-up decision making will be slower, but it will result in more stable behavioural changes. In this way employees can encourage each other to use less direct and indirect energy and because the behavioural changes are autonomous, employees' environmental self-identity will be strengthened among those who engage in the behaviour. This will ultimately lead to less energy use at work and a spillover effect from the workplace to home.

Conclusions

The LOCAW project has used backcasting scenarios with a two-fold purpose: to create scenarios for the future with the input of workers at different levels of the organization and to design reasonable pathways for sustainable change that could then be tested in a simulated environment. It also aimed at demonstrating the potential of this technique to

the organizational leaders in creating a context in which workers can have autonomy and the feeling of control and influence over what is being done in the organization in promoting sustainable everyday practices. It also showed the wealth of ideas that can be generated and the creative potential of using back-casting in designing the strategies for organizational change.

We have presented here two different approaches to back-casting. The one used for the University of A Coruña was a participatory approach, thus fulfilling the criteria for generating the conditions in which workers can actually feel empowered to contribute to change and can become engaged and motivated to actually carry out actions for change. If workers are involved in this process, some of the conditions for spillover of practices from work to home are thus met, such as the strengthening of environmental self-identity by being engaged in the efforts for change, which in turn would lead to more pro-environmental behavior at home.

The approach used at the Municipality of Groningen had to be different due to limitations imposed by the organization. These limitations are based on a subjacent belief that participation in future visioning will not have additional benefits to what can be obtained from experts in human behavior, who can use theories to derive the conditions for behavior change. In spite of the fact that some scenarios can be derived through this method, their implementation would certainly not lead to as much commitment to goals and engagement as when workers are involved in the process of future visioning.

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Assessing the participatory potential of system mapping¹

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Abstract

The question of participation is not only an abstract theme of social or political theory since a number of practical dilemmas arise about planning and conducting participatory processes. The main issues of participation are central to questions such as who the participants are, how the participatory process is structured and what effect the outcome has on the final decision. These issues come up both when organizers decide about a particular set-up of a process and when they select their methodological approach. In the last few years, a new type of participatory method has emerged in the methodological toolbox of social sciences, in which the participants jointly develop casual loop diagrams on a given topic. Moreover, they also elaborate policy recommendations based on these cognitive models. The paper discusses an experiment of the method's adaptation to the Hungarian context and draws the main conclusions in terms of its participatory potential.

Keywords: participation, system dynamics, system mapping, sustainable consumption

Introduction

The paper discusses an experiment of the system mapping method's adaptation to the Hungarian context and draws the main conclusions in terms of its participatory potential. The expression of public participation in a narrow sense denotes the involvement of everyday people (Pataki, 2007; Kiss, 2012) in the deliberation of complex issues and dilemmas that have a significant impact on their lives. Behind this aim prevails the presupposition that there is no need for extensive technical knowledge in order to be able to form an opinion and decide on questions such as how heavy the traffic should be in one's neighbourhood; or whether there should be a waste incinerator, and if so, how close it should be to one's residence. The question of participation is not only an abstract theme of social or political theory. Highly practical dilemmas arise in the course of planning and conducting participatory processes. The main issues of participation can be focused

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around questions such as who the participants should be, how the participatory process should be structured and to what extent the outcome influences the final decision. These issues come up when organizers decide about a particular set-up of a process and when selecting their methodological approach.

This is why the authors believe that the sharing of practical experience regarding participatory methods based on concrete examples can lead to the improvement of the methods themselves. In this paper, the authors base their arguments on a methodological experiment conducted in Hungary in 2013 when system mapping was applied in the topic of sustainable consumption with the participation of one expert and one lay panel. This set-up allowed the authors to assess the potential advantages and drawbacks of applying system mapping in a participatory context. Moreover, one of the explicit aims of this experiment was to test the method itself in order to see whether it can be combined with the system mapping approach in a participatory context.

Hence, our paper will be structured as follows. Firstly, we will introduce the most important aspects of participation related to the questions already mentioned (who, how, what). Secondly, we will describe our methodological experiment, particularly focusing on the process and the specific methodological approach we have taken. Thirdly, we shall analyse our findings in terms of the process and the method attempting to draw general methodological conclusions. This analysis and assessment will reflect back on the aspects of participation introduced in the first part of the paper. Finally, we shall reflect on the question of how system mapping may be applied to a backcasting process. A special emphasis will be placed on the question whether participation, system mapping and the backcasting approach can be used together and if so what 'trade-offs' will be manifest in such an arrangement.

Participation and system mapping

On a theoretical level, it is relatively easy to agree and find support for the general principles of participation. However, the application of these principles may involve several risks and pitfalls. These can range from 'negligent offences' arising from methodological mistakes to the explicit manipulation of the participants. Therefore, one needs specific guidelines in order to avoid these dangers and to guarantee that participatory processes are balanced and sound both in a methodological and an ethical sense.

The *International Association for Public Participation* summarizes the core values of participation in 7 points (IAP2, 2007: see also Appendix I.). These values can be related to three key questions of participation and explicitly reflect on questions such as: (1) *who* the participants should be; (2) *how* this participation should take place; and (3) *what* the effect of a given process is to have on the final decision of the policy-makers.

As for the *who* question, those 'core values' are connected, which emphasize the thorough mapping and engagement of the affected stakeholders. This means that if someone is affected, s/he has a right to be involved and to discuss the different decisional options and to have an impact on the final decision (not only on the outcome of the participatory process). Since participatory mechanisms interpret political participation in a wider sense than elections or referenda, they aim to involve the public in a more direct and interactive manner. However, in most cases practical and organizational matters (that is the resources, funding and time available for the project) decide how many people can *actually* participate from those affected and on what level they can be involved.

As far as the *how* question is concerned, the values connected to the process itself highlight that it is paramount to brief the participants before the process, providing all the necessary information in an understandable format. It is also important that all views of those affected can appear in the process, no opinions or perspectives which stakeholders want to express are marginalized or omitted from the discussions. Furthermore, one of the most important guidelines for public participation is that those involved can influence how they want to discuss a particular issue (or question, problem or dilemma), on what aspects they want to focus on during the deliberation. This ensures that the process is not overly fixed and pre-structured which would inhibit participants from raising new themes or dilemmas during their deliberation.

Values related to the *what* question underline that in the case of a participatory process it is a legitimate expectation that participants have an impact on the final decision and participants are informed about how the outcome of the process shaped the decision. Of course, this does not mean that those involved would become an independent body with a power to decide on important matters for the whole community. In most cases, the result of these procedures has the function to assist and support the process of decision-making. Moreover, the impact may vary from case to case, and it is advisable to choose methodology according to the role the results will play in the decision-making process (i.e. voting conference of deliberative polling can be disastrous if held without the commitment of public officials). Nevertheless, what is essential in all these cases, is that the participant should know beforehand what kind of impact the participatory event will probably have so as to avoid potential disappointment and escalating frustration during and/or after a particular process (Király, in press).

In the last few years a new type of participatory approach has appeared in the methodological toolbox of social sciences. This new approach allows participants to jointly develop complex cognitive models using casual loop diagrams in a given topic and they develop their recommendations based on these models. The potential advantages of this methodological approach of system mapping can be related to its four distinctive characteristics. Firstly, it is inherently explorative in nature since through the visualization of casual relationships and feedback loops it helps to deepen the understanding of a group about a situation (Vennix, 1999). Secondly, since it focuses on variables and their relationships, it provides a neutral communication tool which allows for a dialogue between parties with different types of knowledge (either between experts having different disciplinary perspectives or between experts and lay people) (Sedlacko, 2011). Thirdly, it makes the documentation and tracking of the thinking process relatively easy (Stave, 2002) since the different versions of system maps of the subsequent thinking phases can be effortlessly presented on a few sheets of paper and/or photos after the process. And last but not least, this 'structured thinking style' can be easily acquired and taught, no special training is needed for using it (Forrester, 1992, 2007).

Participatory system mapping for sustainable consumption – a Hungarian methodological example

The research this paper wishes to depict was commissioned by the National Sustainable Development Council, the body of the Hungarian Assembly that coordinates and supports policy aims and measures with regard to sustainable development. In the last couple of years, the so-called de-growth debate has introduced a completely novel perspective into economic discussions and the National Sustainable Development Council also considers the exploration of possible alternative policies crucial. This, however, means that besides

scientific theory building, research requires practice-oriented approaches that uncover ways to exploit the potential of the de-growth economy. The research aimed at finding out more about the constructed mental models of participants on the topic of sustainable consumption, a key concept in the de-growth paradigm. By discovering the cognitive constructions of sustainable consumption, the research was also able to identify policy measures that may not have been exploited in the past².

The researchers set up two panels for the two workshops that took place in April 2013: an expert panel and a lay panel. The reason behind this choice was to exploit the differences these two groups may have in their approaches and to make use of the fact that such dissimilarities can also contribute greatly to adequate conclusions. The expert panel consisted of nine people, whose work is strongly linked to the topic of sustainable consumption or sustainability in general either in the public, civil, scientific or corporate sectors. Even though the opinion of each expert may have been published in some form beforehand, the participatory method enables them to find common grounds during the process. However, the mapping of the lay knowledge was also indispensable as at the end of the day they are the ones who “live with” sustainable consumption and hence, their opinion is highly relevant in the policy context.

The methodological choice of the research, namely, system mapping is a relatively novel experience in the area of sustainable consumption. As discussed before, system dynamics investigations normally aim at modelling complex systems within a given timeframe. Within the area of system dynamics, our research devised complex causality diagrams with a participatory approach, using the contribution of the expert and the lay panel. As our first diagram indicates, the process itself followed the logic of a typical participatory method: its course running from the phase of framing and establishing the cornerstones of the topic towards more concrete recommendations that can serve as serious inputs into policy-making.

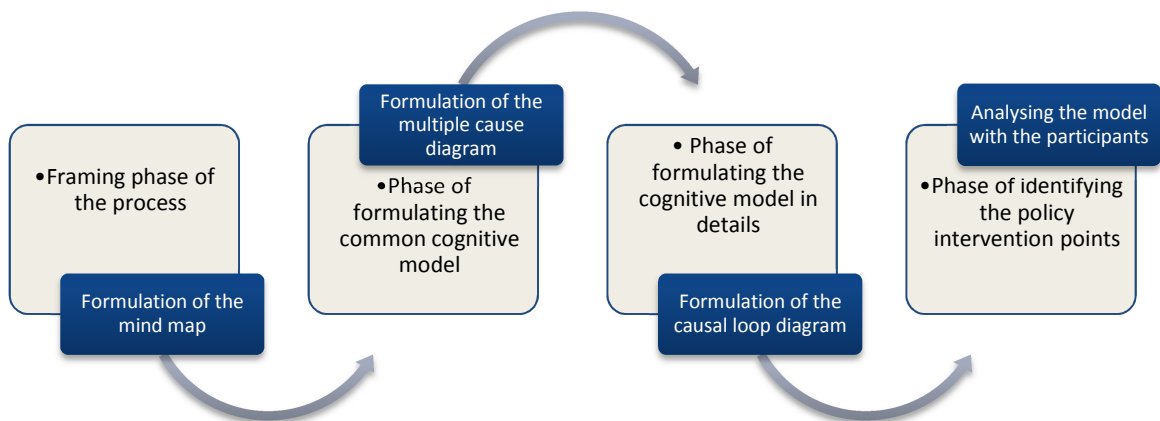


Diagram 1: Phases of the participatory system mapping process

As the diagram also shows, the process differed from other participatory methods in one regard, that is, the subsequent phases all involved the devising of a certain type of

² As our paper focuses on the methodological issues of the research, due to our limitation of scope we do not discuss the workshop results and policy suggestions. The final research study covers these aspects in great length (Pataki et al., 2013).

diagram. Hence, the resulting diagrams reflect how the thinking of the participants moved from a more diffused, associative brain-storming towards more formal constructions that concentrated on causality relationships. The three diagram types that were used during the workshop were a) a mind map; b) a multiple cause diagram; and c) a causal loop diagram (sign graph). The first two served as a preparatory phase to the formulation of the causal loop diagram and the identification of possible intervention points. Below we will describe the research method using these three diagrams. The types of diagrams will be introduced with the help of the resulting diagrams of the lay panel but due to scope constraints, we will refrain from analysing the contents of the diagrams.

The application of the mind map

The function of the mind map within the process was to discover the associative space around the topic of sustainable consumption and it was used for framing the subject. Mind maps are tools that are widely used as they have the advantage of applying both hierarchical and associative cognitive styles, as they uncover the associative space around one central topic in such a way that the thoughts occurring around one notion become the focus points for further thoughts (Wheeldon-Ahlberg, 2012).

During the process, the participants first devised their own mind maps centred around the topic of sustainable consumption, and later they tried to connect their maps by identifying the common elements. Therefore, at the end of this stage, a common mind map of the participants emerged (see diagram 2.) and this served not only as an initial exercise for putting them in the right frame of mind but also as a starting point for deliberating which aspect of sustainable consumption they wish to focus on during the rest of the process.

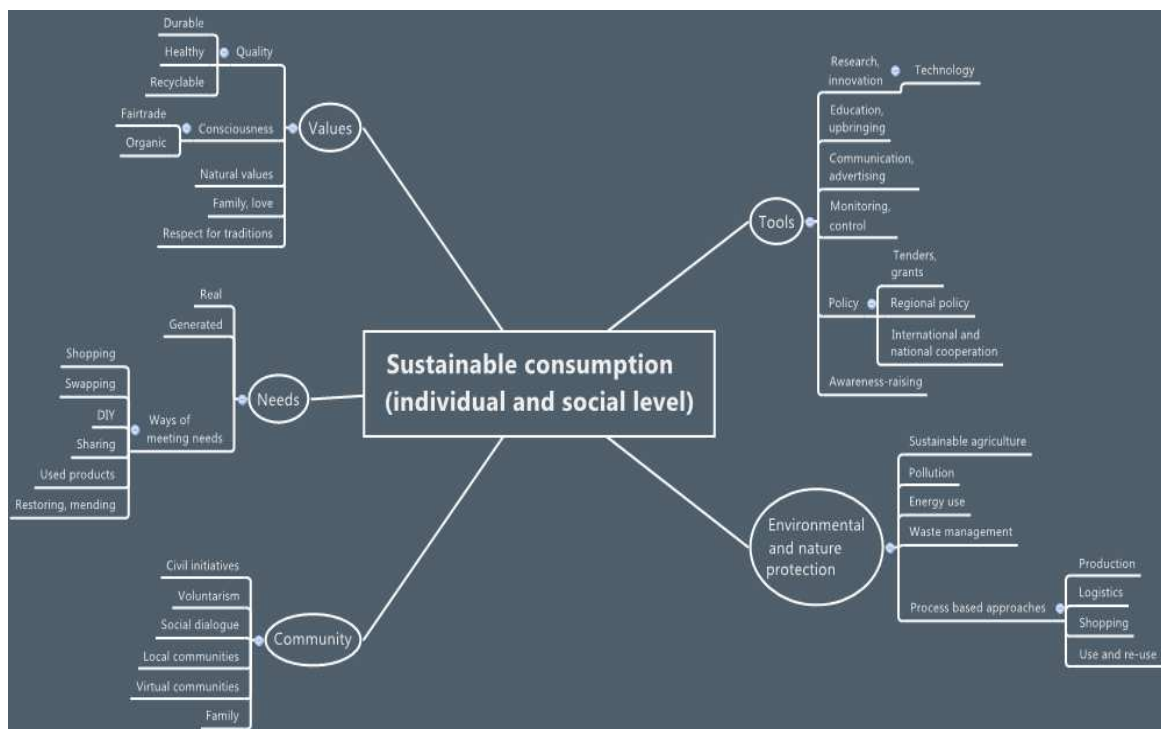


Diagram 2: The mind map of the lay panel

The application of the multiple cause diagram

The use of the second type of diagram, the multiple cause diagram facilitated the formulation of the network of cause and effects that trigger an event, maintain a state or aggravate a situation (The Open University, web). The most important rules when applying the multiple cause diagram are that all relationships must describe causal relationships, and the direction of cause and effect must be correctly identified. Accordingly, the causal structure must be outlined to an adequate depth of details and also the feedback loops must be identifiable. First, the event or state must be precisely described; then the network of cause and effect must be formulated around the event or state; and finally the relationships and potential loops must be identified. During the participatory process, the multiple cause diagrams were used in order to loosely describe the situation concerning sustainable consumption as well as to facilitate deliberation of the differing viewpoints of participants. This diagram also served as a base for the formulation of the causal loop diagram.

The participants of the lay panel picked the subtopic of “the role of community” from the emerging five main topics of the mind map, and hence all later diagrams (including the multiple cause diagram) focused on understanding in more depth this narrower theme by uncovering the structure underlying this topic. The members of the panel also determined the level of analysis where they concentrated their diagrams. They decided that they would want to determine the basic relationship of sustainable consumption and communities on a local level. Hence, at this stage the central issue was what notions lead to the occurrence of a given situation, i.e. in our case it was what causes lead to the development of a strong community. The following diagram shows the result of this cognitive phase in the lay panel.

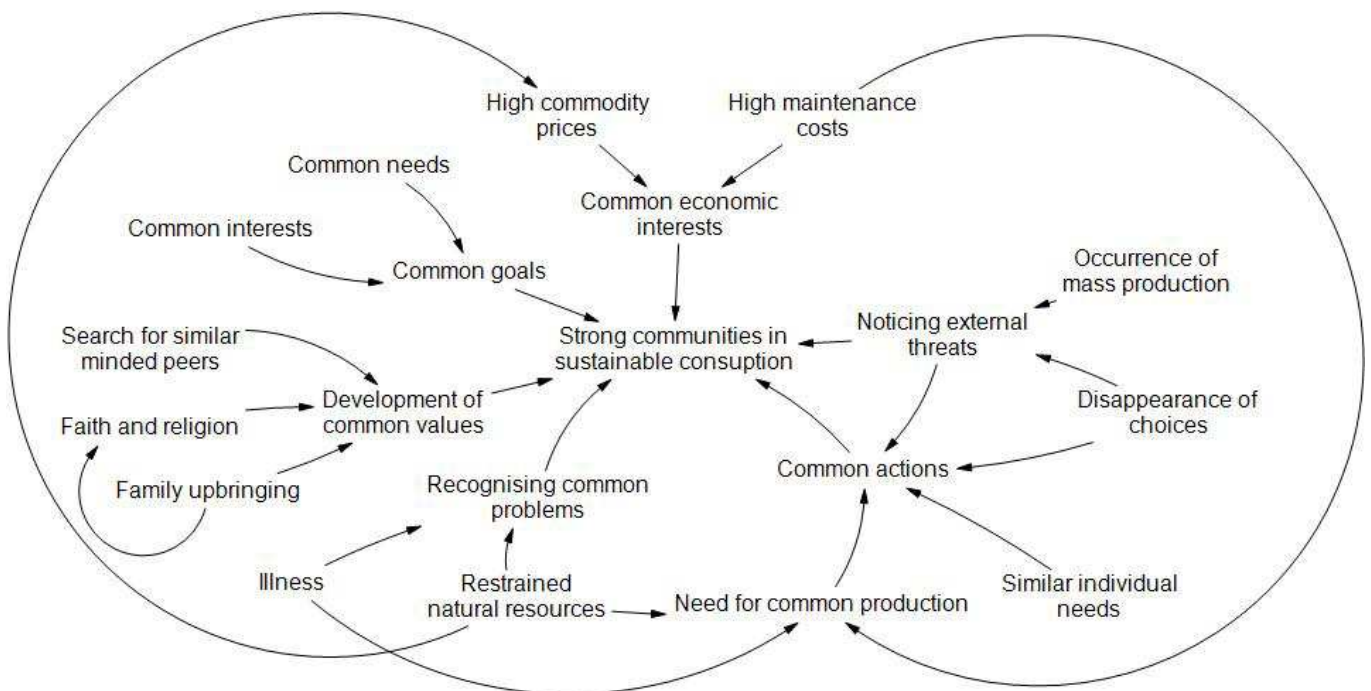


Diagram 3: Strong communities in sustainable consumption – multiple cause diagram

In order to get a clear-cut and straightforward final diagram, the process required a large number of sketches. In order to avoid repeatedly redrawing the diagram and the notions within the diagram, the participants used post-it stickers for each notions and this enabled

them to introduce new ones or freely move the existing ones around in the abstract space if the reorganisation became unavoidable.

The application of the causal loop diagram

The third and final diagram used during the workshops was the causal loop diagram that in many ways overlaps with the multiple cause diagram as both reflect essentially the same causality logic and both aim at uncovering and depicting the network of reciprocally interconnected causes and effects within one system. However, there are important differences between the two diagrams. The causal loop diagram is a stricter and more precisely defined model of the situation. Turning a multiple cause diagram into a causal loop diagram requires the elimination of all prevarication in the phrasing of any notion and in the definition of relationships, and hence the latter reflects more precisely the understanding of the situation by the individual or the group (Sedlacko, 2011). Putting it differently, the multiple cause diagram is suitable for a freer analysis of the situation, while the causal loop diagram provides a clearer scrutiny of the circumstances. This is the reason why the models that occur in these diagrams can be more easily utilised in computer simulations, and in the framing and analysis of formal hypotheses (Morecroft, 2010).

Further distinction of the causal loop diagram is the appearance of signs in the arrows that describe relationships and the formulation of the variables that occur in the diagram. In causal loop diagrams, the arrows have '+' or '-' signs assigned to them that indicate whether the two variables move in the same or in opposing directions. Another important difference is that while on the multiple cause diagram states or events designate the causes and effects, on causal loop diagrams these states or events are formulated as theoretically quantifiable variables that change over time (The Open University, web). Even though both types of diagrams can adequately identify feedback loops, in more complex cases, the causal loop diagram is more suitable for distinguishing between self-reinforcing (positive) and self-restraining (negative) loops (Haraldsson, 2000).

All of the above indicate that the translation process of a multiple cause diagram into a causal loop diagram requires three consecutive steps: the precise phrasing of the variables (if possible with the classification of the units of measure); the identification of the direction of relationships (whether the variables move in the same or in opposite directions); and the recognition whether the feedback loops are self-reinforcing or self-restraining (whether the overall polarity of the loop is negative or positive by summing up the polarity of the individual relationships within the loop). The following diagram shows the resulting causal loop diagram of the lay panel.

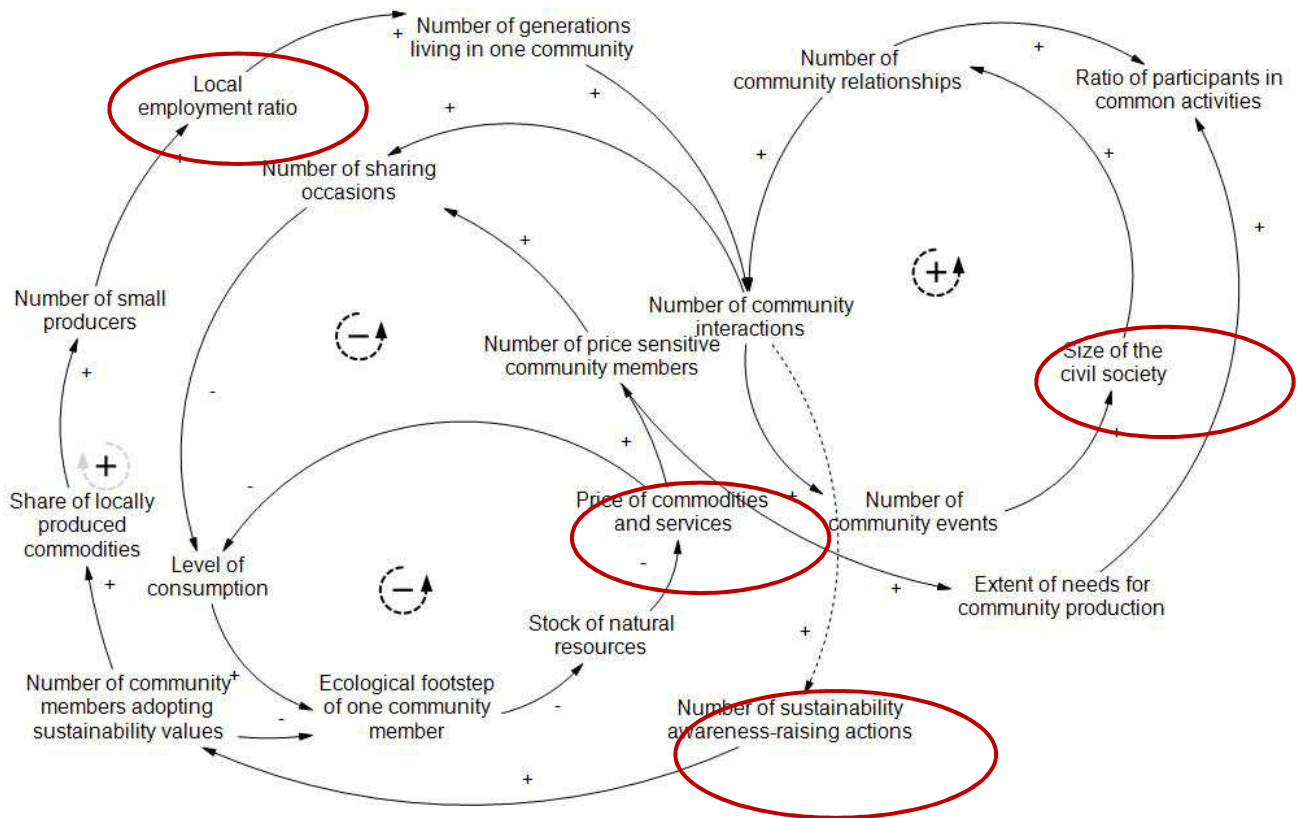


Diagram 4: Resulting causal loop diagram of the system mapping exercise of the lay panel and the identification of the most important intervention points

After drawing up the causal loop diagram, the participants examined the different relationships and analysed what policy measures would have a positive effect on the variables identified as ideal intervention points that, in turn, would lead to more sustainable consumption. Hence, the policy measures are related to individual variables whereby the positive influencing of the given variable would have an impact on the dynamics of the whole system. It is interesting how at this point some of the participants emphasised how local communities must be regarded as self-regulating systems, where external intervention is unnecessary. Consequently, the presumption of the endogenous nature of such systems occurred in the group spontaneously, without the suggestion of the researchers.

Discussions: assessment of participatory system mapping

The previous chapter has shown how the system dynamics approach can be combined with participatory methods. Even though this combination does not go back a long way, and especially in social sciences it lacks substantial history, from the literature certain traits already emerge. Firstly, participatory system mapping is suitable for discovering background contexts which proves especially useful when a wide array of knowledge is needed in order to understand complex problems. Secondly, through visualisation it provides a neutral communication technique for experts and lay experts coming from different disciplinary backgrounds. Thirdly, it has the advantage of recording the thought processes along the way, making analysis easier. Lastly, – according to the literature – the method is easy to teach and easy to learn. The first part of this discussion will provide an overview of the experience gained through the Hungarian experiment with regard to the aforementioned potential advantages.

The Hungarian research has also confirmed that participatory system mapping can indeed lead to new perspectives of certain issues that had not at all or only to a small extent been discussed in preceding literature. An example for that is how the lay panel has chosen the role of strong local communities as the focal point for their examination of sustainable consumption. Even though this approach does appear in the literature, there it has highly different initial axioms.

Our experience has also substantiated the hypothesis found in the related literature claiming that the method provides a neutral communication tool. The expert panel consisted of participants coming from highly diverse backgrounds (civil sector, public sector, business and higher education), and still they found those solutions relatively easily that are capable of reflecting the common standpoint.

The advantage of being able to follow the train of thoughts with relative ease after the workshops through the resulting diagrams can also be confirmed. From the previous chapter it is apparent how the consecutive diagrams indicate the introduction of new elements during the process or how elements that were highly stressed at the beginning of the thinking process lose their importance. In our experience, this transparency of the cognitive process introduced through the constant visualisation and the fact that at the end of the process the participants were able to see the whole model with the help of an IT application, has provided substantial support to the participants as well.

However, the Hungarian experiment has not substantiated the previous expectations that this method is easy to teach and easy to learn. While the language of the method is relatively easy to understand, and through simpler examples the participants comprehend quickly what is expected of them, the constrained way of systems thinking that the method requires did not come naturally to many participants in spite of the preparatory exercises. Most of the difficulties arose when participants had to establish the causal relationships within the complex system (as effects can act as causes in other relationships); when they had to translate highly complicated social notions into simple variables and when they had to transcend their “everything is related to everything” ways of thinking and only handle the most important elements within the complex system.

In addition to the methodological evaluation of the system mapping, it is worth discussing the experiment with regard to its participatory nature. The most important preconditions for participatory techniques can be grouped around three foci. The first places the stakeholders in focus and evaluates the method from the perspective of how well suited it is for people with different backgrounds, uneven knowledge and from diverse circumstances. The second concerns the process itself and how it constrains the participants’ thinking into pre-established cognitive frames or, in other words, whether the participants are given the freedom to introduce new topics and/or cognitive frames. The third issue of the participatory nature is the influence the process has on the final decision or the final policy. In the next part of the discussions, we will examine the Hungarian experience along these perspectives.

From the perspective of stakeholders, it can be stated that participatory system mapping is not necessarily a method that can involve all levels of lay knowledge. In our research both the expert and the lay panel consisted of highly educated individuals and especially in the light of the previous findings, the Hungarian experience confirmed that this method is not necessarily suitable for the involvement of stakeholders with lower knowledge capital. This pinpoints one of the limitations of the method with regard to the participatory nature. If the topic requires the involvement of stakeholders with lower educational background,

it is suggested that the method used in organisational development is followed, namely that the researcher/consultant organises a round of focused group interviews and then prepares the system mapping based on the variables identified by the group. In the second round, the researchers can present the findings and provide an opportunity for the participants to comment and initiate modifications if they deem it necessary. This alteration, however, raises the question whether this approach can be termed as participatory and who is the real owner of the final model (Prell et al., 2007).

When setting up the two groups in our own research, involving expert and lay knowledge has contributed significantly in uncovering many perspectives in our understanding of the general topic as both groups enhanced our comprehension differently. With regard to the dynamics of the two groups, the lay panel found it easier to start a dialogue as they did not need to distance themselves from the organisations they represent and could act as individuals representing their own thoughts. At the same time, the expert panel could bring in more professional experience that, on the one hand, contributed to a wider array of approaches but on the other hand, the extent of their knowledge of the topic made it even more difficult to simplify the complexity of the issue in diagrams.

Regarding the process itself, – bearing in mind the basic requirements of a participatory approach – the organisers laid a great deal of emphasis on enabling the participants to follow their own choices in which topic they wished to cover at the different stages of the process. This endeavour does not only cover the planning of the process but also the choosing of the adequate moderation style facilitating this participatory nature. In our experience, the moderator needs to be more active than for example in the case of focus group interviews (due to the requirement to translate thoughts into the language of causality), but his influence on the participants should be less than for example in the case of a citizens jury (as most of the time the participants work on their diagrams on their own). In this particular case, the briefing stage (that is normally part of participatory processes) was left out as the topic itself relied on the everyday knowledge of the participants and any additional information brought in by the researchers would only have unnecessarily influenced the participants. The briefing was also unnecessary as it would have narrowed the topic itself. However, this does not imply that a system mapping on a different topic would not require a briefing stage.

The process built on three consecutive diagrams has confirmed the previous expectations and helped in constructing the cognitive process. However, the second phase, the drafting of the multiple cause diagram proved to be the hardest part of the process. Nonetheless, it would be difficult to assess how much this lengthy and difficult phase contributed to the relatively smooth construction of the causal loop diagram. The length of the whole process roughly fits in a long work day as the method described in this paper requires a net time of 8-9 hours. The net time in the Hungarian experiment was only 7 hours but the drafting of the final policy recommendations would have required slightly more time. However, it is an advantage of the method that the participatory workshops can fit into one day each as that has a positive impact both on the costs of the research and the availability of participants.

The use of post-it stickers for the facilitation of introducing modifications in the models under discussion has proven to be a highly useful solution as it has made the participation interactive since all participants were able to sit around one table, write and add a new thought or move a sticker to prove a point. The same interactivity could not have been ensured with the use of a computer and hence some of the involvement of the participants would have been lost. At the same time, one of the researchers used an IT application in

the background to draw the results that not only helped in reconstructing the phases of the thinking process but also enabled the researchers to show the participants the final results at the end of the day. This simple action seemed to have given the participants great satisfaction having seen a clear version of their day's work.

This experiment is difficult to assess from the perspective of how far this participatory event has contributed to the final decisions. On the one hand, this research was part of a social experiment that introduced alternative solutions both in its methodology and in its final policy suggestions to decision-makers. On the other hand, the final policy recommendations can be used more as inputs into future strategies rather than background material for immediate action. Nonetheless, it has become clear from this experiment as well that due to their clarity and easy comprehension, the resulting diagrams of the system mapping are useful tools to convey complex ideas to decision-makers. The contribution of the participatory system mapping to the final decision is also obviously largely dependent on the decision-makers' recognition of the importance of deliberation.

In general, it can be stated that the Hungarian experiment has proven that the system mapping approach suited the logic of the participants and could be used for further social research. Combining system mapping and the participatory approach enables the integration of different knowledge and helps synthesising comprehension on a given topic. As for the limitation of the method, it should be noted that this method structures associative and free-flowing thinking and simplifies reality that can lead to the loss of valuable ideas. Nonetheless, the method is capable of bringing in and integrating thoughts and directions away from the mainstream as long as the participants can also integrate them in their own cognitive schemes. Therefore, the method can support decision-makers in identifying and moving towards alternative solutions that may encounter less resistance and this may prove useful in socially sensitive policy areas. However, in order to exploit this advantage, adequate participatory approach is indispensable.

Future research aspirations: the combination of system mapping and backcasting

In this last section of the paper we reflect upon the potential combination of system mapping and backcasting practices. In many aspects, the methodological 'cross-breeding' of these different approaches seems very constructive and fruitful. System mapping can bring a more rigorous and focused cognitive style to oftentimes vague and diffuse discussions about the future. Moreover, a systematic analysis would possibly make the actual 'backcasting phase' (i.e. connecting normative future vision with the present by identifying the necessary policy steps) easier if the issue is seen on a single sheet of paper and the intervention points can be identified in a casual web of interrelated factors. Different versions of system maps can also represent different snapshots in time making changes traceable and observable for participants.

However, we would argue that although an 'arranged marriage' might bring several assets and new insights, there are several constraints which have to be dealt with if such a match happens. Our intention is not to show that this combination is impossible but to pinpoint some problematic points in order to instigate discussion and debate on how to overcome them. Related to the assessment of system mapping in a participatory context above, three problem-areas or constraints can be identified. These are as follows: (a) the constraint regarding the scope of potential participants, (b) cognitive constraints, (c) the constraint

on the type of backcasting utilized. We shall present these constraints in the above sequence.

As far as the constraints regarding the scope of *potential participants* are concerned, it can be argued that utilizing system mapping in a backcasting process might exclude lay people with a lower knowledge capital. Our experience with system mapping has not proven our presupposition that it is easy to acquire the necessary skills to utilize this thinking style for adults who are not researchers or other experts familiar with its basic concepts. Thinking in variables and casual mechanisms in a formal way is very difficult for those who meet with the concepts of variables and causality for the first time. Thus some kind of familiarity with basic concepts would be required at least at a tertiary level of education from the participants. Viewing this question sociologically, it means that a large part of our societies would have serious problems with using system mapping in backcasting. If we understand participation in its narrowest sense (involving the members of the public and not only stakeholders), this would mean that socially disadvantageous and marginalized groups in society could also be marginalized in or excluded from a backcasting process utilizing system mapping.

Even if this problem can be overcome with extensive preparation and training, one has to be aware that serious differences might remain between participants coming from different socio-economic backgrounds. The straightforward visual thinking style of system mapping can be understood as a form of language. Criticizing Habermas' ideas on the 'ideal-speech-situation' (Habermas, 1990) authors such as Bourdieu (Bourdieu, 1991), Foucault (Foucault, 1971) or Mouffe (1999) point out that certain social actors will always use language in a more eloquent, fluent and expressive way creating unequal power relations in the discourse itself. This is also a considerable risk when one utilizes the visual semanticity of system mapping in a participatory backcasting process.

Secondly, there are considerable *cognitive constraints* in connection with the joint application of backcasting and system mapping. Our experience (Köves et al., 2013; Király et al., 2013) with backcasting showed that it involves a way of thinking which runs contrary to the time perspective used in everyday thinking. While participants might jointly develop a future normative vision relatively easily, the actual 'backcasting', the phase of the process in which they attempt to connect this vision with the present is very challenging and mentally exhausting. As we argued above, utilizing system mapping also requires considerable mental effort. Therefore, combining the two methodological approaches might be cognitively overtaxing³ for the participants and it is possible that they cannot be applied together for long periods of time (i.e. 7-8 hours a day). That means that the process has to be structured in a way that participants have enough 'breathing time'. This would mean longer processes with intense periods of joint thinking sessions, yet longer events also require more funding and more time of the participants.

Lastly, the constraint of the *type of backcasting* utilized is also worth mentioning. Backcasting is not a methodologically unified approach since there are different types of backcasting practices. Wangel (Wangel, 2011, 874) drawing on Börjeson et al.'s typology

³There is also a possibility that the two thinking styles might be in conflict also at a cognitive level. In other words, they use different timeframes: system mapping uses the habitual timeframe (time flowing forward), while backcasting challenges, and reverses this timeframe. Cognitive psychological experiments (Móra, 2003) show that it is extremely difficult to use deduction backwards in relation to casual mechanisms. This inconsistency of time frames might cause an additional problem in practice although experiments are needed whether this is only a problem appearing in laboratory context or it would be present also in the practice of a backcasting process.

(Börjeson et al., 2006) presents three types of backcasting processes (target-, pathway-, action-orientated backcasting).⁴ There is not enough space here to extensively describe these backcasting approaches so we only briefly touch upon their differences in focus. Our main point is that the explorative nature of system mapping is most compatible with the explorative approach of pathway-orientated backcasting (focusing both on what can change and how to change it). In contrast, system mapping's holistic and structural approach might be at odds with target-orientated (focusing on what can change to reach a specific goal for example 30% reduction in CO₂ emission) and action-orientated backcasting (who could make the change happen). It can be argued that system mapping's holistic approach (The Open University, *web*), focusing on a web of interconnected causes rather than single cause-effect relationships, does not match with the target-orientated backcasting's strong focus on a single goal. In a similar fashion, system mapping is structural (Morecroft, 2010) in orientation although not in the sense of structural functionalism (Parsons, 1966) or general systems theory (Laszlo & Krippner, 1989). While it does not aim to describe a stable homoeostatic system, it attempts to shift focus from actors and narratives (Meadows, 2008) to the underlying structure of sudden and gradual changes. That implies that there is a mismatch between system mapping's specific perspective and action-orientated backcasting's focus on key actors who instigate change.

Considerable back office activities might provide solutions to both the constraint of potential participants and the constraint of possible cognitive efforts. Organizers can gather input from participants and, not unlike the process of soft system methodology (Checkland, 1989), they can elaborate system maps that provide inputs for participants to work with throughout the rest of the event. This would both alleviate the issue of cognitive overburdening of the participants and, in a sense, level out the social differences among them. However, in this case the legitimacy of the process's participatory nature can be questioned and challenged. It seems there is a serious 'trade-off' to be considered if one aims to utilize system mapping within backcasting.

As for the last constraint, one might argue that not every tool fits every toolbox, that is, system mapping might not be compatible with all the types of backcasting processes. In our opinion the explorative nature of system mapping might fit the explorative type of pathway-orientated backcasting the best. However, this may remain an open question since careful experimentation with the 'cross-breeding' of the different processes and methodologies might produce different results in the future.

All in all, in order to use backcasting and system mapping in a participatory context, these problem areas have to be reflected upon and certain solutions have to be developed to deal with them. Again, we would like to emphasize that it was not our aim in this paper to prove that system mapping and backcasting cannot go together but to highlight potential pitfalls and risks involved in such a match. This reflection is especially important for us since our future research aspirations also include experimentation with such an 'arranged methodological marriage'.

⁴There is also fourth type of backcasting in Wangel's typology although it cannot be totally separated from the others. Participation-orientated backcasting attempts to involve and empower the public and in this fashion can be combined with the other three types (Wangel, 2011, 874).

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Appendix I.

„Core Values for the Practice of Public Participation

1. Public participation is based on the belief that those who are affected by a decision have a right to be involved in the decision-making process.
2. Public participation includes the promise that the public's contribution will influence the decision.
3. Public participation promotes sustainable decisions by recognizing and communicating the needs and interests of all participants, including decision makers.
4. Public participation seeks out and facilitates the involvement of those potentially affected by a decision.
5. Public participation seeks input from participants in designing how they participate.
6. Public participation provides participants with the information they need to participate in a meaningful way.
7. Public participation communicates to participants how their input affected the decision.

(IAP2, 2007)”

Discussion Report

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Organisation

The working session on backcasting, scenario analysis and pathway development was moderated by Jaco Quist from Delft University of Technology and was organized as follows:

- First, there were 10 minute presentations by (1) Gábor Király *et al.* on their paper entitled ‘*Assessing the participatory potential of system mapping*’, and (2), Adina Dumitru *et al.* on their paper ‘*Pathways to sustainable change in organisations*’ which are both included in these proceedings. Therefore, only the discussion is summarised.
- Second, there was a moderated group discussion in which participants shared their experiences and knowledge on backcasting, scenarios and pathways. The following questions were guiding the discussion:
 - What are your experiences with backcasting, normative scenarios & pathway development for sustainable lifestyles & communities?
 - In what projects did you do that and what were main results & outcomes? What does it contribute to the state of the art in the session theme?
 - What are main strengths, bottlenecks and what topic deserves further development and testing?

Main discussion points on the paper by Kiraly et al.

The paper by Kiraly reports on using participatory system mapping in a backcasting approach that focuses on targets, and putting pathways into action. In this method participants jointly develop casual loop diagrams on a given topic, while they also elaborate policy recommendations based on these diagrams and their underlying cognitive models. It was asked whether non-causal relationship, like for example people’s relationship to nature, were also included in the system mapping as they are also important. The author acknowledged that the rigidity of system mapping does not allow to include this kind of relationships.

On the other hand, the potential of system mapping was put forward as a way to help backcasting participants to find the steps that connect the vision with the present. G. García-Mira commented that conceptual maps also help to reveal what people are concerned about, and how information is structured in their minds.

Main discussion points on the paper by Dumitru et al.

The paper by Dumitru et al deals with the role of participatory back-casting in organisations, which ensures workers' autonomy and control and stimulates transfer of more sustainable practices between work and private life. The discussion revolved around the reticence of certain organisations to take part in backcasting exercises. It was mentioned that intellectual property reasons make private organization reluctant to participate and share ideas and information. The research reported on in the paper did not succeed in involving a major oil company in developing visions and doing backcasting, because this multination was not only concerned about providing the data as well as they have their own scenarios about energy futures. The author also noted the difficulty of convincing certain stakeholders of the usefulness of backcasting. For instance, the authors did not manage to convince a major municipality in the Netherlands to do a full backcasting exercise as the Municipality believed scenarios could be drawn based on human behavior models.

Results from the moderated discussion

Gabor Kiraly has been involved in a project in Hungary in which backcasting has been applied to sustainable employment and mentions that envisioning sustainable employment is complicated.

Ricardo Garcia Mira has as a main concern how to use criteria in future steps and mentions the atlas technique as a method to know more about what people have on their mind.

Georgina Guilen mentions briefly the BIG2050 project on which she presented earlier in the workshop, but also refers to different terms that are around for pathways like roadmaps, pathways and strategic plans that can give confusion among participants and practioners.

Julia Backhaus mentions her involvement in the FP7 funded SPREAD project in which backcasting has been applied to sustainable lifestyles. In this project designers were involved to generate creative images of the future that stimulated workshop participants to detach from the present. Involving industrial designer stimulated creativity greatly, but gave also focus on products in the future visions.

Walter Wehrmeyer refers to a project on long-term futures for small island states in which it was a major challenge to get participants out of their comfort zone.

Elena Iacovidou refers to the CRISP project and mentions that young adults were very capable of identifying changes needed to become sustainable, but that at the same time they were more skeptical whether they could change their own behavior is part of such changes.

Felix Rauschmeyer mentions that he has limited experience on backcasting and pathways with groups, but that he has considerable experience on capacity building and personal coaching for individuals in which he uses needs concept of Max Neef as well as guided

imagination exercises, which can be interesting extensions to the existing workshop tool repertoire. Other people refer to the dragon dreaming tool that can be used for this too.

Carmen Vercauteren refers to her personal experiences as a member of a Transition Town group in the city of the Hague and mentions that vision development and turning it into action can be quite complicated in such groups.

Freija van Duijne raises the issue how to deal in case there are several or different visions and mentions reflexive monitoring as a method to evaluate outcomes of multi-stakeholder visioning processes.

Finally, Jaco Quist mentions that generating visions and involving stakeholders is complex, and that good results have been achieved like the examples in the sessions proof, but that the real difficulty is to realize implementation and broader spin-offs. Furthermore, there are various ways of generating visions, such as through elaboration of ideas, using creativity, or by pursuing consensus, or seeking diversity.

Main discussion points

The challenges posed by participatory vision and pathway building were a major discussion point as several persons pointed out that participants tend not to be comfortable with the exercise of envisioning. Walter Wehrmeyer emphasized the importance of playing with participants' comfort zone and finding ways to bring them out of it without being too brusque. Freija van Duijne, Felix Rauschmayer and Georgina Guillen suggested that, to face poor visioning skills, creativity could be stimulated by the use of dreaming and imagination exercises. Techniques that have proved to be useful are designing a "dreaming contest" and using visual stimulation (e.g. by showing the evolution of computers from their creation up to now). We could also borrow techniques that are already used in businesses like for example the "dragon dreaming technique" where one person starts with a vision and other people add to this vision.

The issue of discrepancy between societal visions and personal visions also came back several times on the table. Eleni Iacovidou pointed out that backcasting participants can see drastic social changes needed for the future but when it comes to changes in their own personal lives they are less ready to be as drastic. Carmen Vercauteren noted on the other hand, that participants may have difficulties seeing the role they can play in the vision. Felix Rauschmayer raised the question: would it be interesting to combine personal and social vision? In the context of community building this could perhaps be interesting for instance.

Another discussion point was about the evaluation of backcasting. What is the impact of backcasting? How does participatory backcasting exercises change the view of people? What do participants learn from it? Does it empower participants? Does it lead to action and change? Does it impact policies? Visions are one thing but turning them into action is

another thing. It was acknowledged that evaluation is a shortcoming in backcasting that needs more attention and that is better tackled in Transition Management approaches.

Finally, the accountability of the visions created in backcasting was also discussed. Julia Backhaus raised the concern: Who are we, as researchers, to say that the visions developed in backcasting should be guidance for society? Jaco Quist responded that the role of researchers is not to make their visions grow but to facilitate and articulate sustainability visions. Walter Wehrmeyer also noted that visions do not necessarily need to be positive to be good because policy makers find it easier to avoid something undesirable rather than construct something towards a desirable goal.

Conclusion

When finalizing the session, a number of diversities is summarized, which also call for further study and methodological development:

- With regard to involvement: expert involvement vs stakeholder involvement vs involvement by citizens and lay-people
- How to get participants out of their comfort zone: bringing creative images in the meeting vs stimulating people to make their own
- Content of visions: focusing on social and cultural changes vs technical and structural changes
- Learning by participants: individual learning vs group learning
- Defining pathways vs making a real life impact and implementation
- Diversity of several visions vs a single vision
- Backcasting within a single organization vs multi-stakeholder processes
- Emphasizing creativity & and radicalism in visions vs realism and feasibility
- Personal visions vs Societal and group visions.

4a

**Drivers and
barriers for
pathways and
transitions to
sustainable
lifestyles &
communities**

Exploring Design Thinking for Citizen Involvement and Societal Goals

Lessons from Design Thinking and Cradle-to-Cradle for Developing (Beyond) Sustainable Infrastructure with the Involvement of Citizens

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1. Extended Abstract

This paper explores what we can learn from Design Thinking for the development of sustainable infrastructure. Various authors have criticised and expressed concerns regarding the technocratic dimensions of sustainability discourses, and the resulting lack of direct citizen involvement (Hendriks & Grin 2007, Hendriks 2009, Meadowcroft 2009, Voss et al 2009). Such technocratic tendencies are especially apparent in the context of infrastructure projects, where issues of scale, safety and efficiency (are used to) justify the need for technocratic knowledge and top-down planning. Meanwhile in the empirical field, there is a resurgence of citizen-led projects and grassroots civil society initiatives for sustainable infrastructures, especially in the field of energy (Walker et al. 2010, Smith 2012, Seyfang & Haxeltine 2012). The participation by citizens -and by civil society more generally- in sustainable development is a widely debated topic in a variety of social science studies (Seyfang & Smith 2007, Hess 2009, Swyngedouw 2010, Wesselink et al. 2011).

The thematic of sustainable infrastructure and citizen involvement can be approached from many different angles. Due to the interdisciplinary and transdisciplinary nature of the debate, the state-of-the-art insights are scattered across a variety of research fields. Examples of such research fields include: urban studies (Swyngedouw & Heynen 2003, Boonstra & Boelens 2011, Mason & Whitehead 2012), infrastructure studies (Frantzeskaki and Loorbach 2010, Egyedi et al. 2012), community energy studies (Walker & Devine-

Wright 2008, Walker et al. 2010, Allen et al. 2012), sustainability transition studies (Grin et al. 2010, Markart et al. 2012) and environmental governance (Meadowcroft 1999, 2000, O’Riordan 2004). These fields often operate as relatively separated ‘inter-disciplines’, each with their own journals, conferences, academic community and epistemological positioning. This is not necessarily problematic, as long as there is dialogue between the respective fields.

1.1 The Relevance of Design Thinking

In this paper we want to contribute to this interdisciplinary and transdisciplinary dialogue by exploring what we can learn from Design Thinking regarding the development of sustainable infrastructure, including the social dimensions of sustainability such as the involvement of citizens. We argue that Design Thinking is particularly interesting for this debate, due to its ability to ‘bridge the gap’ between engineering sciences and social sciences.

Design Thinking (DT) has received significant attention for its ability to generate non-orthodox ‘solutions’ for various types of ‘problems’, both in the scientific literature (Young 2010, Burns, Cottam et al. 2006, Kimbell, Julier 2012, Manzini, Penin et al. 2010, Brown, Wyatt 2010, Plattner, Meinel et al. 2009) as well as in the popular media in design and business (Nussbaum 2007, Breen 2005, Cannell 2009, Tischler 2009, The Guardian 2010, Ante, Edwards 2006, Hostyn 2013). DT builds on traditional design skills to address social and economic issues by using the design process as a means to enable a wide range of disciplines and stakeholders (Burns, Cottam et al. 2006). DT can be characterized as a positive approach that addresses the needs of the human users, using a particular product or service. It crosses traditional boundaries between public, for-profit and non-profit sectors, because designers cooperate closely together with the potential users for which they work, enabling bottom-up solutions to emerge during a participative design process. In addition, designers are equipped with other tools than words or symbols, which allows the process to be more inclusive, intuitive and creative (Brown, Wyatt 2010).

“Design Thinking.” Its human-centric methodology integrates expertise from design, social sciences, engineering, and business. It blends an end-user focus with multidisciplinary collaboration and iterative improvement to produce innovative products, systems, and services.” (Plattner, Meinel et al. 2009, p. xiv)

While there are many fields that combine engineering and social science (e.g. socio-technical transition research and infrastructure studies), these fields have been criticised (by social scientists) for containing elements of ‘social engineering’ (e.g. Shove & Walker 2008, 2009, Duineveld et al. 2007). The concept of ‘design’ tends to be associated with such ‘social engineering’, or ‘remaking society by design’ especially when combined with sustainability discourses. We argue that this (often negative) association primarily has to do with the manner in which design approaches are applied and communicated in practice. Often, the application of design approaches is predominantly focused on the physical and ecological aspect of sustainability, typically in products, buildings or physical spaces. In that focus on the physical and ecological aspects, the more social dimension of DT is forgotten, or at least undermined. This is particularly regrettable, considering the many insights that DT has to offer regarding the inherently social challenge of involving and empowering ‘users’ i.e. citizens. In this paper, we want to make this social and empowering potential of DT more explicit, through a focused literature review.

1.2 Methodology & Structure

In order to tackle the challenge as laid out above, this paper follows a specific methodology and structure. Considering our aim to draw lessons from DT regarding the development of sustainable infrastructure in relation to citizen involvement, we focus our literature review on DT-perspectives that specifically target issues of sustainability and/or citizen involvement. Therein we make a distinction between process-oriented DT-perspectives and goal-oriented DT-perspectives.

The process-oriented DT-perspectives highlight the needs of human users and/or aim to involve them in a participatory manner. These include 'user-centred design' (Burns, Cottam et al. 2006), 'human-centred design' (Greenhouse n.d, Kimbell, Julier 2012), and 'participatory design' or 'co-design' (Burns, Cottam et al. 2006, Manzini, Rizzo 2011, Björgvinsson, Ehn et al. 2010, Sanders, Stappers 2008). Within the goal-oriented DT-perspectives, we focus on those that aim to mobilise design for dealing with global challenges and realising societal goals, including: 'socially responsible design' (Davey, Wootton et al. 2005, Cooper 2005, Melles, de Vere et al. 2011), 'design for sustainability' (Sherwin 2004, Spangenberg, Fuad-Luke et al. 2010, McDonough, Braungart 1992) and 'design for social innovation' (Manzini, Penin et al. 2010, Murray, Caulier-Grice et al. 2010, Brown, Wyatt 2010, Cipolla, Moura 2011, Hillgren, Seravalli et al. 2011).

We will start our paper with an extensive literature review of the abovementioned process-oriented and goal-oriented DT-perspectives. First, we discuss how three different design perspectives address the involvement of citizens: 1) user-centred design, 2) human-centred design and 3) participatory design. Second, we provide an overview of how different design perspectives address global societal challenges, including 1) corporate social responsibility (CSR) 2) sustainability, and 3) social innovation. Third, we distil lessons from different Design Thinking perspectives and from the specific approach of Cradle-to-Cradle (Braungart, McDonough et al. 2007, McDonough, Braungart 2002, McDonough, Braungart 2013, McDonough, Braungart 2002), regarding the development of sustainable infrastructure and citizen involvement. With this example, we aim to illustrate how a design approach incorporates elements from various design thinking perspectives, and how these elements are applied in practice and/or get lost in the practical application. The example of Cradle-to-Cradle is particularly interesting, because it pointedly illustrates how the potential social and empowering dimension of a design approach –which is implicitly ingrained in Cradle-to-Cradle design – tends to get lost or, least undermined, in its eco-focused application. Fourth, we distil lessons from DT and from the different design perspectives, and we discuss which lessons we can draw for the development of sustainable infrastructure, including the involvement of citizens. In conclusion, we summarise the main insights and identify challenges for future research.

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Supporting sustainability transitions by enhancing the human dimension via empowerment, social learning and social capital

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Abstract

In sustainability transitions, as answers to persistent problems and societal challenges, local initiatives are assumed as having an important role. Their success is supposed to be depended on a variety of drivers. Among others, social and particularly higher order learning is proposed as a key instrument to deal with uncertainties and complexity in sustainability transitions. Empowerment is forwarded as a core aim of governance approaches to facilitate sustainability transitions, due to enabling citizens to shape sustainability locally. Finally social capital is proposed as important precondition for joint local action when addressing societal challenges. This paper explores the meaning of social learning, empowerment and social capital for sustainability transitions at local scale and analyses how a development of all three factors can get facilitated by local transition management.

In a first step we define and conceptualize social learning, empowerment and social capital in the context of sustainability transitions. We then present the results of three transition management pilot projects in local communities with regard to strengthening social learning, empowerment and social capital amongst participants. In a last step the orientation of the facilitated process towards sustainability is analysed along four dimensions: environmental thinking, social thinking, interregional and inter-temporal thinking. Results show that in all three pilot projects social learning, empowerment and social capital development took place and the processes had a clear orientation towards sustainability.

Introduction

More than 20 years after the international community agreed upon sustainable development as a major principle to jointly strive for (WCED 1987, UNCED 1992) the environmental, social and economic challenges addressed by it have not lost their relevance. Rather the contrary can be stated: The impact of human actions on the earth systems reached a level where they become equivalent to a geological force (Crutzen 2002). Recent studies focussing on essential building blocks of assuring a safe operating space for humanity have revealed that human actions already have crossed thresholds for some of them (Rockström et al. 2009). Long-term societal stability and well-being will depend on pro-actively addressing environmental pressures such as climate change and impacts of resource consumption, social equity and ensuring viable economic activity that supports human flourishing.

These societal challenges are characterized as being complex, highly interrelated, are subject to uncertainties and unfold their impacts over long time horizons. Challenges are related to solving 'wicked' or 'ill-defined' problems, which are defined, perceived and valued differently and persist over time (Grin et al. 2010, Rittel & Webber 1973). Changes in societal systems, including human-nature interrelations, do appear frequently. But prevailing incremental changes nevertheless are not considered substantial enough by many scholars to cope with today's sustainability challenges (Markard et al., 2012, p. 955). Therefore transitions, as radical and structural change of societal (sub)-systems attracted large interest in the scientific community and beyond in recent years (Rotmans and Loorbach 2009: 2; Grin et al. 2010, Markard et al. 2012, Geels and Schot 2007, Berkhout et al 2004).

Transition research proposes that 'wicked' problems require a fundamental change in the structures, cultures and practices of a societal system for the system to become (more) sustainable (Frantzeskaki and Haan 2009). Transitions appear frequently, but they do not automatically lead to sustainability although an adequate facilitation, as aimed for by Transition Management, may work in favour of it (e.g. Rotmans and Loorbach 2009: 2). Rather than assuming that societal change processes can actually be 'managed' as the name 'Transition Management' (TM) implies, TM holds that sustainability transitions cannot be governed in a regular way. Due to their open-endedness, non-linearity and uncertainty they require an iterative, reflective and explorative way of governing aimed at societal learning.

Still, TM processes can contribute to transitions as radical changes. A key instrument to facilitate radical change in TM is the systematic development and empowerment of alternatives, in societal niches and by working with so called frontrunners as engaged and creative individuals (Frantzeskaki et al. 2012, Loorbach 2010). "The ultimate goal of transition management should be to influence and empower civil society in such a way that people themselves shape sustainability in their own environments, and in doing so contribute to the desired transitions to sustainability" (Loorbach 2007:284).

In the process of development and empowerment of frontrunners and niches learning plays an essential role. Participatory processes of joint deliberation and reflection, can "initiate social learning processes that go beyond individual and often predefined interests and / or values and create opportunities for a shared understanding and joint action" (Garmendia and Stagl 2010: 1713). At the individual level, social learning can contribute to empowering individuals as well as to raise their awareness and motivation for sustainability-related activities. At the niche level, learning can contribute to the development of alternative and innovative ways to jointly solve complex challenges and – indirectly and potentially – to the empowerment of the niche. Finally on a macro-level

social learning as facilitated by TM appears to be of core importance for societal systems to build up resilience as the capacity to buffer perturbations and take an active role in shaping transitions (Folke et al. 2002, Rammel. et al 2007).

As the TM methodology proposes an open-ended process it puts the concrete approach to sustainability into the hands of participating frontrunners. These frontrunners essentially shape the understanding and valuation of sustainability in the TM process (Rotmans & Loorbach 2009: 10) and therewith have a crucial role in directing the process towards sustainability. This practice that has not been without critique. Rauschmayer et al. (upcoming) e.g. draw attention to the need to design a proper process allowing to make sustainability meaningful to the frontrunners and to later critically evaluate the developed vision and understanding. They as well point out the essential role of addressing values, awareness and sustainability motivation of participants when facilitating social learning via TM.

Research background and approach

Applying Transition Management in three communities

This exploration focuses on the application of a new TM approach called community arena (e.g. Wittmayer et al 2011), which was developed as part of the EU FP 7 research project InContext. The 3-years project started in late 2010 and includes theory development, case studies and pilot projects. Within the InContext pilot projects participatory processes got applied that systematically facilitated a collective search to explore new opportunities of joint action. Building up a community arena, a protected communicative space for societal learning where participants meet outside of their usual habits and roles (Loorbach 2010), stood at the core of this process. The process used was explicitly based on deliberately defining visions for the future of the communities as well as doing a participatory back-casting to concretize steps for realizing future visions. Setting up experiments as to realize these steps was a concluding part of the pilot project processes. The processes were participatory and reflexive in nature, aiming to allow for intensive learning amongst participants. Reflexive elements included a focus on the values, needs, thinking and feeling as what was termed the “inner context” of the participants, as they were supposed to be essential drivers for behavioural change and collective actions. Community arenas can get understood as pre-niches which are not there yet. The community arena process therefore primarily focussed at the interplay of the individuals and the group.

Three concepts stood in the centre of the process-facilitation in the arenas: empowerment, social learning and social capital (for an in-depth discussion see Wittmayer et al 2013b):

The concept of **social learning** captures the processes of individual and collective experimentation and reflection. Social learning as well is connected to changes in values, assumptions and worldviews and relates to the awareness and valuation of sustainability topics in the arena process. The concept of **empowerment** captures the idea of finding (new) ways to at (I) an individual level meet needs (sustainability) and (II) a collective level make the developed visions for (sustainable) communities turn into reality. Another aspect which turned out to be of critical importance during the pilot projects with regard to the co-creation process was the development of **social capital** by building trust, good relations and networks among participants. In their interplay social learning, empowerment and a strengthened social capital are considered to be essential contributions to enhance the communities potential of shaping sustainability locally and enhancing possibilities to deal with societal challenges: via increasingly motivated and skilled arena participants which are increasingly connected and acting as a group when

experimenting with and find innovative solutions to societal challenges (cp. Wittmayer et al. upcoming for a more conceptual discussion of building blocks of communities transformative potentials). In principle the process of social learning and empowerment can contribute to realizing sustainability aims of the TM process in two basic directions: (1) participants can discover new or more effective ways of (jointly) realizing an (already) intended sustainable development and (2) participants can gain insights which make them more aware of sustainability issues and more motivated to address them in the TM process. Therefore learning processes that lead to changing values can play a core role.

The three pilot project communities are (taken from Wittmayer et al. 2013a):

Carnisse is an urban neighbourhood in the city of Rotterdam, situated at the Western coast of the Netherlands. Some 10,000 (out of Rotterdam's 600,000) inhabitants live in Carnisse. It is known as a deprived neighbourhood scoring low on a number of municipal indexes, marked by a high turnaround of inhabitants which together represent about 170 nationalities. Severe budget cuts of the municipality are threatening the continuation of social work as well as community facilities. The focus of the community arena process was on the quality of life in the neighbourhood and it was co-financed by the Dutch government. The vision is put into practice by a group that aims to re-open one of the community facilities in selfmanagement. Members of the community arena are also organising a number of deliberative meetings with different stakeholder groups.

Wolfhagen is a rural town situated in the centre of Germany in the federal state of Hesse. It comprises a core city and eleven rural districts, which leads to a high amount of commuters. The city, while being a frontrunner in the development and use of renewable energy, is marked by a vacated city centre and a decline in population (currently some 13,800 inhabitants). The focus of the community arena process was on the quality of life in the inner city. The vision process is put into practice by the arena group that aims to open a multi-faceted community centre in a historically important building in the inner city.

Finkenstein am Faaker See is located in Austria, on the border to Slovenia and Italy. It is one of the largest communities in Carinthia (one of the nine Austrian Länder). About 8,500 people live in Finkenstein - distributed over about 28 villages and settlements and divided into a Slovenian-speaking minority and a German-speaking majority. Main economic sectors are tourism and (small) industry and agriculture. The focus of the community arena process was on quality of life. The process was co-financed by the municipality of Finkenstein and the vision is put into practice through action-oriented projects or deliberative processes in a number of Working Groups, e.g. on economics, sustainability, and social issues.

The aim and structure of this paper

This paper analyses the experiences of the action research done in three pilot projects building on core synthesis documents of the project (e.g. Wittmayer et al 2013a, Wittmayer et al 2013b) as well theoretical considerations (Schäpke und Rauschmayer 2010, 2011, 2012). Our aim in this analysis is to provide insight in the empirical results of the action research done and engage in a reflective discussion with the theory. We will address the described interrelations by starting with a definition of the core concepts (empowerment, social learning and social capital) and analyse in a second step the impacts of the community arenas regarding the core concepts of empowerment, social capital and social learning. In a third step we reflect on the orientation of the pilot project processes towards contributing to sustainable development on three levels: first with

regard to raising awareness and sustainability learning in the process, second with regard to the representation of sustainability in the vision developed by the community arena and third with regard to the action already started by arena participants. Discussion and outlook form the last part of the paper.

Core concepts: social learning, empowerment and social capital

This section provides a brief overview of the relevant analytical core concepts “Empowerment”, “Social Learning” and “Social capital” and the role of values.

Empowerment

The concept of empowerment is addressed by different disciplines such as management studies, critical theory etc. in quite diverging ways. For the evaluation of the pilot studies we found Avelino’s definition (Avelino 2009, based on Thomas/Velthouse 1990) very helpful as it relates empowerment to transition theory. In this cognitive model, empowerment is seen as an increased intrinsic motivation strongly dependent on positive task assessments. The assumption is that the experience of positively fulfilled tasks leads to a person’s belief that she or he is able to direct own actions to a desired end. The concept is based on following four intrinsic ‘task assessments’ (cf. Avelino 2009: 64):

- 1 Choice: Asks whether a person's behaviour is perceived as self-determined.
- 2 Impact: to which degree people perceive their behaviour producing intended effects.
- 3 Meaningfulness: the value of the goal of the task in relation to the individual's values.
- 4 Competence: the degree to which a person can perform task activities skilfully.

The feeling of being empowered in turn depends on the way individuals evaluate their actions, attribute them to others, and think about future actions (Avelino 2009: 385). Schöpke and Rauschmayer (2011, 2012) highlight the role of values and awareness when it comes to how people ‘use’ the perceived empowerment: engaging for sustainability or not.

Social Learning

Social learning is seen as a process through which to deal with complexity and uncertainty. Although learning may be understood in different ways, at its core it involves a lasting change in the interpretive frames (belief systems, cognitive frameworks, etc.) guiding the actions of a person (Grin and Loeber 2007; Grin et al. 2010). The kind of social learning most relevant for InContext can be defined as second order learning. It indicates learning processes aiming at changes in underlying values and assumptions which contribute to the actual behaviour. Several authors have emphasised the relevance of this type of learning as a way to adapt to a continuously changing and increasingly complex environment through collaborative action and dialogue (Isaacs 1993; Schein 1993; Kofman and Senge 1993; Garmendia and Stagl 2010). Contrarily, in first order learning, fundamental assumptions, values and identities do not change (Argyris and Schön 1978; 1996). This is the simplest mode of learning and has to do with the acquisition of new cognitive knowledge. We assume that second order learning is one possible precondition for voluntary intrinsic behavioural change. The most important conditions for second order learning work are a) surprises, b) outside views, and c) safe spaces (Grin and Van de Graaf 1996; Grin and Loeber 2007). Schöpke and Rauschmayer (2012) put forth that (social)

learning can be understood as one major source of empowerment (e.g. via new skills or insights in new possibilities for action). In how far an empowerment via social learning has a positive impact on the awareness on sustainability related issues is not per se clear, but may be part of changing values and assumptions in second order learning.

Social capital

Social capital describes relationships, relations of trust, reciprocity, and exchange; the evolution of common rules; and the role of networks. It encompasses the involvement of civil society and collective action. Social capital theory provides an explanation for how individuals use their relationships with other actors in societies for their own and for the collective good (e.g. Adger 2003). Important dimensions of social capital, according to Gehmacher et al. (2006), are Bonding-Bridging-Linking. Bonding describes the relationship between people within a group, whereas bridging refers to the relation between different groups and linking to their connection to other levels (like the state or the broader public). A community arena has the potential to raise all three: bridging, bonding and linking social capital of a community and can enable the development of meaningful relations.

The relation between social capital development and sustainability is not fully straightforward, but there are some indices. Chang (2013: 232) points out the critical role of social capital to sustain and develop community initiatives and environmental protection efforts. Crompton (2010) shows that people with high intrinsic values (e.g. affection, benevolence) tend to have more and better social relations (social capital) and use less resources. The concrete relation between a development of social capital and sustainability awareness and motivation would need to get further assessed.

Empirical analysis of core concepts

This section investigates in how far the community arena process empowered participants, created learning experiences (i.e. social learning), and connected participants within their own social groups and to other groups (i.e. social capital). This section is mainly based on data from the final evaluation and the process-accompanying monitoring interviews, the participatory evaluation session, and participant observation. It reports on the perceptions of the participants in the three pilot areas (for a more in-depth analysis see Wittmayer et al. 2013b).

Making a difference: from wish to reality

Analysis of the empirical material, from the perspective of empowerment (defined as increased intrinsic motivation), shows that the community arena had positive effects on all four intrinsic 'task assessments'. Having analysed the material, we can argue that the participants self-reported that the community arena contributed to an ongoing learning and empowerment process in the pilot areas.

Regarding the 'task assessment' "choice", the fact that the process had an open agenda contributed greatly to the participants' feeling of self-determined behaviour. It gave people the feeling of being able to choose what to put on the agenda and that no certain policy agenda was "imposed" on them (which they feel is often the case). For participants of the pilot project of Carnisse, this also positively distinguished this project from other processes carried out in the neighbourhood in recent years.

In terms of the category "impact", the wish to make a difference in the local environment can be traced back to the reported motivations for joining the project, e.g. to gain a better

picture of the own living and working context (Carnisse) or to co-creating their environment (Finkenstein). Asking participants from Finkenstein in the evaluation phase if they believe they can have an impact on the local environment, most of them responded in a positive way, although there is also some scepticism. This was addressed through the learning process, emphasising that transitions occur in small steps and need time. Differing in Wolfhagen, all the participants had already gained positive experiences in different community-based processes and were (already) convinced that their actions are fruitful.

The third intrinsic ‘task assessment’ leading to empowerment is “meaningfulness” – is based on the assumption that if a project’s goal links to the ideals of the individual participants, this has an empowering effect. The scores participants gave for being able to bring in their own input and topics they felt strongly about, were good in all pilots. This positive assessment is also clearly related to the open agenda of the process as this made it possible to meet the different senses of urgency.

The ‘task assessment’ for “competence” was closely linked to the second one on “impact” as well as to the results we report in the next section about “social learning”. In summary, participants felt they can have an impact on their community, although some were also sceptical and claimed that more time, people, money, and political support would be needed. In terms of social learning, people gained competence in a series of different skills (e.g., speaking in front of many people, working together) and also changed some underlying values and assumptions (i.e. related to people with different backgrounds). All of this strengthens the perceived competence and therefore has an empowering effect.

In sum, the community arenas addressed all four task assessments – choice, impact, meaningfulness, and competence in a variety of cases. Through social learning processes, the participants’ belief that they are able to direct their actions to desired ends could at least in many cases be strengthened; thus, we can assume that empowerment took place.

Learning to change values and assumptions

In the evaluation interviews as well as in the participatory evaluation meeting, participants of all pilot projects reported several learning experiences, including first as well as second order learning. In Carnisse as well as in Finkenstein people, e.g. reported that they learned about their possible impact (see above) and their roles and the roles of others in the project. This increased awareness about the own impact lead many participants of the community arena in Finkenstein to a changed attitude towards the future in a positive way. A very important learning experience shared by all pilot project participants was the experience of working together in a respectful and constructive way even with previously unknown people and in a very diverse group. In Finkenstein people reported an increased self-reflexivity and attention in contact with other people. Some participants described themselves as being more open and having fewer prejudices in interactions with others. All learning experiences mentioned so far can be defined as second order learning processes as they all touch underlying values and assumption e.g. on the future.

These second order learning processes are complemented by more first order learning processes which centre on concrete skills. Examples for these are: speaking one’s own mind in public and speaking in front of a large group of people (e.g. 100 people), facilitating meetings, working respectfully together in diverse groups and the whole array of legal, financial and institutional know-how related to keeping open a community centre. As also mentioned above, stimulating factors for second order learning are a) surprises, b) outside views, and c) safe spaces. For all community arenas, the integration of outside

views seemed to trigger second learning in a special way. In establishing the community arena, all research teams were very attentive to building trust among the participants and especially between the participants, the research team, and local policy makers. These trust-building processes were successful in all pilots and guaranteed a safe space for fostering second order learning. Participants from Finkenstein also explicitly reported some surprises ('eureka moments') they came across during the project, e.g., the insight that some apparently individual worries (but also ideas) are shared by others.

From single individuals to connected groups

The community arenas enriched the social capital of the participants in all pilots as new relationships and networks could be established. A participant from Finkenstein described the networks: "Through the process the group got stronger than the sum of its single members." Via relationships and networks, new ways of working together for the collective as well as the individual good could be found and tested. Two aspects form the bottom line for these attempts to shape the local environment: a trusted atmosphere in the community arena as well as the insight that there is a shared understanding.

In composing the arena, all research teams specifically tried to mix people with different socio-cultural backgrounds (bridging). Although it was difficult to achieve an ethnically mixed group in Carnisse as well as in Finkenstein (see section 4), groups were quite diverse in terms of age, gender, professions, etc. This diversity was appreciated by the participants themselves as it gave them the possibility to gain new perspectives and unconventional insights, a very important condition for social learning. Participants of the community arenas also connected with other groups (linking). In Finkenstein, these were primarily policy makers (as part of the transition team) and the general public. In Carnisse, contact with other groups actively engaged in the neighbourhood and also the local government was established through an outreach event. In Wolfhagen, the group got in contact with the owner of the vacant building they identified as a possibility for the community centre.

From another point of view, bonding relationships could be established as well. People of all arenas reported appreciation of the exchange and collaboration with "like-minded" people and perceived themselves as "one group". For this perception, the vision-building process was probably decisive as it contributed a lot to a group feeling, giving the group a shared aim. In sum, social capital via "bridging", "bonding" and "linking" could be enhanced for the participants and thereby also the social capital of the communities.

Closing remarks and intermediate conclusion

Working with the instrument of the community arena brought changes in the inner context of the participating individuals: through social learning processes, changes in underlying values and assumptions occurred. People feel, for example, more able to direct their actions towards desired ends and to have an impact on their local environment – thus, they were empowered. Also, not really visible but of great importance are the variety of social contacts and connections (social capital) that were established. Three aspects were especially important in triggering changes in the inner context: The open agenda was very helpful in empowering the participants as it gave them a sense of meaningfulness and choice. The diversity of the groups was decisive for successful social learning and (bridging) social capital. Finally, the intense trust-building phase and trusted atmosphere in the small group of the community arenas established an environment conducive to learning. As all three aspects, social learning, empowerment and social capital development, got enhanced in the three pilot projects, an enhancement of the communities' transformative potential is likely. Unclear remains the relation of this

enhancement to strengthening sustainable development. As outlined above there are two basic contributions to targeting sustainability at community level possible: first via empowerment, social capital building and social learning the effectiveness of reaching already intended sustainability targets is raised, and second, sustainability as a possible target becomes more important to the participants via raising awareness and motivation. In the following we foremost investigate first, the meaning participants give to sustainability as a target of the process. The second possibility is addressed as part of the outlook on the role of value change, e.g. towards more intrinsic values, for sustainability.

Analysis: Transition and sustainability

In this step we reflect on the orientation of the pilot project processes towards contributing to sustainable development on three levels: first with regard to the representation of sustainability in the vision developed by the community arena and second with regard to the action already started by arena participants. Both is done by an analysis of the researchers. Third we report on the self-evaluation of participants on the importance of sustainability to them and the inclusion of the concept in the pilot project visions and actions, allowing for assumptions on the sustainability awareness and learning of participants.

Sustainability and concepts that matter locally

Transition processes do not automatically lead to sustainability, although an adequate facilitation may work in favour of it (e.g. Rotmans and Loorbach 2009: 2). To facilitate a community arena for sustainability, one might first want to define what sustainability means. As with many other normative concepts (e.g. justice, human rights), sustainability is in itself an inherently ambiguous and contested concept. The InContext consortium had a number of discussions on the meaning of the term, as well as on the way it should be used within the project as a whole and within the pilot projects in particular. This did not, however, lead to one fixed definition or one single idea of what sustainability means or should mean. On the contrary, a plurality of ideas persisted with common denominators, e.g. long term thinking.

A predefined sustainability goal with targets for the pilot projects would be counterproductive to the idea of having an open agenda for the process (and would have prevented empowerment for example). Because of the ambiguity of the concept, the impossibility of monitoring outcomes (such as behavioural change or its impacts on individual or community level) within a three year research project and the need for a locally emerging understanding, the community arena approach focused on sustainable development as a process (as opposed to a pre-determined ultimate goal). The processes were conceived as learning journeys which render the concept meaningful in the local context. Rather than focusing on the term and concept of sustainability, the community arena process aimed to play into local dynamics and was centred on a good quality of life for all now and in the future – herewith hoping to catch the essence of sustainability without falling into quarrels about the notion itself. The researchers operationalized the concept of sustainability in four dimensions:

- 1) environmental thinking (awareness of nature and natural resources),
- 2) social thinking (consideration and acknowledgement of self and others),
- 3) time horizon (short and long term) and
- 4) interregional thinking (connection with other parts in the world, near and far).

These dimensions of sustainability thinking were to be used in the facilitation of the processes (Wittmayer et al. 2012). For the action research practice, this meant that the

researchers provided space to the participants to decide what is important for them and for their community locally. In the discussions the four dimensions were used to motivate people thinking into directions of sustainability (for details see Wittmayer et al. 2013b). The term sustainability was thus in general not prominent in the process of the three pilots, although in Finkenstein it was more frequently used than in the other pilot projects. In order to see to what extent the four dimensions that were used in the facilitation of the process also had an influence on the outcomes of the community arena we look at two things. Firstly, we explore how the four sustainability dimensions can be traced back in the visions (see table 1) and the implementation projects of the pilot areas. Secondly we present a self-evaluation of visions and planned activities done by the pilot project participants with regard to the four sustainability dimensions.

Envisioning sustainable communities

Dimensions	Wolfhagen 2030	FinkenSTERN	Blossoming Carnisse 2030
Social thinking: consideration and acknowledgement of self and others.	<p>Possibility to find and meet people with shared interests.</p> <p>Creation of networks for activities</p> <p>Active and lively/vital city</p> <p>Inclusive meeting places</p> <p>Reviving cultural aspects</p> <p>Generation-spanning living</p>	<p>Active cooperation of whom</p> <p>Teambuilding btw whom?</p> <p>Binding through culture</p> <p>Diversity</p> <p>Sharing with and supporting each other</p> <p>Independency (through science)</p> <p>Living together</p> <p>Intergenerational living</p> <p>Politics (transparent, cooperative)</p> <p>Care places</p> <p>Creation of participation</p>	<p>Living together</p> <p>Social relations</p> <p>Language and diversity</p> <p>Helpfulness and respect</p> <p>Safety</p> <p>Creativity: thinking beyond the conventional</p> <p>Activity: individually and in groups</p> <p>Cohesion</p> <p>Flexibility in choosing residence</p> <p>Knowledge building</p> <p>Inclusive meeting places</p> <p>Local economy, sharing and employment</p>
Environmental thinking: awareness of nature and natural resources.	<p>Reduction of traffic: Car sharing, riding along.</p> <p>Creation of green areas.</p> <p>Environmental friendly mobility: cycle paths, car free city?</p> <p>Renewable energy</p> <p>Greening the surrounding</p>	<p>Awareness of nature</p> <p>Preservation, development and improvement of nature</p> <p>Renewable energies</p> <p>Alternative mobility</p> <p>Local production</p> <p>Working group on sustainable development</p>	<p>Renewable energies</p> <p>Emphasize nature and how it should be treated</p> <p>Knowledge??</p> <p>Re-use of space</p> <p>Greening of the neighbourhood</p> <p>Natural diversity</p> <p>Local economy</p>
Interregional thinking: connection with other parts in the world, near and far	<p>Role model</p> <p>Expansion of the cycle paths between core city and rural districts.</p>	<p>Role model for neighbouring regions</p> <p>Tourism</p> <p>Infrastructure/ accessibility (roads, public and private transports)</p>	<p>Attractive neighbourhood</p> <p>History building</p>
Time horizon: ability of future generation to live the way they want	<p>Generation specific aspects (care for elderly, childcare)</p> <p>Renewable energies</p>	<p>Renewable energies</p> <p>Preservation of existing resources</p> <p>Working group on SD including the future</p>	<p>Renewable energies</p> <p>Building renovations</p> <p>Connecting long term thinking and doing in the present</p>

Table 1: Analysis of all three visions along the four dimensions of sustainability (Source: Wittmayer et al 2013b)

Drawing straightforward, meaningful conclusions on the basis of Table 1 is problematic. The researchers used the prompting of the four dimensions in their facilitation in a flexible way and not in a way that makes direct comparison possible – also in this table we only compared the vision documents and did not include an analysis of the vision discussions. From the analysis of the vision documents in Table 1, we can see that aspects of social thinking gain prominence in the future narratives of the three communities. Aspects of environmental thinking are present while interregional thinking aspects were only touched upon. It would be interesting to look further into this and investigate whether the fact that the community arena process is organized as a place-based process enhances the identification of the participants with the immediate surroundings rather than the global world that this place is embedded in.

Implementing and reflecting sustainability

We can trace the four dimensions of sustainability thinking not only in the visions, but also in the implementation projects that are initiated by the community arena groups. In both Wolfhagen and Carnisse, the implementation projects, being the opening of community centres, contain aspects of social thinking (communication, social cohesion, social learning etc.), environmental thinking (re-use of existing buildings, promotion of regional products, etc.) while interregional thinking and long-term thinking play a minor role. In Finkenstein, the working groups and the measures that are already implemented or are planned take into account all dimensions except the long-term: social thinking (integration, civic participation, bringing young and old people together, participation workshops, building social capital, a new culture of communication, integration, exchange, etc.), environmental thinking (public transport, bicycle lanes, land use, organic agriculture, renewable energy) as well as on interregional thinking (Finkenstein together with two other communities has recently become a "climate-energy-model region"; an exhibition around the issue of sustainable culture and quality of life is planned with two other regions). From the working groups in Finkenstein, one is prominently named "Sustainable Development" and covers energy, mobility and others topics. The long term thinking is only implicitly part of the projects as they should contribute to better living in the communities now and in the future.

In addition to the visions and the implementation projects, we can turn to the self-evaluation of visions and planned activities by the pilot project participants with regard to the four sustainability dimensions. The participants were asked a few questions with specific reference to sustainability during the evaluation interviews. In Carnisse, most of them indicated that sustainability was very important to them. To them, sustainability mainly refers to the environmental dimension or to aspects of energy saving as well as the long term aspect. For most of the interviewees the vision of Blossoming Carnisse is linking to sustainability, either in its role — hinting towards the future (the year 2030) — or through its topics e.g. housing, green surroundings and being in contact with nature. One of the six pathways of the local vision actually has sustainability in its name: "... green sustainable oasis". In Finkenstein, the participants reported a strong relationship between the vision and sustainable development. The objectives of the vision are focused on a high quality of life for all now and in the future. It is based on gratitude for and awareness of the already high quality of life in Finkenstein, due to good environmental conditions and the positioning of the village in the midst of mountains, with the lake Faak in the middle of the region. The participants are aware of the importance of protecting these local treasures to ensure the high quality of life for a common future. They see also a strong relationship between the whole project and sustainability: 9 out of 15 participants state that the project implements measures that are not just good for the moment but also the

far future and that they are not just good for Finkenstein but also for other parts of the world.

Closing remarks and intermediate conclusion

The focus in all processes, judging from the visions, the implementation projects and the discussions in the arenas, was on the dimension of social thinking. With the theme being quality of life for all now and in the future, the 'social thinking'-dimension was the entry point and led to aspects of the 'environmental thinking'-dimension that emerged at a later stage of the process. Operationalizing sustainability in four concepts was meaningful especially in putting social and environmental thinking on the table. It supported the action researchers in playing into local dynamics (e.g. issues of social cohesion) and linked these to the other three dimensions of sustainability without referring to the term at the outset.

There is an interesting contrast visible between the evaluation of vision and actions done by the researcher and the self-assessment of the participants done with regard to long-term thinking: while long-term thinking is explicitly mentioned as part of the visions to a very little extent, participants still strongly connect visions and activities to long-term thinking. In sum it becomes clear that sustainability played a major role in the community arena process and that there is a strong sustainability awareness and motivation of participants given which is transmitted into the developed visions and activities.

Discussion and outlook

Our approach in this analysis was to provide insight in the empirical results of the action research done and engage in a reflexive discussion with the theory. The aim of the arena process was to address societal challenges and raise awareness on sustainability related topics. The process aimed to strengthen social learning, empowerment and social capital which in their interplay are considered to be essential contributions to enhance the communities' potential of shaping sustainability locally and to deal with societal challenges. Next to having analysed the impacts of the community arenas regarding the core concepts of empowerment, social capital and social learning we reflected on the orientation of the pilot project processes towards contributing to sustainable development. We did this by analysing the representation of sustainability in the vision developed by the community arena and the activities already started by arena participants as well as a self-assessment of the participants on the importance of sustainability for the arena process and vision.

Our analysis suggests that the three pilot projects contributed to the enhancement of the communities potential to respond to societal challenges and shape sustainability locally: not only social, second order learning and empowerment but also the development of social capital as increased networks, trust and friendships amongst participants and beyond took place. Furthermore there was an orientation of the community arena process towards the aim of sustainability. The involved action researchers did not or did only initially and rather broadly introduce sustainable development as an aim or topic for the arena process, but focussed on related the discussion to it via four basic dimensions: Environmental, social, interregional and long-term thinking. Participants themselves developed the community arenas vision and activities and in the evaluation related them to the goal of sustainability, broadly captured in four dimensions as outlined above. It can as well be stated that the engaged citizens have already started to set up experiments and actions connected to the aim of sustainability. Taken together with a successful strengthening of social learning, empowerment and social capital, the arena processes are

very likely to have contributed to shaping sustainability locally and to raise the potential of the communities to solve societal challenges. The impacts of this success though have not fully understood as they will probably only become visible in the long run, and therewith are promising targets for future investigations.

Not fully clear is the impact of the arena process on strengthening the sustainability awareness as the analysis of the visions and (planned) activities does not focus on changes in sustainability awareness, motivations or values changes of participants. There has no before-and-after comparison been done. A critical assessment if the introduction of sustainability into the process via the four dimensions mentioned above was the most efficient way to secure the direction of the process towards sustainability therefore cannot be done in this case but must be left for future investigations. Furthermore not all dimension of sustainability as introduced by the action researcher can clearly be tracked in the developed visions and activities. While issues attributed to social thinking are very strong and to environmental thinking as well are very present, interregional and long-term thinking aspects are addressed only to a little extent. It would be worthwhile to investigate if this as well can be found in comparable processes or if it is a specificity of the InContext project, where social aspects had a strong relevance to local dynamics, e.g. in the deprived neighbourhood of Carnisse. This may reveal insights on good entry point for starting the learning journey towards making sustainability meaningful locally. An entry point for taking first steps which are needed in every journey, although it remains important to stay aware of the need to take the other steps, too.

In InContext participants themselves attribute the developed vision and activities strongly to long-term thinking, making it plausible that developed environmental and social activities are implicitly linked to the long-term. O'Riordan suggests that social issues are a worthwhile entry point for addressing sustainability in times of austerity and crisis: "Sustainability is now about creating a sense of trusting companionship between humans. Through this process, sustainability extends between compassionate humans treated fairly and with respect, and their natural world" (O'Riordan 2011: 161). Possible reasons for this are learning processes including value changes, e.g. making intrinsic values (e.g. caring, benevolence, compassion; e.g. Crompton 2010) more important. Changing values are one possible link between learning and empowerment process needs to a raising awareness and motivation on sustainability issues (cp. Rauschmayer et al. forthcoming, Schäpke & Rauschmayer 2012). Social learning in general encompasses this change, as it is not just about finding "new facts and a better understanding of relations and impacts but [...] a way to shape our values and reflect on assumptions and limitations behind our knowledge" (Garmendia & Stagl 2010: 1714). But: again not all kinds of learning including value and worldview change can be considered to be connected to sustainability awareness and motivation. Rauschmayer and Omann e.g. highlight the need for deep changes including strengthening the intrinsic sustainability motivation of actors (2012) in opposite to extrinsic motivations (Crompton 2010). Hedlund-de Witt (2013) very recently showed how only certain worldviews are positively related to sustainability motivation and behaviour. A further investigation of the impact of community arena processes on the values of participants appears promising as to further develop facilitation techniques that allow for second-order learning that works towards empowerment and raising sustainability awareness and motivation like. E.g. the link between building social capital, as trust, friendship and networks, and strengthening intrinsic values could form a valuable part of this investigation.

Finally, as the action research in the InContext pilot projects contribute to social learning, empowerment and social capital, only partly under an umbrella of sustainability as a broad aim of the process, it is of interest in how far the process lead to an increased

resilience of the communities at hand. And therewith to the resilience of society at large. Originating in ecology, the concept of resilience has developed to be referred to in many disciplines and ways. Core of all understandings is that resilience means the ability of a system to deal with disturbances, while the terms “ability” and “deal with” are filled with different ideas (see Brand and Jax, 2007 for an overview). As diverse as the understandings of the exact meaning of resilience are, a number of characteristics exist that contribute to the resilience of systems. These include for example strengthening response capacities, supporting self-organisation, (both relating to the core concept of empowerment and social capital) fostering learning, encouraging adaptation (related to social learning) and redundancy. Of course these characteristics are not set in stone and either judging a system’s resilience or taking action with a view to increasing its resilience need to be based on a sound and detailed analysis of the system and its specific characteristics. For InContext this clearly goes beyond what we can and want to provide at this stage but still we can assume that by touching on each of the above mentioned characteristics the pilot projects have increased social resilience. This way, and with a view to a greater perspective, the pilot projects help shaping a society that can deal with crisis and absorb external shocks and therewith increase society’s ability to respond to existing and probably even more importantly future societal challenges.

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End-user engagement for flexible energy consumption patterns

Towards tailored interventions for shifting and reducing household energy demand

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Abstract

The term smart grids refers to innovations in grid management and the physical infrastructure. In theory, future smart grids may support trends towards local decentralized energy generation, distribution and storage. As such they may support sustainable lifestyles and communities around decentralized patterns of consumption and production. However, future smart grids may also turn out to be of service mainly to a continued top-down management of demand and supply. The current deployment of smart meters at the household level is accompanied by a rising interest in how these meters can be used to introduce dynamic pricing to encourage end-users to shift or reduce their energy consumption. This paper reviews experiences with dynamic pricing. A dynamic pricing approach consists of three elements: the pricing mechanism (for instance Time of Use, whereby peak and off-peak prices are set according to time of day, day of week, and/or on a seasonal basis), supportive technology (e.g. smart meters) and feedback (e.g. on consumption behaviour or on prices). Taking a socio-technical approach, we inquire into the interactions between on the one hand new arrangements/interventions consisting of incentives, technologies and feedback, and on the other hand end-users who are part of a household and who differ in lifestyles. Mismatches between such arrangements and end-user expectations, lifestyles and needs can result in very different outcomes than expected by those who design and deploy these arrangements (utilities, Distribution System Operators (DSOs), policy makers). We show how household needs and wishes are usually not taken as a starting point for designing dynamic pricing interventions and discuss the consequences of that. After having addressed these issues of framing and shaping expectations – based on an elaborate review of dynamic and smart metering pilots and projects across Europe - we explore ways to design interventions such that household end-users and their lifestyle characteristics are central (rather than the technology or price incentive) so that the intervention is tailored (rather than 'one size fits all'). End-user segmentation can be helpful here but it also raises issues related to end-user data ownership protection. After all, metering data and segment-specific information represent a high value and the household increasingly is becoming a site of contestation where citizens are being asked for a passive engagement limited to providing personal and potentially sensitive data. We propose and explore the creation of an alternative 'socio-political' space: a decentralized solution that allows for a new form of engagement and role for both households and DSO's/utilities which may also contribute to a better articulation of different views and expectations around our future sustainable energy system, the smart grid and the roles of various actors and technologies.

1. Introduction: smart grids for decentralised energy systems?

1.1 Setting the scene: Smart Grids, what and what for?

The term smart grids refers to innovations in electricity grid management and the physical infrastructure. There is a lot of ongoing activity around smart grids, while at the same time no clear definition exists of what a smart grid is and what it should do, to what purpose. The term suggests that our current grid is not smart; one central characteristic of smart grid would be that it allows for more flexibility from both supply and demand sides to accomplish the most efficient generation and use of electricity. In addition it can also refer to a change in roles, whereby end-users (household, company and industrial levels) also can be producers in a more decentralized energy generation system. In theory, future smart grids may support trends towards more localized distributed energy generation, distribution and storage, including a future in which neighbours can buy and sell their electricity within their neighbourhood or as a cooperative and a situation in which people match their demand to the supply, e.g. mainly use some of their electric appliances when the sun is shining or the wind is blowing (Kobus, Mugge, & Schoormans, 2013). In the discussion on smart grids little attention is given to the need to change the incumbent organization and infrastructures of our current energy system to make this transition towards an increased distributed generation systems possible, particularly when it concerns the question of how this may ask for changes to the established stakeholder positions and the institutions that support the current organization.

Discussions have to a large extent focused mainly on how to best encourage household end-users to change their energy behaviours - more specifically to shift (and reduce) energy consumption. If end-users can be incentivised to decrease their energy consumption during peak hours, this may prevent the need to extend the grid and thus save considerable costs. In these discussions benefits like reduced costs, increased comfort, indoor climate, health impacts, and social aspects are identified. In addition, in this discussion the claim is often heard that if household end-users become more aware of their energy usage, through the feedback they receive from smart meters, this may encourage the uptake of a more pro-active role as energy users and producers. For society at large, reduction and shifting are framed as serving environmental goals (e.g. when it allows for more decentralised renewable energy generation) and as serving the societal goal of maintaining the stability of the energy system. As such smart grids *may* support the creation of sustainable lifestyles and communities around decentralized patterns of consumption and production. However, future smart grids may also turn out to be of service mainly to a continued top-down management of demand and supply – whereby it is uncertain how this will affect the options for local distributed systems.

A fierce debate on the future of smart grids and the lifestyle issues accompanying different forms of smart grids is as yet not taking place. Most of the talk and work on smart grids focuses on technology and accompanying services. In relation to societal end-users it addresses questions of how to achieve acceptance of technologies that already are designed and decided upon by policymakers. Much less attention is awarded to the institutional organisation of energy supply and demand (Wolsink, 2012) or on the lifestyle issues resulting from interacting with all these new technologies and services.

This lack of attention for the role of different stakeholders, not the least citizens and end-users, is perhaps most visible in the discussions on smart meters as a key technology for the deployment of smart grids. Smart meters, in contrast to the old ‘dumb’ meters make a

two-way communication possible between households and utilities or suppliers, depending on which party is responsible for the roll-out of the smart meter. In the Netherlands the distribution system operators (DSOs) are responsible for the roll-out. Smart meters are often regarded as a tool to accomplish energy savings through the encouragement of conservation behaviour at household level. The EU Directive 2012/27/EU calls for 20% energy saving in 2020 and stipulates a mandatory roll-out of 80% of the smart meters by 2020 in EU member states (Directive 2012/27/EU). This shows the high expectations policy makers hold concerning the role of technology (smart meters) in reducing household energy demand. Smart meters find their way, through standardised processes of replacement to an increasing number of households which has given rise to questions as to why we have smart meters when the rates are still dumb and do not encourage demand shifting (consuming electricity during off-peak times (Faruqui and Palmer, 2011)). Therefore the current deployment of smart meters at the household level is accompanied by a rising interest among Distribution Network Operators (DSOs), utilities and policy makers in how these meters can be used to introduce dynamic pricing to encourage end-users to shift their energy consumption. The mechanism of dynamic pricing is not new. Basically it refers to differentiated prices for the use of energy depending on time of day, day of the week and/or season of the year, or resulting from extraordinary circumstances (e.g. extremely cold weather; black-outs). The same mechanism is applied in e.g. the holiday-branch where off-season holidays are typically cheaper than during the peak-season.

DSOs and utilities claim that dynamic price incentives may provide households with insight in their own energy consumption patterns and related costs. It may help them in gaining or maintaining control over their energy consumption, saving costs, getting reassurance that behavioural changes have worked, getting support in motivating other household members to reduce energy consumption. Pricing incentives are always accompanied by at least basic technologies like smart meters, but can also become part of a whole new technological system such as a fully remotely controlled automated smart home. And there are many in-between possibilities. Whatever the configuration, these new technological systems interact with their users, and the households living in these smarter homes, and will require changes to their lifestyle, small or big.

1.2 Focus and conceptual approach

This paper focuses on dynamic pricing, because of the strong interest from the side of DSO's, utilities and governments in the question how dynamic pricing can encourage end-user to adopt new lifestyles and demonstrate behaviours and energy consumption patterns that are more in line with the needs of grid balancing. In other words they are interested in encouraging end-users to respond to price signals in such a way that end-users stop or start using electricity at a specific moments in time. Obviously, dynamic pricing will only be effective if households respond to these signals. This paper critically reviews the pilots and studies available on dynamic pricing and end-users. We will focus on the lifestyle changes that dynamic pricing interventions require from household end-users and if these changes match the real life needs and demands of these end-users. We will look for insights about how and why end-users would respond, alter (elements of) their lifestyle and under which conditions. Based on this review, we will then argue for the need to learn how end-users can become a more central concern and starting point for designing interventions aimed at changing energy consumption patterns.

While this paper is based on an extensive empirical inquiry, our approach is a socio-technical one that focuses on the notion of matches and mismatches between interventions and end-users. We build on social construction of technology (SCOT)

perspectives (Pinch and Bijker, 1984), and take a socio-technical perspective on innovation and deployment that views these as the outcome of processes in which technology and society interact and co-shape each other (e.g. Breukers et al, 2009; Jolivet and Heiskanen, 2010; Raven et al, 2009a, 2009b; Walker and Cass, 2010). As Pinch and Bijker's (1984) notion assumes a relevant social group that shares the meaning of an artefact, successful innovation, principally on how well it becomes embedded in a society via a process of negotiation that eventually arrives at some degree of closure and stabilisation (Kline and Pinch, 1999). From this perspective, engagement serves to encourage the active participation of societal actors in the design of interventions, in order to arrive at embedding. Such embedding not only requires end-users to adapt some of their expectations and wishes when interventions are presented to them. The actors that design and implement these interventions also need to have some flexibility to scrutinize their initial assumptions and expectations and allow for adaptations to the intervention (or how it is designed). Like with the diffusion of technological innovations (e.g. renewables) , interactions between implementer and other local stakeholders entails a confrontation between different preferences, interests and expectations: engagement operates *between* implementers and local end-users (Walker and Cass 2010).

Translated to the topic of dynamic pricing in this paper, we inquire how different elements of dynamic pricing interventions have matched with end-users needs and lifestyles. This paper is partly based on an extensive review of empirical evidence and conclusions from existing studies, cases, pilots, experiences (Breukers and Mourik 2013). In that review, we searched for a better understanding of why and how end-users change their behaviours in response to dynamic price interventions. After having introduced dynamic pricing interventions and two other essential components of a dynamic pricing approach (technology and feedback), we will discuss how behavioural change is implicated in dynamic pricing interventions. Next we will assess what we have learned from the review on why and how end-users have changed their behaviours and elaborate our argument on the need to pay more attention to these issues. As we will show, this can be done by performing segmentation of end-user behaviours and lifestyles. However, this also raises some additional issues that we will discuss in the final chapter.

2. Dynamic pricing interventions and how they match with end-user needs

2.1 Dynamic pricing incentive

Price incentives have the purpose to achieve a shift and/or a decrease in overall energy consumption. Time-dependent or dynamic pricing incentives vary according to time (e.g. hour of the day, season, critical peak periods). Dynamic pricing interventions were first introduced in in areas characterised by summer and winter peaks in demand combined with supply constraints. During critical hours, demand needed to be reduced and shifted to off-peak hours (e.g. California, Ontario, North-eastern parts of the USA and parts of Australia) (Darby 2006). For other countries, increasing problems in balancing demand and supply and expectations regarding the expansion of micro generation have triggered interest in dynamic pricing.

For DSOs and energy suppliers, dynamic pricing is a potentially effective means to achieve a better balancing between demand and supply and realising security of supply. In addition DSOs that have a clear public task (like the state-owned Dutch DSOs) are expected to further societal aims like increasing energy efficiency, energy conservation and facilitating the deployment of renewable energy, which also asks for strategic load

shifting to high supply hours. Several studies and reviews conclude dynamic pricing results in overall shifts and reductions in demand (Faruqui and Palmer, 2011; 2012; Stromback et al, 2011). Dynamic pricing can be coupled to automatic and remote control of appliances (e.g. washing machine, dishwasher, thermostat). A dynamic tariff can apply to price of energy set by suppliers and/or the price of transport of energy set by the DSO or TSO. We briefly present the most common forms of dynamic prices below.

2.1.1 Time of Use (ToU) pricing

Time of Use (ToU) tariffs recur daily and aim at encouraging people to use energy during periods of the day when overall energy consumption is lower. The focus is on shifting the demand from one period to another, not at reducing overall energy demand. Peak-price hours are invariable and known a long time in advance by the end-users. A day can have one or more peak periods during which the prices are higher compared to the rest of the day. Two to four levels of prices may be distinguished (peak, partial peak, off-peak, and weekend tariff) and in addition, prices may also vary according to the season (Stromback et al, 2011:83,84). Several trials conducted in Europe - Northern Ireland, UK, France, Germany and Norway - show realised peak reductions that vary from 0 to 12%.

2.1.2 Critical Peak Pricing (CPP)

Critical Peak Pricing (CPP) schemes offer lower year-round tariffs during non-peak hours in exchange for substantially higher tariffs during critical peak hours. Critical peak periods or event days occur at times of increased wholesale prices due to heightened consumption (e.g. very hot or cold days) or when the stability of the system is at risk (e.g. black-outs). The maximum number and length of critical peak periods is agreed upon with the end-user in advance. However, since the occurrence of critical peaks depend on market and weather conditions, the exact moments when these occur cannot be set in advance. Households are usually informed a day in advance of an expected critical day (Stromback et al, 2011:83) and the number of critical peak days varies from 1 to 18 a year (San Diego Gas & Electric Company 2010). An example in Europe of CPP is a pricing scheme introduced in France by EDF. This so-called TEMPO Tariffs pilot started as an experiment in 1989- 1996 but has been continued and scaled up since. The programme combines ToU with CPP and has been quite successful with an overall national peak reduction of 4%. ToU in combination with CPP can achieve a load shifting up to 30% (but this for a limited number of days and hours a year). In Sweden a percentage of 50% has been reached - thanks to electric heating and water heaters that provided significant flexible loads and thus good opportunities for shifting.

2.1.3 Critical Peak Rebate (CPR)

In Critical Peak Rebate (CPR) schemes the end-user is refunded at a predetermined tariff for any reduction in consumption relative to what the utility expected the household to consume during a few critical peak hours a year (e.g. very hot summer afternoons, or very cold winter evenings). Similar to CPP, with CPR the the maximum number and length of critical peak periods is usually agreed upon in advance while the exact timing cannot be predicted. End-users are usually notified a day in advance of a critical day (Stromback et al, 2011:83). Because with CPR participants benefit from participation, unlike with CPP where participants can be financially 'punished', this scheme may be more appealing to end-users. It is also a relatively new form of pricing which has not yet been used in a large number of pilots.

Both CPP and CPR have not seen wide roll-out in Europe, where the need for load shifting during a limited set of hours in a year is less felt than in countries with great climatic

differences and either extremely hot or cold days. An exception is the French TEMPO project. In addition CPP and CPR are particularly useful when there is a significant flexible load like for instance is the case with air conditioning and electric heating, which can be switched off during peak hours. In Europe these technologies are less widely used than in countries such as the US, Australia and New Zealand. Consequently, most experiences with CPP and CPR are from outside of Europe - with peak shifts of up to 38%. Effects have been shown to be lasting during long-term pilots (Stromback et al, 2011).

2.1.4 Real time pricing

With real-time pricing (RTP) the end-user pays a price that is tied to the electricity price on the wholesale market. End-users can be informed by a text message alert when wholesale prices reach a certain threshold so that they do not need to check the prices continuously (Stromback et al, 2011:83). RTP has been trialled on a limited scale (as day-ahead real time pricing which is technically less of a challenge), but the results are not very robust (Frontier Economics and Sustainability First, 2012; Stromback et al, 2011). To be truly effective RTP schemes need to be connected to smart appliances (price to device) that automatically respond. RTP is experienced as complex by end-users and to be really effective it may need to be connected to smart appliances (price to device).

2.1.5 Inclining Block Rate (IBR) pricing

As the name indicates, Inclining Block Rates offer block-wise increasing rates. This scheme is the least commonly applied. This pricing mechanism has been proposed as a complement to other dynamic pricing schemes and serves mainly conservation goals. As a household consumes more, the rates increase. The first block is the cheapest, sometimes even free, and subsequent blocks are increasingly expensive. Belgium has an IBR scheme since 2001, aimed at helping low-income consumers to keep their spending on energy within limits. However, it has had little effect on the consumption of the poorer households, mainly because they appeared not to be aware of the existence of this mechanism (CREG, 2010).

2.1.6 Shifting and reducing demand

Most dynamic pricing schemes focus on shifting the demand to off-peak periods, but some such as the inclining block rate also aim for overall reduction. A review of 5 large studies conducted mainly in the North-West of Europe concludes that: *"(...) in best cases a consumption reduction of 2-4% can be expected in the short term. This corresponds to around 15 to 30 Euros saved per year for an average European household (3,500 kWh at 0,20€ per kWh). The best cases include a smart meter that is linked to an IHD (direct feedback) or to accurate billing, with energy efficiency advice."* (Klopfert & Wallenborn 2010:21). US pilots show similar savings percentages (EPRI 2008). ToU schemes, while not aiming at reduction, may have the effect of making end-users more aware which may result in them reducing their energy consumption. With CPP and CPR, the overall reductions can be significant because the energy reduction during critical hours or days is unlikely to be fully compensated for with consumption at other times (e.g. if the air-conditioning or electric heating is turned off for a few hours). There is also a potential danger of increased consumption as a result of dynamic pricing: in the Italian Trento ToU project, the off-peak tariff was so low that even with increased overall consumption the energy bill of households still showed cost-savings, whilst their comfort level had increased. An increase of 13% resulted (Torriti 2012).

2.2 Essential components of a dynamic pricing intervention: technology and feedback

2.2.1 Technology

Next to the pricing mechanism (described above), a dynamic pricing intervention also includes two other essential elements: supportive technology and feedback. The first element, technology, covers a wide range of supportive and feedback devices, of which smart meters and In-House-Displays (IHD) are the 'must-haves' in combination with dynamic pricing. In House Displays (IHD) can provide feedback in a variety of forms and has been shown to significantly improve the response from end-users (Stromback et al, 2011). Other useful technologies include ambient displays like energy lamps (that change color when prices change), smart apps, websites, email services, but also very simple devices like paper mailings, more frequent detailed energy bills, fridge magnets or stickers (figure 1).

Figure 1: Example of a sticker indicating the time bands (CER 2011: 56)



The smart meter is needed for actual and real-time metering of the energy consumption patterns. Furthermore, it allows for the design of a tailored feedback that takes account of the particularities of the household. More complex technologies that support behavioural changes in response to pricing include all sorts of smart appliances that can be programmed to respond to (changes in) information and/or remote-controlled. In principle, the advantages of automation and remote control is that it allows for very quick responses and controllable levels of reduction, that it is available when system emergencies occur unplanned and when households are unable to take action (e.g. when away or asleep). Automation can include very low-cost options like for instance using a time-clock that makes sure that the fridge turns of 15 minutes at set intervals. However, it can also include high-cost options when smarter appliances have to be purchased and/or

made suitable for remote-control, and become part of full Home Energy Management systems, security systems, with couplings to personal computers (PCs), smart phones or pads. Crucial for effective use of automation is that the end-user understands and appreciates it. Several studies highlight concerns that consumers have to hand over control over their energy demand to third parties. In the Netherlands, 53 percent of the respondents object to handing over control over to utilities (Accenture, 2010 a, 2010b; Ryan & Blackmore, 2008).

Since supportive technologies are intended largely to interact with the end-users and need to be integrated in their homes, this interaction should fit the needs, wishes and capabilities of the end-users. Different (segments of) people are likely to appreciate technologies differently. Moreover, this appreciation may change over time – e.g. from an initial hesitant attitude to enthusiasm; or from enthusiasm to weariness with a particular technology (Van Dam et al, 2010).

2.2.2 Feedback

The second additional component to a dynamic pricing intervention is feedback. Feedback to support energy consumption reductions has gained a lot of attention in research recently (Darby, 2006; 2010; Mourik, 2011; Stromback et al 2011). A distinction can be made between direct, indirect and associative feedback (Darby, 2006). Direct feedback involves readily available information and learning from this feedback happens through the process of reading it or by having to pay for energy. The advantage of this form of feedback is that it directly shows the impact of behavioural changes. Indirect feedback is characterised by a time delay. Unintended feedback results from (associative) learning, e.g. when the bill increases after buying a new device or when the installation of own generation capacity encourages people to read their meter (more often). In addition to this distinction we also differentiate between feedback intended to communicate price changes and feedback intended to communicate (changes in) consumption patterns and volumes. Relevant lessons for designing tailored feedback as part of a dynamic pricing mechanism can be drawn from an earlier study (Mourik 2011) and are summarised in text-box 1.

Table 1. Lessons for effective feedback on consumption behaviour (Mourik 2011)

<ol style="list-style-type: none"> 1. Need for a smart meter and user interface (IHD, App, ambient technology) 2. For changing routine behaviours : feedback should last at least 3 months 3. Preferably, feedback is direct, without time-delay. This allows people to experience how turning devices on or off as well as other behavioural changes affect energy usage. 4. The feedback is detailed, providing information about devices, spaces, people and functions (e.g. cooking, heating, entertainment). 5. The feedback is historical, normative and involves goal setting. 6. The feedback is positive, graphical and symbolic. 7. There is a combination of user-interfaces (device media/locations) at different spots in a household displaying different information in combination with particular media. 8. The feedback system is being continuously improved and updated 9. There is maximum interaction possible with the meter and/or display which results in new routines around the feedback system. 10. A supportive social environment ensures that there is no constant negotiation on underlying norms
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11. The feedback also gives personal advice and is coupled to other interventions
12. There is no negative impact on (perceived) comfort and ease-of-use.

2.2.3 Pricing, feedback and technologies

Different pricing incentives will ask for different types of feedback (feedback related to price changes and feedback related to consumption changes). RTP needs real time feedback on consumption and on price changes. This can be provided by means of ambient technologies such as light bulbs change colour when prices increase and/or consumption is 'too' high. Historical feedback enables users to assess the impact of their changed behaviour on consumption and price. For ToU, feedback should at least show the attained reduction or shift in response to the peak and off-peak tariffs. Some people may want to check this on a daily basis, for others find a monthly (paper) overview sufficient. In addition simple technologies such as stickers or magnets with an overview of the ToU periods are very valuable to remind people. For ToU the feedback will need to be provided long enough for new routines to rise. When new routines have become embedded, the frequency of feedback can be decreased. Providing feedback whenever consumption is increasing again during peak hours, can be useful as well. Feedback that informs the individual members of a household of their achievements can be useful too, at it enables them to take informed decisions about the best options for reduction and/or shifting.

The more stable the price incentive over time, the simpler the feedback can be. When pricing incentives are not frequent, and even not fixed in advance (e.g. CPP, CPR), text message alerts, or other reminders and prompts via email or facebook will work well. The more frequent the feedback on consumption is needed, the more complex the necessary technology will be: e.g. smart appliances, real-time feedback, remote control, energy orbs etc.

2.3 Effective combinations: is more better or less more?

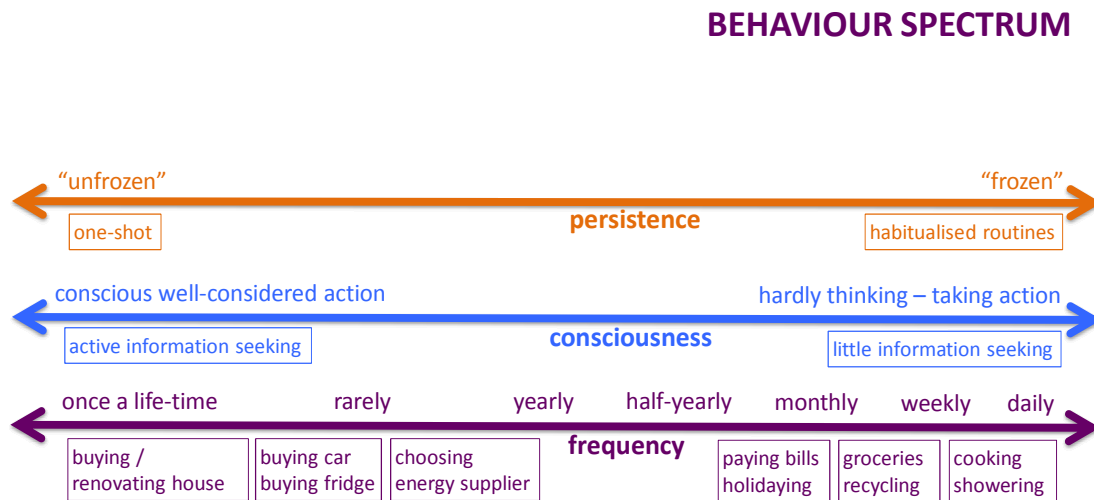
Some studies argue that the more elements are used, the the higher the response of people (in terms of the achieved shift and the number of people that respond). Faruqui et al (2010) demonstrated after analysis of multiple large pricing pilots in the US that the combination of ToU, CPP, CPR, with multiple enabling technologies and feedback technologies generated the highest peak clipping and load shifting. Obviously, with such a 'full court' approach - using as many technologies and feedback options as available in order to reach as many different people as possible - a large section of different segments can be reached. However, this will not deliver the most cost-efficient approach and since the brunt of the costs eventually comes down on society, it is undesirable from a societal perspective. To illustrate that less can also be more: in a New Zealand's pilot that targeted a particular segment (high incomes, high age, new houses) ToU worked well in combination with only energy saving tips and a monthly bill that showed the realised shifts during peak-periods per day (Thornes et al. 2012).

3. Dynamic pricing interventions that match end-user needs, behaviours, capacities and household related options

3.1 Behavioural change and dynamic pricing

To assess how pricing mechanisms so far are successful in targeting end-users we first need to understand what behavioural changes are asked from end-users. Therefore we first briefly what the types of behavioural changes are that ToU, CPP, CPR or RTP ask for. We can distinguish between conscious/intentional behaviours and routine behaviours, but it would make more sense consider a behaviour spectrum as displayed in figure 2 below.

Figure 2: Behavioural Spectrum¹



Intentional behaviours can include one-shot behaviours that occur rarely and consciously, like for instance buying a house, or investing in the house (e.g. insulation, double-glazed windows). Examples of more frequent intentional behaviours are e.g. the purchase of smart appliances or changing the settings of the thermostat. Dynamic pricing in the form of CPP, CPR and RTP encourage intentional behaviours - e.g. the critical peaks only occur a limited number of days a year in which energy consumption needs to be reduced or shifted. With RTP however, if the response is automated (e.g. automated response when the prices reach a certain threshold, the intentional behaviour only pertains to the moment of deciding to automate the response). Routine behaviours are recurring, habitual behaviours that affect how we go about our daily doings (cooking, washing, caring,

¹ The authors thank Julia Backhaus for contributing to this figure

working, etc). Unconscious routines can be changed by making them conscious first, after which an intentional behavioural change is possible. Next, time is needed for this changed behaviour to become a new habit/routine. Examples include a change in dishwashing times to other set times of the day or evening; or changing routines in showering – in length, frequency or the amounts of hot water used. ToU typically asks for changes in routine behaviours: end-users are encouraged to permanently perform (different) behavioural patterns at different times of the day/night. People need at least 3 months to get used to new (dishwasher, washing machine, cleaning, entertainment, eating) routines. It is during this period, but preferably also after, that reminders and prompts are crucial (Abrahamse et al, 2007; Darby, 2006; Fischer & Duscha, 2008; Janssen et al, 2007; Martiskainen, 2007). The effectiveness of ToU increases over time: people unfreeze their old ways of doing, adopt new ones and these become established routines in course of time. They may even purchase supportive appliances to help them control the energy usage of certain household appliances, like for instance timers (Filippini 2011; Thornes et al 2011; Torriti 2012).

Generally speaking, investment and intentional behaviours are easier to perform compared to changing routines (Breukers et al., 2009; Mourik et al., 2009; PwC2009). When changing routines, people find turning off the lights easier than using dishwasher and washing machine more efficiently. Turning appliances off is an even more difficult routine to adopt. Decreasing temperatures or decreasing level of coolness (in summer) is done less easily as this is perceived as directly impacting on the need for comfort. And turning off the stand-by mode is done even less frequently as it affects the perceived need for convenience and control (people often worry that that programmed settings are lost when turning the appliance really off) (DEFRA, 2007). Hence, there appears to be a negative relation between changing routine energy behaviour and the need for comfort and convenience. This also has consequences for the effectiveness of price incentives that target demand shifting through routine behavioural changes. Table 2 summarises the theoretical potential for load shifting and the reduction for different types of loads (appliances and practices) of households.

Table 2: options for load shifting and reduction for different types of household demand (Breukers and Mourik 2013)

Appliance	"Household Practice or need"	Flexibility in terms of potential load shifting	Options for reduction	Flexibility in terms of Willingness to shift and reduce	Automation/ remote control?
tumble dryer	Washing & cleaning	+	+	-	=/-
washing machine	Washing & cleaning	+	+	+/-	++
dish-washer	Washing & cleaning	+	-	+	+/-
cooking (if electric)	Eating & drinking	+/-	-	-	-
water cooker,	Eating & drinking	+	-	-	-

Appliance	"Household Practice or need"	Flexibility in terms of potential load shifting	Options for reduction	Flexibility in terms of Willingness to shift and reduce	Automation/ remote control?
microwave, espresso machine, coffee grinder, blender, oven					
fridge and freezer	Eating & drinking	+	++	++	++
lights inside the house	Comfort	-	++	-	++
outside lighting	Safety	+	-	+	++
TV's	Leisure	+	-	-	-
music installations	Leisure	+/-	-		-
games	Leisure	+/-	-	-	-
PC's, tablets,	Leisure/ administration	+/-	-	-	-
hair-dryer; el toothbrushes, el razors, etc.	Care	+/-	-		-
stand-by	Ease	+	-		+
Vacuum cleaner; do-it-yourself and garden-related machines (e.g. lawn-mower, drilling machine, terrace heater)	Cleaning and maintenance of the house, balcony and/or garden. Hobby	+	-	+	-

When designing a dynamic pricing approach, it is important to understand what motivates behavioural changes (both intentional and routine behaviours) and consequently the responsiveness of households to pricing signals and the potential flexibility of certain loads in a household and how such changes can be made durable.

3.2 Shortcomings in dynamic pricing pilots, trials and reviews

An extensive review (Breukers and Mourik 2013) revealed that mismatches between interventions and end-user lifestyles, behaviours and needs can result in very different outcomes than expected by those who design and deploy these arrangements (utilities, DSOs, policy makers). Further, the suggestions of what dynamic pricing can accomplish, based on a host of trials, pilots and reviews, is overly optimistic due to a number of reasons (Klopfert and Wallenborn 2011) like the tendency to extensively report on successes rather than on failures; self-selection of (motivated) participants that result in distortions; the drawback effects (when the newness of an intervention is worn off, responsiveness diminishes); the Hawthorne effect (people behaving differently when they know they are being observed – however this effect weakens as the duration of a pilot increases).

Most pilots and trials on dynamic pricing have a strong techno-economic bias. Most studies appear to ignore the fact that end-users can have various motivations for changing their behaviour - a financial motivation being one of these. Most studies conclude with recommendations towards designing a “one size fits all” dynamic price approach. There are several reasons why that is not advisable when aiming at energy consumption reduction or shifting. Such approaches usually focus on providing financial incentives, assuming that people are economically motivated to participate. However, plenty of evidence shows that people can also have different motivations that relate to environmental goals, health, comfort, the wish to ‘do good’ etc. Two dynamic pricing pilots in Sweden (Lindskoug, 2006) showed that a majority of participants were motivated by other than economic considerations. Research on energy DSM aimed at energy consumption reduction has shown that approaches that predominantly focus on individual behaviours without addressing the social and physical environment in which behaviours are embedded have not been successful in achieving *lasting* behavioural changes (Breukers et al, 2009). In the case of dynamic pricing, attention for the characteristics of the house, the appliances, as well as attention for household dynamics are relevant to take account of (Hargreaves et al 2010). Furthermore, if end-users are targeted with financial incentives only, this increases the risk of rebound. Because no social norms are addressed, no pro-social behaviour is likely to occur. Money saved is likely to be invested in other energy-consuming activities - because there was no motivation based on pro-social values, nor any broader consideration of societal interest related to energy- and environmental issues was involved.

3.3 The end-user as the point of departure

A shortcoming of many pilots and studies is that they focus on whether price incentives have had an impact in terms of saving or shifting, while leaving the question *how* and *why* end-users change their energy behaviours unaddressed. End-user needs and wishes are rarely taken as a starting point for designing dynamic pricing interventions (Breukers and Mourik 2013). This raises the question as to how this can be changed. Rather than starting an intervention with selecting instruments (price incentive, technology, and feedback), we propose to turn the process around and take the end-users as a starting point in the process of designing a dynamic pricing approach. When we know more about the end-users, their needs, motivations and behaviours, we are better able to design a dynamic pricing approach that also fits their interests and needs (Breukers et al, 2009).

3.3.1 Socio-demographic segmentation is not enough

Segmentation is not entirely new to dynamic pricing pilots. Segments are typically constructed around particular ‘load profiles’ in order to match the envisaged pricing

approach and technologies with the appliances and technologies in the household. While useful, it does not help in assessing whether the people targeted will perform the behavioural changes needed to realize these potentials in full. Ex-post segmentation on socio-demographic factors has also been used to correlate end-user responses to their socio-demographic characteristics. In an Irish trial, the level of energy consumption reduction was found to decline along with socio-economic class - also due to the overall higher levels of household consumption in high-income households compared to low-income ones. For peak reduction these relations could not be established with equal clarity. Factors such as employment status and home ownership also impacted overall and peak reductions (CER 2011:83). Another ex-post study using a large database (50,000 households, socio-economic information, building-specific information and meter readings on heat and electricity consumption) revealed the following correlations between users, buildings and energy consumption (Gram-Hanssen, 2011):

- The number of people that a household consists of is the strongest predictor of electricity consumption; income comes as a second and size of the home as a third most important predictor.
- Age and education of the residents explain consumption only to a small degree
- Living together with more people is more energy efficient (the trend towards more single-person households increases energy consumption).
- When comparing households in detached houses of the same size and with the same income, huge variations appear in the electricity consumption appear. *So while household size and income are the strongest predictors for electricity consumption, they still only account for one third of differences in consumption.*

Furthermore, heat consumption is much more dependent on the building's energy efficiency, while electricity consumption is more dependent on end-user practices (including number, size and use of appliances) (Gram-Hanssen, 2011). A recent study among more than 4,000 US households found that lifestyle factors reflecting social and behavioural patterns associated with air conditioning, laundry usage, personal computer usage, climate zone of residence and TV use explained 40% of the variation in electricity consumption (Sanquist et al, 2012).² And a Swedish study found large differences in electricity consumption between households with very similar profiles in terms of electric heating systems, number of household members, and perceptions and experiences with ToU mechanism (Bartusch et al, 2012). Another study (>1000 respondents) found that the use and duration of appliances related to cleaning and entertainment accounted for a large part of the variance in electricity consumption between otherwise similar households (income, age, dwelling) (Bedir et al, 2013). What we can conclude from the above is that differences in end-user practices and in the energy consumption of households can only to a limited degree be explained by the socio-demographic factors that the usual segmentation studies use. These include factors such as age, education, income, environmental attitude, household size etc. While such segmentations can help to

² Sanquist et al define lifestyle as : "...patterns of consumption influenced by decisions at various points across the lifespan, such as what profession to engage in, where to live, when (or whether) to marry and have children, and more proximal choices regarding what to purchase and how and when to operate energy consuming equipment. This conceptualization suggests that analysis of life-style and energy consumption needs to encompass not only the traditional demographic segmentation elements, but also information about what people own and how they use it" (2012:1).

find out how to tailor a *communication* strategy to different segments (e.g. the sort of information, level of detail, media used to communicate) these segmentations do not predict actual behaviour.

3.3.2 Comprehensive segmentation

Understanding what motivates lifestyle behavioural changes (both intentional and routine behaviours) and consequently the responsiveness of households to pricing signals, the potential flexibility of certain loads in households, and how such changes can be made durable is important when designing an effective dynamic pricing approach. Different end-users are likely to have different attitudes, motivations, behaviours, capabilities, knowledge and other resources - which will affect how they respond to and participate in dynamic pricing interventions. Ideally, these different end-users should be targeted in ways that fit their needs, preferences, knowledge, capabilities etc.

This would entail that real needs and real behaviours of real households are included in a segmentation, to understand how their attitudes, motivations, awareness, capabilities, sociodemographic variables, home and appliances play a role in maintain a certain way of life. To understand how a particular lifestyle brings with it certain patterns and volumes of energy consumption it is important to know how people wash, eat, clean, care, relax, move, sleep etcetera. Segmentation offers a first step towards tailoring a pricing approach to the motivations, behaviours and needs of a group of end-users that share relevant characteristics - thereby increasing the chances that these end-users will respond. Such a comprehensive segmentation includes several crucial elements:

- Attitude, motivation, awareness, capabilities, behaviours
- Sociodemographic variables
- House-related characteristics
- Appliances
- Presence patterns
- Household dynamics: timing and negotiable (read flexible) use

Segmentations that address all these elements do not exist to our knowledge. Nevertheless, first steps to segment lifestyles have been undertaken (Sütterlin et al, 2011). Segments resulting from such a segmentation on lifestyle could then be matched to tailored interventions that consist of a combination of e.g. pricing mechanism, technology and feedback. To explore this further, an effort has been done to elaborate dynamic pricing mechanisms based on end-user lifestyle segments for the segments identified in the Swiss study by Sütterlin et al (2011). The resulting segments, offer end-user profiles that we can reasonably expect to occur in the Netherlands, be it in different percentages and possibly with nuance differences. Table 3 shows the segments. For each segment, several relevant questions are posed (table 4) regarding motivations (e.g. financial, environmental, social), behaviour and opportunities for change (and should this be on reduction and/or shifting) and expected willingness. Based on the answers, argued choices for dynamic price signal, technologies and feedback can be made. This is illustrated for segment 1 in table 4 and figures 3 and 4 (to be read horizontally).³ Based on

³ Each element in the toolbox is a building block that can be chosen or not. Each column represents the building blocks that can be chosen within the categories: pricing mechanism, technology and feedback. The combination of selected building blocks create a basic design for a tailored dynamic pricing intervention aimed at a specific segment. For an elaboration of all six segments, we refer to Breukers and Mourik 2013 (or contact the authors)

this, further tailoring could be done based on the house characteristics, appliances, presence-patterns and particular other local characteristics..

Table 3: Six segments derived from Sütterlin et al

<p>Segment 1: Idealistic savers (15.6%)</p> <p>This group shows most efforts to save energy, both through routine behaviour and efficiency measures. Driven by idealism, these people are willing to make financial sacrifices and impose restrictions to themselves even if it means loss of comfort. They support policies that put a price on the energy intensity of products within a product category. They believe that they can make a difference, in a positive sense.</p>
<p>Segment 2: Selfless inconsistent energy savers (26.4%)</p> <p>This group also shows significant energy-saving activities. At the same time, they are not very consistent: although they do believe that they can make a difference, they are quite inconsistent in terms of energy efficiency measures at home - because at that level they do very little.</p>
<p>Segment 3: Thrifty energy savers (14%)</p> <p>The thrifty savers are into energy-saving as long as this does not bring them any negative financial consequences. This also applies to their acceptance of policies: these should not ask for any additional financial efforts from end-users. Their motivation is not primarily intrinsic- but relates to financial necessity and social pressure.</p>
<p>Segment 4: Materialistic energy consumers (25.1%)</p> <p>The materialists do little to save energy, but are open to energy efficiency measures for the house. They are not very positive about policies if these have financial implications for them. The main motivation for energy saving behaviour is financial.</p>
<p>Segment 5: Comfort-oriented indifferent energy consumers (5.3%)</p> <p>The comfort oriented are the least likely to energy saving behaviour. They do not care about the potential societal problems that the increasing energy consumption entails. They do not feel responsible and energy consciousness is nil. Their behaviour is driven by the search for personal comfort. This group of people is opposed to restrictive policies and interventions that discourage this behaviour.</p>
<p>Segment 6: Problem conscious welfare-oriented energy consumers (13.6%)</p> <p>This segment is not enthusiastic about saving energy. Although they are aware of the consequences of their behaviour and also believe that energy-saving behaviour can make a difference, do not they feel called to action. This is possibly because they think that their ability to save energy is very limited. Although oriented towards comfort, they also feel a certain social pressure to do something about the energy situation.</p>

Table 4: Considerations underlying the choices of building blocks for segment 1

Segment 1	Idealistic savers
General Considerations	This group shows most efforts to save energy, and already does a lot in terms of reduction. Driven by idealism, these people are willing to make financial sacrifices and impose restrictions on themselves even if it means loss of comfort. This customer is knowledgeable and consists largely of highly educated women.
Preferred behaviour	Both routine behaviour and efficiency measures
Main motivation	This group could be motivated to shift their consumption but from an environmental motivation.
Choices related to Pricing Mechanism	Saving and shifting will not be financially motivated (no emphasis should be put on money) and a price incentive may not be the best incentive. If a price incentive is used, a combination of ToU, possibly with CPP, is a good option to visualise energy shifting options. Because this segment is not financially motivated, RTP is probably not suitable (because you still need to respond strongly to price). You could also simply CPP (and focus on shifting only).
Choices related to technology	Since this group is highly educated and well informed, different technologies can be used to support further behavioral change. The use of technology should be functional for this group. Almost all options are ticked in the toolbox because these people want information to be provided both at home and at work on PC, smart phone, IHD. This group does not like ceding control (especially to a party that is less environmentally conscious and idealistic than themselves). Remote control by third parties is not an option, automation is possible if this group can control it themselves.
Choices related to Feedback	Detailed and differentiated information is desired. Because this group is well informed, she is well able to interpret the information. Text, graphics, and / or lamp signals when price changes are options. Tailored advice needs to be focused on shift options. What is important for this target group: who gives feedback and how reliable they find this party?

Figure 3: toolbox to design tailored interventions

Toolbox				
PRICING Mechanism	TECHNOLOGY	FEEDBACK: Price related	FEEDBACK: Use related	FEEDBACK: Frequency, Level, type
none	Smart meter	€/kWh	Use kWh	Per appliance
	IHD		Reduction kWh	Per space
IBR	Energylamp	Colour change	Use €	Per activity
	Website		Reduction €	Historic
ToU	Email	Sound	CO2 emission	Comparative
	App	Emoticons	CO2 reduction	Goal setting
CPP	Post		Emoticons	Benchmark
	Magnetic sticker	Graphic	Graphic	Invoice detail.
CPR	Automation		Numbers	Tailored tips
RTP	Remote control	Tailored tips		

Figure 4: Dynamic pricing approach for segment 1 (the blue blocks)

Pricing Approach segment 1				
PRICING Mechanism	TECHNOLOGY	FEEDBACK: Price related	FEEDBACK: Use related	FEEDBACK: Frequency, Level, type
none	Smart meter	€/kWh	Use kWh	Per appliance
IBR	IHD	Colour change	Reduction kWh	Per space
ToU	Energylamp	Sound	Use €	Per activity
CPP	Website	Emoticons	Reduction €	Historic
CPR	Email	Graphic	CO2 emission	Comparative
RTP	App	Tailored tips	CO2 reduction	Goal setting
	Post	Emoticons	Emoticons	Benchmark
	Magnetic sticker	Graphic	Graphic	Invoice detail.
	Automation	Numbers	Numbers	Tailored tips
	Remote control			

4. Discussion: end-users tailoring interventions (to) themselves

4.1 Tailoring without giving away private and sensitive information...

In the preceding section we elaborated a first exploration of how a tailored pricing intervention (combining price incentive, technology and feedback) that takes the end-user as a starting point could be designed. This practicability and desirability of such an approach can however be questioned. A tailored intervention requires a lot of detailed personal data from individual households and a comprehensive segmentation asks for a lot of private and sensitive information from households. It is unlikely that end-users provide such information easily - for several reasons, one being the perception that the privacy and security of their data cannot be safeguarded. A tailored solution thus raises additional issues to the discussions about ownership and protection of smart metering data – namely ownership and protection of segment-specific information. After all, metering data and segment-specific information both represent a high value and the household increasingly is becoming a site of contestation where citizens are being asked for a passive engagement limited to providing personal and potentially sensitive data. Rather than trying to create an elaborate and costly centralised data system (Curtius et al. 2012) that ‘guarantees’ the safety and protection of privacy and other end-user interests, it may be a better idea to keep end-user data and information decentralised.

4.2 Decentralised Do-It-Yourself Segmentation

We propose that a further exploration is needed for the creation of an alternative 'socio-political' space: a decentralized solution that allows for a new form of engagement and role for both households and DSOs/utilities which may also contribute to a better articulation of different views and expectations around our future sustainable energy system, the smart grid and the roles of various actors and technologies. That would also better fit with a future situation in which end-users have the opportunity to become more actively engaged in smart grid technologies and distributed generation. It would make it easier for Dutch DSOs not to compromise their task of furthering of the public interest when working closely with parties that have very different priorities (e.g. huge interests in selling as much smart and intelligent devices as possible collide with cost-efficiency for end-users as a priority). In a decentralised data and information management system, the end-users' active role would become key. Such a system ensures that personal information needed for the segmentation as well as household metering data remain with the end-user and with no one else. This also resonates with other studies that discuss the options of full end-user control and ownership over (metering) data.

The role of the DSO could be to design a tool that provides to the end-users several segment-descriptions with accompanying price-technology-feedback combinations with an explanation of critical issues and potential risks and benefits. Or the toolbox could allow for a household to fill in their personal data and the tool would subsequently advise the best fit in terms of combination of pricing mechanism, technology and feedback. This would allow households to choose the segment that fits their situation best. Next, the households could ask the DSO or retailer for this particular dynamic pricing intervention combination (perhaps with options to adapt elements further to be in line with one's personal situation). The toolbox would serve to enable interaction between households and DSO and/or retailer, in such a manner that personal data and information stay with the end-user. The end-user keeps control over his/her data, the choice of segment and the choice for a price intervention. While the authors are interested in further investigating the feasibility of such a toolbox, this paper also served the aim of opening up the discussion on the role of end-users in our future grid management, in terms of being actively engaged and possibly co-owners.

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Discussion Report

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Bottom-up approaches vs. top-down management

The discussion opens with a reflection on what are often perceived to be two opposites: bottom-up, participatory approaches and top-down management to support more sustainable lifestyles. Robert Rattle appreciates user-centred approaches, which were discussed in all three papers, and their attempt to take people's needs into account. At the same time, he wonders whether bottom-up approaches do indeed support more sustainable lifestyles or whether top-down management, which is nowadays mostly done for economic reasons, may not be more effective. Siliva Breukers responds that, if financial considerations are (considered to be) the main driver for sustainability, top-down management may indeed be the most efficient and effective approach. However, thinking broader and taking sustainability to include notions of democracy and participation, care for the environment and other people, other motivations to become engaged in change processes come to the fore. After all, in any sustainability project or intervention, there is usually more at stake than sustainability in a narrow sense (e.g. resource consumption reduction) and it is worth reflecting on and including these other aspects or dimensions of sustainability. Interventions that aim at sustainability can often increase their outreach or impact by addressing other, e.g. social, needs more openly or clearly. Alternatively, one could consider turning participation and engagement into a game that may change over time in terms of its goals, approach, and needs and values it relates to.

Gamification as a means to stimulate more sustainable lifestyles

Tying into the idea of creating sustainability games, Flor Avelino raises the question whether gamification, in general, may be a way to draw more attention to ecological issues and to challenge people to consume more sustainably. We had heard during a session on the previous day that the computer game *Grand Theft Auto V* had, globally, sold millions of copies shortly after its release. This could be taken as an indication for how much potential there is to engage people through gamification.

Silvia Breukers cautions that although providing consumption feedback is often useful and has behavioural effects, we might not want to solve all issues technically and view gaming or smart feedback as a silver bullet. Felix Rauschmayer adds that practice theory tells us that electricity itself is not considered but that people simply do what they need to do, e.g. wash their clothes or travel to work, and that electricity and resource consumption is embedded in these practices. One question, therefore, would be whether behavioural change should be stimulated by helping people to use a particular technology, i.e. the

washing machine or the car, more sustainably and to save money and, thereby, emphasise individualistic and economic values; or whether the focus should rather be on strengthening altruistic and ecologic values. Marlyne Sahakian reflects on possibilities to allow for different choices and perspectives relating to a variety of values that could be catered to by gamification and still allow for autonomy. To this, Flor Avelino responds what indeed other values than monetary ones could be triggered or stressed. For instance, the focus of gamification could rather be on empowering people and facilitating collective engagement rather than competition of individuals. Silvia Breukers adds that such games would not need to have sustainability as primary goal or could change over time in terms of what and whom they target and which values they address.

R. Rattle notes that conferences dealing with the gamification of sustainability exist but that the notion of values and whether a change in values is needed, and if so, how to bring such change about, is absent from discussions there. He appreciates how the paper by Schöpke et al. tries to evaluate whether values have changed and whether or not this triggers more sustainable behaviour. It is relevant to keep in mind that a change in value can go either way and can also relate to a change in behaviour either way: towards or away from sustainability. Notably, there is no either-or but, even for the individual person, there may be change in both directions.

Values, value creation and value change

Triggered by the repeated mentioning of values, Julia Wittmayer, the moderator, asks Yuliya Voytenko, how she, in her work on innovative value creation models, considered and defined values. Yuliya. Voytenko elaborates that they considered financial, environmental and social values and that is worth believing in individual values as drivers of change. Felix Rauschmayer connects this back to the notion of the niche-regime which was discussed on the previous day by Flor Avelino et al. in their paper on energy cooperatives. Interestingly, such kinds of cooperatives in Germany occasionally take over the ownership of the grid for reasons of self-empowerment and to exclude dominant players. Since it is often difficult for the individual to bring about change, the group has more influence. Hence, these meso-level activities are interesting to study and support.

Niko Schöpke wonders how the different types of values mentioned (social, environmental and financial) relate to one other and across different scale levels (individual, community, etc.). Udo Pesch mentions that ethics makes a distinction between moral and financial values and Max Reichenbach adds that financial values are seen as instrumental for need fulfilment. Looking at the matter from a business point of view, Yuliya Voytenko mentions that companies usually solely drive for financial value creation and employees are, in a way, required to share this value as their primary concern. The innovative value-creation models she and her co-author investigated, relate to a number of different values and also employees are motivated by different values.

Udo Pesch addresses the InContext team with the question whether they could make out directionality in the value change they observed in their project. Niko Schöpke replies that their analysis of different dimensions of change processes showed how biospheric values entered the scene. In the Rotterdam project, participants certainly learned about their power vis-à-vis local government which may have created a more equal level playing field, Julia Wittmayer adds.

Drivers and barriers to sustainable lifestyles

J. Wittmayer reminds the group that the session is entitled “drivers and barriers for pathways and transitions” and invites reflections. In a group brainstorm, “connecting people”, “involvement”, “participation”, “empowerment” and “a broad understanding of sustainability, including social needs” are mentioned as drivers. The group reflects on empowerment which is regarded to be an integral part of sustainable development by most, but as having potential negative aspects. For example, empowerment requires citizens to engage and not everyone might be willing or able to do so. In addition, every empowerment may bring disempowerment too, because it stigmatises those who lack power and need to be empowered. Therefore, the notion of empowerment calls for reflexive questioning, e.g. empowered to what, by whom and how.

Regarding the drivers mentioned, N. Schöpke emphasises that a focus on social learning and the community alone do not necessarily contribute to more sustainable lifestyles and M. Reichenbach adds that transition processes with an open agenda may inherently bear a number of barriers to sustainable development. For example, different actors’ goals or agendas may conflict or ecological issues might be left aside.

The group agrees that when thinking about drivers and barriers for sustainable lifestyles, it is worth distinguishing whether one would like to support people in taking small steps towards more sustainable ways of living, or whether one would like to address the lock-in of current practices in existing systems. It may be worth helping people to reflect on why our current lifestyles are the way they are and to what extent this comes down to individual or community choice.

4b

Potential of Individual Change and Alternative Consumption Niches

What can we learn from demonstration projects?

Towards more sustainable consumption practices

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Introduction

This position paper builds on an article in press that looks at both social practice and social learning theories (Sahakian and Wilhite, in press). In that paper and through different empirical examples, demonstration projects – among other factors – are seen as being significant towards changing certain consumption practices. The idea behind this position paper is to further discuss and debate the potential value of demonstration projects in promoting more ‘sustainable’ pathways.

In the past, demonstration projects have proven successful in shifting certain everyday practices: washing machines and other household appliances were showcased door-to-door to housewives in the post-War era in certain contexts, promoting convenience along with family values and new ways of doing. Demonstration projects are also valued in marketing and promotional strategies: it has been statistically proven that test-driving a car enhances the likelihood that that particular car will be bought, for example. The main question of this position paper is, can demonstration projects also serve towards introducing more ‘sustainable’ consumption practices?

The main hypothesis of this paper is that the way we learn may have to do with being engaged in new types of practices (Lave and Wenger, 1991 / 2009) but that the different dimensions of a practice have to come together – including interactions with a product, the opinion of trusted people, norms and values, among many other elements. Through the social practice theory lens, consumption is being conceptualized here as being made up of things, people and culturally-grounded social structures, where changes in practices can involve situated learning in communities of practice. Demonstration projects can therefore involve interacting with new products and services, which represent one form of learning, but participating in other types of learning communities – such as online social networks, associations or membership groups – could be another. The assumption here is that raising awareness solely through information campaigns on one hand, or by introducing a new technology or product on the other may not suffice.

The paper provides a brief introduction to the conceptual framework, followed by a summary of different examples related to food, beverage and energy consumption. The examples are pulled from the article referenced above, as well as derived from in-depth interviews and observations, which took place between 2011 and 2013 in Geneva, Switzerland and Metro Manila, the Philippines. The opportunities presented by demonstration projects will be discussed, as well as the issues that such projects raise.

Conceptual framework

This section provides a brief introduction to a conceptual framework that is further elaborated in Sahakian and Wilhite, in press, for the purpose of moving quickly into the examples and discussion.

How are we conceptualizing consumption?

We accomplish many tasks on a daily basis, without much reflection, such as shopping for food, bathing and cleaning, and getting around. We can therefore say that many of our everyday practices are habitually reproduced, and that certain habits are energy and material intensive. One goal for those involved in 'sustainable consumption' research and action would be to change these habits towards more 'sustainable' pathways.

The stubbornness of habits could depend on how deeply anchored the habits are in relation to three pillars of practices: the body – including cognitive processes and physical dispositions; the material world – including technology and infrastructure; and the social world – including settings, norms, values and institutions. A change in any of these three pillars can shift a habit and indeed influence our overall dispositions. A change in more than one aspect would most likely lead to the dissolution of the habit. Addressing only one pillar may not suffice, for example introducing a new technology or influencing cognitive processes through awareness-building campaigns.

This calls for a further exploration of the concept of distributed agency in relation to practices (Wilhite, 2010). As defined by Ortner (1989), agency is the capability or power to be the source and originator of acts. If we are interested in change, we need to identify all of the agentive aspects of a particular practice, across each of the three pillars, or dimensions discussed above: body, objects and social contexts.

How do we see change as occurring?

If change can occur across each of the three pillars – body, objects and social contexts – how do people actually learn to change? For the body to learn new things, we can imagine repeated mental and physical exercises for example. For things to change, we can imagine people developing new designs, technological advances or changes in infrastructure, for example. For changes in social contexts, we can imagine efforts to change policies, the introduction of new laws, or public debates for example. The focus of this position paper is about how people learn to do things differently. In Sahakian and Wilhite, in press, we argue that you can consider all of the distributed agency potential across different elements of a practice. But when it comes to actually engaging people in change, we feel that social learning is a relevant theoretical framework, one that considers 'learning' as an engagement in and with new practices.

Lave (1991) argues that learning comes about through cognitive and practical processes, which in turn lead to the acquisition of practical knowledge. For Lave (1991), learning should involve two stages: a broad understanding of what it is to be learned, then participation in the practice, what she calls situated learning in communities of practice. Learning is viewed here not as an individual experience but as participatory and social (Lave and Wenger, 1991 / 2009). The implication is that people should be given an opportunity to actively participate in more sustainable practices – which could be achieved by participating in 'demonstration projects'.

Examples of demonstration projects

Demonstration projects were used extensively after the Second World War to engage (mostly¹) housewives in using new appliances, such as the washing machine, with marketers striking a delicate balance between freeing up women's time in the home, and selling products that promote the idea of the perfect housewife (see Pérez, 2012 for an example of the links between gender, consumption and refrigerators in post-war Argentina).

Could demonstration projects help shift practices towards areas that have a lower environmental impact? In Europe, there is consensus on what consumption areas have the highest negative impact in relation to a range of environmental indicators: transport, food, and heating homes (Tukker et al., 2006). This paper discusses food consumption in Europe. While there is no comprehensive data on the high impact areas in other regions, this article also considers energy for cooling homes and food consumption patterns in the Philippines, as I have just returned from 11 months in Metro Manila. What I provide below is a brief summary of how certain people changed their consumption practices in relation to demonstration projects.

Food and beverage consumption

In Sahakian and Wilhite, in press, three empirical examples are presented in relation to food and beverage consumption. They are summarized here with a focus on the 'demonstrative' aspect:

- *London on Tap Campaign*: reducing bottled water has become emblematic of environmental campaigns not solely because of impacts, but because safe and clean tap water is readily available in certain contexts. As Wilk (2006) has discussed, bottled water is an example of how to get people to pay for things that are abundantly available around them. One example to promote tap water was the *London on Tap* campaign, launched in partnership between the City Mayor and Thames Water, the utility company. In 2007, different information campaigns around tap water were disseminated but none were successful in and of themselves: a blind taste test found that tap water was rated third out of 24 varieties of water, including 23 bottled waters. The price and health benefits of bottled water were also discredited. The campaign then focused on a specific practice: ordering bottled water in London restaurants. In a survey, people were said to be embarrassed to ask for tap water in that specific context. A new water carafe was designed for restaurants, and these establishments encouraged guests to order tap water and use the new carafes. Bottled water sales were reduced by eight percent in the summer of 2008 during the restaurant campaign. What is lacking is data on the long-term success of the program, and whether this change in a public space had any affect on other practices, such as household water consumption.
- *Putting Oklahoma City on a Diet*: another city-level campaign began with Mayoral concerns that the city was a regular fixture on ranking lists for obesity and general un-healthiness. While the Mayor recognized that city infrastructure was a main issue (ie, car driving culture, with limited opportunities for walking or biking), he also created a community of practice around healthy food entitled 'City on a Diet' in 2007, with the goal of getting the population as a whole to lose one million pounds (450,000 kg) – starting with himself – and by creating an online interface

¹ Certain household products were also directed to men, such as the barbecue grill and cooking knives. In a 1957 issue of *Popular Mechanics*, directions are given on how to construct an oil-barrel type grill. The main image that accompanies the article portrays a man in a chef's hat preparing a meal on the grill, with a woman standing by to serve the guests (Sahakian Wilhite in press).

where people could share experiences and stories. Camps for people with obesity were set up around the city, allowing people from similar age groups to meet and share their personal stories on weight loss with their peers. The one million pound target was achieved in early 2012 for the city as a whole, with the Mayor himself losing 38 pounds since April 2007. More than 47,000 people recorded their weight-loss efforts online as part of this campaign.

- *Promoting local foods in Geneva:* this example is based on two women in 2008 in Geneva who started offering vegetable baskets in their neighbourhood, based on relations built with local farmers. The goal was to promote seasonal, local produce and build social relations – both with farmers and with neighbours. They realized that certain people did not know what to do with some types of seasonal products in the basket: the black radish, for example. They began offering recipes but realized that reading about the use of a new vegetable would not be sufficiently compelling to incite people to use that vegetable in a meal. They believed that they would attract more people to their products if their clientele could experience these recipes first-hand. The concept of the restaurant as a demonstration project was therefore born out of a desire to stock certain products in a local store, but also to show how these products can be used and to create a place where people can dine on mostly local products. The restaurant has been operational since 2011, with vegetables playing a central role (meat/fish/poultry is also offered on some menus, to promote local animal raisers, but the priority is given to vegetables). The meals offered in the restaurant demonstrate new ways of cooking seasonal vegetables, and are offered along with recipes for people to try out in their homes. Certain customers have given positive feedback, explaining that they were proud to serve these original dishes to their own guests at home.

Based on research conducted in Manila in 2013, the following examples related to food consumption also show the value of demonstration projects:

- *A new vegetarian restaurant:* the founder of Corner Tree Café, one of the few vegetarian restaurants in Metro Manila, explains how she turned to a vegetarian diet in her forties. This shift was based on a trip abroad visiting a relative in London, who is a vegetarian. The friend she visited prepared all kinds of delicious meals that she enjoyed, as she told me. She realized through that experience that meat did not have to be central to her meals and she did not ‘miss meat’. Growing up in the Philippines, she had been raised with what she described as a ‘very meat and rice diet, with many fried foods’. Still today in the Philippines, a ‘vegetarian’ meal usually means vegetables cooked along with pork or shrimp ‘for the flavour’, as people will explain. At the same time, she deplored the fact that more people do not switch to a vegetarian diet more easily. She opened her vegetarian restaurant to showcase what she calls delicious vegetable meals that can also be enjoyed by people who are not strictly vegetarian.
- *‘Organic’ food production and waste management:* The founder of a ‘organic’ food market in Makati, one of the most affluent cities in Metro Manila, explains that much of what she learned in terms of food production and distribution was gained while living in New York City in the 1980s. She returned to the Philippines in the 1990s and fell sick from the types of foods she was served, at her parent’s home and in restaurants. She claimed that health was the main reason she was interested in promoting a more organic, vegetarian-based diet in the Philippines. She founded a farmer’s market and an association, and works with farmers around

the country to transition towards less chemicals and pesticides in their farming practices. In the example of one farmer who is selling organic fertilizers at the local market, he returned to the Philippines after fifteen years in California. When he returned, he wanted to start an organic farm and invited friends from the West Coast to the Philippines to help him design his farm. Another man who started an organic waste management system learned about composting in a visit to South Korea. He also invited 'experts' from his visit to come back to the Philippines and become partners in his new composting enterprise.

Energy consumption

The following examples related to energy consumption also show the value of demonstration projects and are further elaborated in a forthcoming book on air-conditioning in Southeast Asia (Sahakian, In press 2014):

- *Making a home energy efficient:* this example is about how a person and his family decided to make their home more efficient. The male household head started by looking at the main appliances that he considered to be most energy intensive: the electric water pump, three air-conditioning units in the bedrooms, and the refrigerator and freezer. With his family, they made changes to reduce consumption, which in some cases involved the installation of more efficient appliances. For the air-conditioning unit in the children's rooms, he told me that he had to gradually increase the temperature of the room at night from sixteen degrees to twenty-three. This took several months, as well as changes to their bedding. His efforts at one point were halted, as he felt he had done all that he could do to reduce energy at home. His decision to consider energy sources and introduce solar panels on his roof came about after visiting a friend's home where the installation had already been made. I asked if he would have made the decision based on information alone and he responded that he would not have, as he feels that most information is about 'marketing' and could not be trusted. He did trust his friend and his friend's experience, however, and by seeing and hearing firsthand about the solar panels, he was sufficiently convinced to do the same. I asked if it had proven to be a good return on investment, to which he responded: 'you don't think about ROI when you buy a couch, do you?' Cost savings was not the most important factor for his decision.
- *Making buildings more energy efficient:* there are currently no building standards in the Philippines that promote high-energy efficiency. The Philippine Green Building Council is promoting a voluntary scheme, but examples of energy efficient buildings are few and far between. For many developers, promoting a 'green' housing development means planting trees in gardens. A commercial building recently received a gold rating via LEED: this tower of glass (using low emissivity windows) is promoted as the most ecologically sound building in the Philippines (a tropical country that is humorously said to only have two seasons, hot and hotter). Older buildings made with small windows and thick walls are seen as non-ecological, as the notion of what is 'ecological' seems to be tied up with the idea of large window openings and green landscapes. One self-taught architect is going around poking holes in people's homes, as he puts it. He creates openings that allow for passive ventilation, but he encounters much resistance to this basic strategy for indoor cooling. He claims that only his friends allow him to take such measures in their homes. When you are physically standing on one of his buildings, it is noticeably cooler than it is outside. He tells me that people are always satisfied

with the results but that ‘opening a hole in the roof is like opening a hole in the mind’.

Discussion

The idea of promoting demonstration projects may be a rather simple one: it is about learning by doing. Perhaps one contribution of the combined social practice theory and social learning approach is that we don’t just learn by doing, we also have to understand what it is we are doing and be engaged with the new practice, which can involve interacting with things, but also other people, and challenging some preconceptions or norms that we implicitly adhere to.

Some of the main points we can glean from the examples above are as follows:

- *Bringing back learning from ‘elsewhere’*: in some examples, people went elsewhere to learn new ways of doing and saying. Should we actively be promoting more direct experiences such as these, where people are physically brought into a new context to experience ‘sustainable’ practices? Should this be between regions of the world, or can it be done virtually online? Who should be the focus for such types of experiences, ie students, practitioners, policy-makers, etc.?
- *Practicing a new product*: interacting with a new product seems to be part of demonstrating, as people can become comfortable with the ‘innovation’ or ‘change’ before acquiring it or adhering to it themselves. For example, people trying new vegetables in restaurants before cooking them at home, or seeing solar panels on a friend’s roof before installing them on their own. Do we need to have more spaces where people can directly experience a new product or service? Where would we set up these demonstration sites, at the workplace, in public spaces, going door-to-door among households?
- *Challenging implicit norms*: there seem to be some assumptions people take for granted that deserve to be challenged. Why are you comfortable sleeping at 16 degrees? Why do you associate an ecological home to glass tower? Why are you embarrassed to ask for tap water in a fancy restaurant? Why is meat central to your meal? Through the practice approach, one could try to uncover some of the implicit norms and expectations tied to ‘unsustainable’ practices and bring them out in the open. However, as discussed elsewhere (Sahakian and Wilhite, in press), this may lead to reaffirming the norm or even pushing the norm towards more ‘unsustainable’ pathways.
- *The importance of trusted social networks*: peer-to-peer groups that share stories and experiences, or the opinion of friends, are arenas where trust seems to be high. We are seeing new forms of sharing through collaborative consumption that are also based on relations of trust and build on new technologies that facilitate peer-to-peer networking (see Botsman and Rogers, 2010). Identifying trusted networks or sources seems to be an important factor in successful demonstration projects.

Some of the issues these examples raise are:

- *Time factor* or can demonstration projects be sustained over time? The London on Tap and Oklahoma City Diet are both Mayoral campaigns. What will be their rate of success over time or once a Mayor is no longer in office? How can we be sure that by demonstrating something once, or over the course of a season, or a year, we can sustain the change long-term?

- *Space factor* or can demonstration projects be extended over space? Cultural context seems important, yet certain practices are carried from elsewhere and brought back. How can new practices be shared among more people, from niche to mainstream, from micro to macro? Perhaps virtual demonstrations are significant, as the Internet has the possibility of reaching across spaces.
- *The learning proposition*: learning a new practice should probably involve a clear understanding of the learning proposition, or what 'sustainable transition' we are seeking to promote. By promoting a healthier lifestyle in Oklahoma, will people travel to exotic destinations for health treatments, for example? What is the 'learning proposition' and are we even clear within the research community as to what we mean by 'sustainable consumption'.
- *What's missing*: what are we demonstrating and not demonstrating? Perhaps one significant finding is that there are plenty of things we are not demonstrating as a society. In Manila, we are not demonstrating energy efficient housing. More generally, global media are not demonstrating sustainable lifestyles. Telling stories and showing examples of what it means to live sustainably seems to be lacking. No doubt visioning and back-casting techniques are working in this area.

I look forward to discussions around this position paper and how it might be relevant to other research towards sustainable pathways, as well as opportunities to further develop this research theme.

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Community gardens as learning spaces for sustainable food practices

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Abstract

Urban agriculture is an emerging topic and it is widely argued that it has considerable potential for sustainable consumption and production. Community gardening is a promising type of urban agriculture and questions have been raised like whether it has additional benefits for sustainable lifestyles and behavior, and we can understand community gardens from a social practices perspective. This paper aims to provide first insights to these questions by looking at community gardens in the city of Rotterdam in the Netherlands, when aiming at more sustainable urban food provisioning practices. Two cases are analyzed using Shove's image-, skills-stuff model, while also looking at learning processes, expectations and enrolment of involved actors. Data have been collected, through participatory observation and semi-structured interviews.

There are both similarities as well as major differences between these two gardens that influence the food provisioning practice of participants as a whole. This study also shows that there are not only innovative developments pointing towards sustainability as well shared elements with less sustainable mainstream food provisioning practices. The former can be seen as opportunities that are not yet taken, whereas the latter are barriers that withhold the practice from changing. These insights improve our understanding how urban agriculture can play a role in a transition to more sustainable food provisioning practices. In addition, the role of the participants has found to be essential in the evolution, reproduction, changing and sustaining of urban food provisioning practices.

KEYWORDS: *Urban agriculture; community gardening; practice theory; grassroots innovations; sustainable consumption; sustainable urban food provisioning*

Introduction

Urban Agriculture

In recent years urban agriculture, the practice of growing food within cities, has gained a lot of attention and is becoming an increasing urban activity in Western countries (Corrigan 2011; Veen 2013). Also in the Netherlands urban agriculture is gaining interest and the number of initiatives is growing. The practice of growing food within cities comes in various forms, such as allotment gardens, guerrilla gardening, balcony gardening, school gardens, rooftop gardens, community gardens, etc. Even supermarkets are picking up this trend – of growing your own food - by selling compost, soil and edible plants. The increasing interest in knowing where food comes from and participating in growing food is also reflected by the growing number of local farmer markets and organic markets and a growing number of workshops, blogs and platforms helping out new urban growers (Brinks 2012).

Urban agriculture is not something new though. It has been practiced since the first cities emerged. Ancient societies practiced agriculture to feed people from the earliest settlements, this made it possible for the first cities to arise (Steel 2011). In developing countries urban agriculture is still widely practiced contributing to food security and access to healthy and fresh food to the poor. Here, urban agriculture is often practiced out of necessity; a well-known case is Havana in Cuba.

In developed countries this necessity is not so prevailing, as food is readily affordable and available for (most) citizens. Research on Urban Agriculture in developed countries (e.g. Smit, Nasr, and Ratta 2001; Cohen, Reynolds, and Sanghvi 2012; Deelstra and Girardet 2000) link this trend to the growing concern among citizens on safety and sustainability of the food chain and a need for greening and social cohesion in their neighborhood. As such urban agriculture is perceived as part of the transition to a more sustainable food system in Western countries.

Research in Western countries has shown that urban agriculture adds beauty to the city and provides space for urban dwellers to relax and recreate (Gardenworks 2006). Moreover, it may contribute to the well-being of urban dwellers; it contributes to health and well being by involving urban dwellers in healthy, active work and recreation (Bellows et al 2004). This practical experience with fresh food is assumed to increase people's awareness and appreciation for living things (Gardenworks 2006) as well as their understanding of growing and seasonality (Bellows et al 2004). Some authors (e.g. Deelstra and Girardet 2000; Cohen et al 2012) claim that urban agriculture may also change the perception of urban dwellers regarding food. They claim urban dwellers to have more interest in food-growing processes and the biophysical processes involved if crops are cultivated locally. Through agriculture and environmental training and education their knowledge on food growing processes then expands. This may enhance the influence urban dwellers have on the way food is produced; when they better understand what sort of inputs are used in the farming process, they can better and more quickly respond to harmful environmental practices (Deelstra and Girardet 2000). In the end this may positively influence dietary habits (Bellows et al 2004).

In the Netherlands it is expected that urban agriculture might positively influence health and dietary habits and contributes to raising environmental awareness and knowledge about more sustainable food choices (e.g. Hassink 2005). Jansma et al. (2008) argue that if urban agriculture produces green city areas that facilitate direct effects of producing fresh food locally, care, education and recreation, it could contribute to making cities more sustainable. Yet, if we place urban agriculture within the food system, these effects are

considered as limited in pursuit of making the entire food system sustainable (e.g. Kleis 2010). However, several authors, (Jansma cited in Kleis 2010; Duchin 2008; Weber and Matthews 2008; Tukker et al. 2010; PBL 2012), showed that eating local, seasonal and stop wasting food could deliver much more environmental gains than only trying to make a city self reliant on food. As urban agriculture is about much more than just growing food, those same direct effects of education, care, trainings, cooking classes and the like might help reaching those changes in eating habits.

Community gardening as a sustainable food provisioning practice

This paper focuses on community gardening as a promising type of urban agriculture with possible additional advantages (direct and indirect) for sustainable lifestyles and behavior. Therefore, this paper focusses on how we can understand it as a more sustainable food provisioning practice. So, the focus is not on urban agriculture as an instrument to provide fresh food or as part of a local food system, instead the focus is on the opportunities community gardening may have to bring about changes in food consumption behavior and food provisioning practices for instance through education, and raising awareness and interest about food production processes.

To understand the influence of community gardening on changing food consumption behavior, we consider behavior as a complex phenomenon of both dynamic agency and the social conditions of such agency (Halkier 2009). This means that behavior is not only driven by individual values and beliefs, and moves beyond awareness, perception, interests and knowledge. Instead, we use the theory of social practices, as used by Shove and colleagues (2005; 2012; 2007; 2005) and Spaargaren (2011; 2012). It not only provides a theoretical model that aims to incorporate the complexity of behavior, but it is also a dynamic approach in which individual behavior is considered to be part of the infrastructure and values that influences behavior and are thus also instrumental to creating them, rather than only being subject to it (Shove 2010). By now, practice theory is not only used as an analytical approach, but also more and more used as a design approach that addresses sustainability issues (Hielscher et al 2009; Kuijer and De Jong 2011; Scott et al 2012; Wever 2012 De Borja et al, 2010), as well as for developing future images of sustainable practices (Davis 2013, Doyle and Davis 2013). Also, in policy this approach may be valuable in formulating changing behavior towards sustainable consumption behavior (Spaargaren 2011; Shove 2010; Shove and Walker 2010; Spaargaren 2003; Hargreaves 2008). In this paper practice theory is to understand the potential of urban agriculture to bring about change in food provisioning practices, rather than to design or create policies.

By using social practice theory, food consumption behavior can be seen as a food provisioning practice, consisting of acquisition, preparation, consumption and disposal of food (McIntyre and Rondeau 2011). According to Warde (2005), the practice theory implies that the sources of changed behavior can be found in the development of practices themselves. So innovative food practices like urban gardening can therefore be considered as a niche development in the current food system. Viewing upon community gardening projects as a social practice niche or a grassroots innovation niche emphasizes its potential for sustainable development through widespread participation and calls for social learning (Seyfang and Smith 2007, see also Quist and Tukker 2013). So, community gardening does not only include the consumption of food and related stuff, but also the production of food and related stuff. In this way community gardening can eventually have a broader influence on broader food production and consumption practices.

The main purpose of this paper is now to analyze two community garden cases in the city of Rotterdam from a practice theory perspective and to investigate whether these

practices stimulate more sustainable behavior with regard to food consumption. The core question is whether community garden can be seen as a good learning environment for sustainable food practices. The remainder of this paper is organized as follows. The next section deals with theory and the applied case study methodology, which is followed by a case results section and a conclusions & discussion section, respectively. More details can be found in Vercauteren (2013).

Theory & Methodology

Overview of practice theory

Theory of social practices emerged within the field of sociology as a conceptual attempt to put social practices – instead of individual actors or social structures- as the central unit of analysis. Authors as Pierre Bourdieu (concepts of habitus and field) (1984; 1992), Anthony Giddens (theory of structuration) (1984), Bruno Latour (1992), Michel Foucault (1977) have provided major contributions to its development. More recently, Schatzki (2001, 2002) and Reckwitz (2002) made serious efforts to synthesize and connect these inputs into a more comprehensive analytical approach to social life. Reckwitz's (2002) article provides a clear overview of the theoretical aspects so far and makes a clarifying distinction between social practice theory and other cultural theories.

A key step was to put social practices central, and thereby bridging the dualism between agency and structure, was made by the recognition of the dialectical interplay between people's individual action (agency) and collective norms and regulations (structure); *'structures can only be established through actions of individuals, and simultaneously, these actions are formed by the prevailing structures'* (Røpke 2009, p 2491). Giddens' theory of structuration (Giddens 1984; in Røpke 2009) built on these ideas by formulating the interactions in which social practices become the mediating concept between action and structures. Examples of practices can be cooking, working, bathing, heating and cooling, taking care of others, writing, shopping, etc. Practices are often defined as a *"routinized type of behavior which consists of several elements, interconnected to one another: forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge. A practice (...) forms so to speak a 'block' whose existence necessarily depends on the existence and specific interconnectedness of these elements, and which cannot be reduced to any one of these single elements."* Reckwitz (2002, p 249)

A practice can only exist when an individual or group of individuals puts it into action. By using the theory of practices individuals become not only users or consumers, but also 'practitioners' or 'carriers' or 'agents' of a practice. They are producing and reproducing the practices. Since individuals are the agents performing a social practice, these social practices exist beyond the individuals who 'carry' them (Shove 2012). Just as individuals may take part in social practice and carry them, they may also change them, but also disengage, abandon, or resist a practice (Warde 2005; Scott 2008).

The organized constellation of action, through the carrying out of practitioners, can be seen as an organized entity (Schatzki 2002; in Røpke 2009). A practice is thus a (performed) activity and at the same times a pattern of activities shared by several individuals. To make a clear distinction between the practice as an entity on the one hand and the performed actions at the other hand Schatzki identifies two central notions of practice: first, the practice as a coordinated entity, consisting of both doings and sayings (cooking practices, voting practices, industrial practices, recreational practices, and correctional practices), which is the emerged outcome of the performance of practices and

refers to the on-going reproduction of practices. Second, practice-as-performance, which refers to the actual performance of this practice. It refers to carrying out of practices, performing of doings and sayings that ‘*actualizes and sustains practices in the sense of nexuses*’ (Schatzki 1996; in Warde 2005). While the practice-as-entity refers to the abstract level of the practice, the practice-as-performance refers to the real life performance of a practice.

Shove’s model of practices: Image, Skill, Stuff

Shove and colleagues have introduced a simplified model of social practices. They describe a practice as a configuration of three main elements; Image (meaning), Skill (competence and knowledge) and Stuff (the resources, materials, etc.). ‘Skill’ covers competences, know-how and techniques needed to carry out a practice. Through experience and training these become embodied in practitioners. Knowledge can be transferred between people, but this may need codification into rules and social norms, definitions, instructions and understandings. Although competences are embodied in the individual, it is seen as part of the practice and through its sharing of the social (Røpke 2009).

‘Image’ relates to the social and personal meaning of practices, it is about making sense of the carrying out of practices. These include the ideas behind the why, the emotional aspects and forms of self-representation. These can again be shared through understandings, e.g. doing something healthy, and are so connected to the social, including social identity and appearance (Røpke 2009; Scott 2008). The material aspects are covered by the component ‘Stuff’. These include objects, equipment, technologies, structures, bodies of body parts needed to perform practices (Røpke 2009).

The three elements are depicted in Figure 1 and should be understood as broad categories covering a range of aspects. There are no clear boundaries in relation to one other and the connection or linkages between these components are made by the practitioner (Røpke 2009). Through doing the practice the components are partly embodied in the practitioner self.

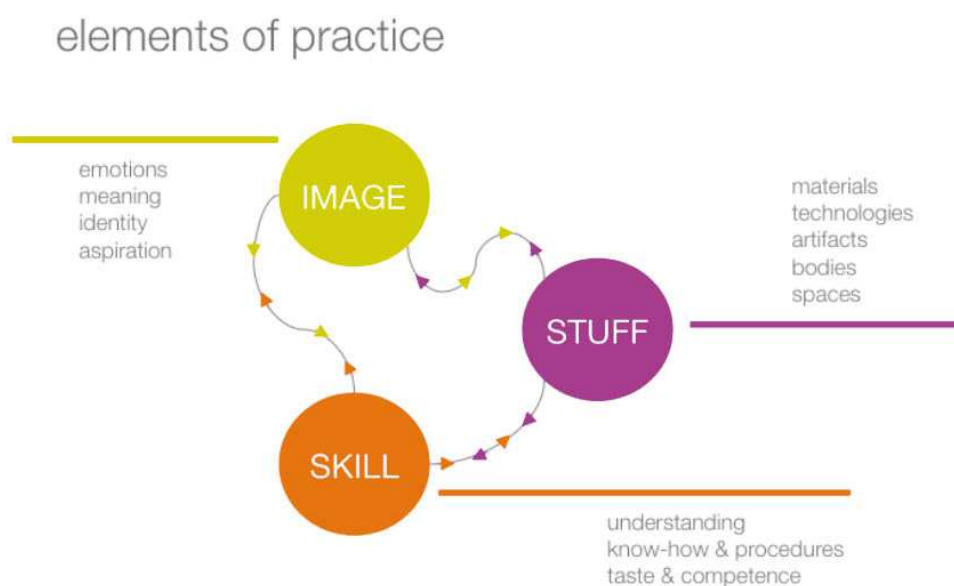


Figure 1: Elements of practices based on Shove et al (2007) and McMeekin & Southerton (2007), as depicted in Scott (2008)

A practice only exists when practitioners perform its activities over and over, and has therefore a temporal nature. As such a fourth elements 'time' could identified (Scott 2008). Scott describes how we can see the image-skill-stuff-model as a frame in a film, which is only a momentum of the full story. **Error! Reference source not found.** 2 shows, building on Shove, demonstrates the role of routines in recreating practices as linkages are maintained through each performance, yet might change and so practices evolve over time (Scott 2008). Practices are also subject to change and innovation. Practice innovation, and even fossilization, occurs through the creation of new links and breaking up of existing as small changes stack up, or as a result of the introduction of new ideas, new products (e.g. from analogue to digital cameras), new procedures or even through the linkage of existing elements, such as bike-sharing programs in European cities (Shove et al. 2007; Scott 2008). As some practices fossilize the knowledge embodied in those practices is often lost (e.g. the use of the old telephone in contrast to using a mobile phone, or the decrease of knowledge on fresh food through ready-made ingredients).

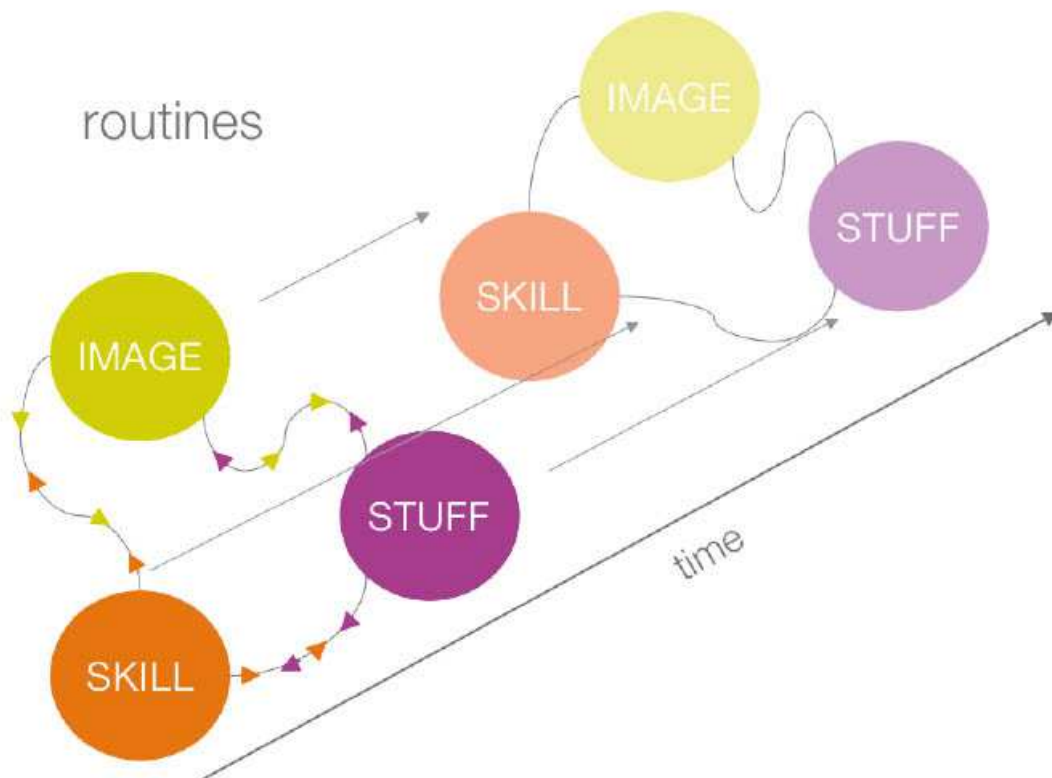


Figure 2: The reiterative performance of a practice over time, based on Shove et al. (2007) by Scott (2008)

Practice theory as used in this paper

In this paper Shove's Image-Skills-Stuff model is used to analyze community gardens as practices in performance. To do so the social practice is in this paper configured according to McIntyre and Rondeau's (2011) food provisioning concept, making it easy to identify the involved sub-practices. McIntyre and Rondeaus (2011) described food provisioning practices to consist of (i) acquisition through growing and shopping, (ii) preparation, treatment and cooking, (iii) consumption or eating, and (iv) the disposal of food. By the

use of the concept of food provisioning by McIntyre and Rondeau (2011) 'acquisition', 'production' and 'consumption' can thus be integrated in one practice-as-entity. Individuals are then neither only producers nor only consumers. Furthermore, the food provisioning practice is represented in this study as an innovative niche-practice within the current food system. Doing so emphasizes the potential for sustainable development (both in practices and innovations) of community gardens, through widespread participation and calls for social learning (Seyfang and Smith 2007).

The model of Shove can be applied to so-called Do-It-Yourself (DIY) practices as Shove has shown (Shove et al, 2007). Whereas Shove's work assumes that practitioners are rather homogeneous, in our study a DIY community practice is studied in which practitioners have different roles. Therefore, more attention is paid to the role of the actor by looking into aspects like (i) the different social networks actors are involved in, (ii) the different power and hierarchical relations between practitioners, (iii) the different capacities and performances of practitioners (see Warde 2005), and (iv) the involvement of actors.

Methodology and case selection

Case studies using, participatory observation and semi-structured interviews with participants have been used. These have resulted in the identification of practice-as-performances and how these build up to a practice-as-entity at the level of a community garden. The cases have been selected in the city of Rotterdam, one of the leading cities in urban agriculture in the Netherlands. Other criteria were (i) that the gardens are within the boundaries of the city; (ii) that the gardens exist for several years, and (iii) that the gardens are grassroots initiatives initiated and organized by citizens or local communities. Sometimes, there is collaboration with public or private organizations, but key to community gardens is that people work together in a shared garden, and that they do not have separate plots. Although this does not imply that participants share everything; participants may have specific roles and activities in the community garden. Work is often divided among participants so that everybody has their own role in the community garden.

Selected cases based on the criteria discussed above are the Gandhi Garden and 'Garden at the river Meuse' in Rotterdam. The Gandhi Garden is a community garden initiated by members of the Rotterdam Transition Town network. The association holds a strong vision for an alternative economy and views upon the community garden project fitting in this vision. The 'Garden at the river Meuse' represents a community garden initiated by neighbors, who wanted to transform a neglected empty building plot into a nice environment for the neighborhood. They created a community garden at the head of the pier next to the river Meuse. There are both similarities as well as big differences between these gardens that influence the food provisioning practice as a whole. Table 1 shows some characteristics of both cases.

Table 1: Characteristics of selected cases

Characteristics	Gandhi Garden	Garden at the river Meuse
Number of participants	20-25	±9
Size	2000 m ²	±1400 m ² (Including a small fruit orchard)
Starting year	2011	2010 (since association, but the garden was there since 2007)
Initiators	Transition Town members	Neighbors
Association	Peace Garden (Vredestuin)	Garden at the river Meuse (Tuin aan de Maas)
Farming style	Permaculture	Conventional, partly organic
Important values and vision	Everybody is welcome, inclusiveness, connecting people, sustainability, peaceful and justice	Liveable neighborhood, social cohesion, it about the process of growing together more than the product, everybody is welcome

Results

Gandhi Garden (Gandhituin) in Northern Rotterdam

In 2011, when several school and senior allotment gardens at the Gordel road became available, members from Rotterdam Transition Town and a local neighborhood community joined forces to ensure that these gardens would stay. The association 'Vredestuin' (Peace Garden) are officially the initiators of the Gandhi Garden. They joined forces with the Transition Town network and responded also to a request of the municipality to create a community garden; the municipality wanted a garden that is freely available for the neighborhood.

The Gandhi Garden is thus a neighborhood garden where everyone is welcome to participate. Currently, about 20 to 25 people work and participate on this garden during two days a week (Tuesdays and Sundays). The association also wants the Gandhi Garden to provide possibilities for people that mostly need a garden, the work and its fruits. The association clearly states this on their website, and this is also reflected in the group of participating gardeners; the mixed group includes both temporally and long-term unemployed, as well as people incapable to work. The initiators, and thus the Peace Garden association also want everybody to participate in decision-making, although the Peace Garden association has a final say if plans do not follow the vision of the Gandhi Garden. The vision includes the following statement:

"What is needed to cope with the global social and ecological crisis of our modern world is a growth of humanity, compassion and love. In an inclusive, sustainable and non-violent economy, which is produced for needs and for those who are most in need (poor and oppressed), the world will offer an abundance. Through the Gandhi Garden we want to show that such a world is possible if we change our everyday local life." (Gandhituin 2011).

The vision is also based on permaculture gardening, Transition Town philosophy and Gandhi's vision of a non-violent and non-exclusive society. The vision also builds on the three principles of Transition towns: Heart (living center for the neighborhood), Hands (permaculture garden) and Head (education center).

'Garden at the river Meuse' in Delfshaven, Rotterdam.

In 2002 the first apartment building named 'Eendracht (Concord)' was completed on the Mullerpier (Lloyd quarter) next to the river Meuse. The owners of these apartments were still living in a sandy and muddy place, but found each other and shared their pioneering experience. In 2004, several other apartment buildings were completed, but the head of the pier was still a sandy empty space, which raised considerable discontent among residents. Therefore, the residents of 'Eendracht' handed in a so-called Green Thumbs 'Groene Duimen' plan at the municipality to create a green space at the head of the pier, as long as no constructions were started. The plan included a grass area, a slide, a picnic table, a terrace, a vegetable garden for the local school children, a football field and a bowling alley. The municipality approved this plan and provided funding. The idea of the municipality was to give this empty area a temporary functionality for the neighborhood, though construction would start within two years (LloydKwartier Rotterdam 2006). However, three years later, the construction had not started yet, and also the school garden had not been realized. Therefore, some of the residents took up the garden themselves and started to experiment with some plants. In 2010 a small group decided it was time to take it serious and they registered an association for the 'Garden at the river Meuse.

The association and the municipality came to an agreement that the neighborhood could take care of the garden for as long as there are no plans for construction on this what was called a 'White Spot'¹. At that time the municipality expected building to start in 2017. Since this announcement the garden has become a tidy garden consisting of a vegetable garden, a green and flower garden (with several plants donated from the neighborhood getting a second life here) with benches and since 2012 also a fruit orchard. The association has four members (five at the start), but several other residents also work regularly in the garden, making a core group of about eight people. The garden is open to everyone in the neighborhood to come and help, yet most of the participants are from the 'Eendracht'(Concord)building (only one person in the core group is from another building). The association refers to an "open garden" as anyone can contribute to the maintenance of the garden. Apart from the core group, also children and other neighbors occasionally help. Usually, the participants gather on Saturdays; such garden workdays are announced on the website and the association's Facebook page. There is no obligation to work in the garden, and this results in some uncertainty about how many people will show up. According to the initiators this varies considerably, depending on the weather.

Food provisioning practices in the two community gardens

The food provisioning practices of the two cases have revealed several interesting differences and similarities. First, we will briefly explain the steps within the food provisioning practice as performed on these community gardens and describe both stuff and activities. These differences between cases influence the food provisioning practice at study in different ways. Although the cases are quite different in set up, goals and vision, working methods and process, the 'individual' food sub-practices, such as cooking, eating and preparing are quite similar. By contrast, in the disposing of food waste and food shopping there are notable differences.

Acquisition through growing:

The first step in the food provisioning practice is the growing of food. Growing has many variations in performance depending on both the practitioner and the context. The

¹ It is a construction site with virtually no maintenance from the municipality, as there are plans to build here.

growing process, especially in this community type of growing food, needs different roles to successfully produce vegetables. There is a need for leadership and coordination. These roles are not always fulfilled by the same practitioners, which also lead to changes in the performance per practitioner, as well as over time. Leadership and coordination can be seen in different organizational parts of the growing process: there are leaders in deciding what and when to grow, leaders in dividing the tasks, and leaders in taking up responsibilities. These roles change the context of performance for other group members and define the outcome of the growing process. Warde (2005) argues that we can differentiate between the contribution of practitioners to the reproduction and development of the practice on the basis of their role and expertise. This can clearly be seen in the decision-making about what to plant, when to plant, what needs to be done, etc., but also in how those that are less involved in the decision-making perform their role and tasks. For instance in the case of the 'Garden at the river Meuse' the building and maintenance of the benches and fences plays an important role in maintaining the garden as a nice place to be, which is vital for the continued activity of participants in the garden. And in the case of the Gandhi Garden the expert permaculture knowledge of the association members is essential for the structure and planning of the whole garden, which defines whether harvest will succeed or not.

Acquisition through shopping

The vegetables from the garden do not make participants fully self-sufficient in vegetables; most of practitioners' vegetables needs to be purchased. There is a slight difference between the cases as they buy different stuff at different places. In the Gandhi Garden case mainly organic vegetables and fruits are bought, often taking seasonality into account. Yet some performances do not fit in this picture as some practitioners face extra (financial) barriers. Those who buy organic vegetables, buy these at organic stores and to a minor extent in supermarkets. Criteria used to select vegetables and other foods include affordability and price, convenience, freshness, healthiness and organic (including both environmental and ethical & fair-trade considerations). The vegetables can be seen as the main part of 'Stuff' following Shove's elements of practice; as such we can see a difference in stuff between the two cases.

Planning or preparations

Planning or preparations may play an important role in sustainable performance of food provisioning practices. Carefully planning what to eat and using shopping lists might help in limiting food waste, as people only buy what they need. Several participants indicated to plan in front what to buy for a whole week. Incorporating the harvest from the garden, however, seemed a difficult task for the gardeners. Often this is forgotten to take into account when shopping, so it is taken as additional food. Whether this creates more food waste is unclear.

Cooking and eating

The skills and involvement in cooking differs among the practitioners. There is no shared way of cooking food among the practitioners in either cases. The practice-as-entity thus becomes a mix of different cooking styles in both cases and link to mainstream cooking practices. These practices differ in creativity, skills and expertise, meaning and value of food, expectations and perceptions and the foodstuff used. There is some relationship between cooking creatively with vegetables and the involvement in the garden. We can see that those taking up leadership and responsibility (on what to plant and seed) in the garden (regarding edible food) also are more eager to experiment with vegetables and

want to get the most out of a dish. They also eat less meat and fish. While those more focused on the action of gardening such as weeding and hoeing, and are mainly lead by others, also stick more to routine cooking. So the roles of practitioners in the garden are related to how they cook food. People who tend to be more engaged in their food, also value more the quality and aesthetic of their food going well together with more sustainable food choices such as organic and local food (Halkier 2009).

Eating together with the other participants highlights the role of social cohesion, norms and understandings. In the case of the Gandhi Garden the challenge is to make a delicious meal from scratch with vegetables from the garden. These meals are always vegetarian and sometimes even vegan; it is not even considered to serve meat. In summer these dinners are prepared together, when one practitioner takes the leading role and others help intuitively with both cooking and preparing dinner. During cooking and eating, people discuss what is healthy food and what the impact and consequences are of certain food choices. Eating together is about sharing and enjoying time spent together.

At the 'Garden at the river Meuse' group dinners occur in weekends when people were working in the garden or doing chores together. The dinners are not exclusive to garden participants only; other neighbors can join too. Although the neighbors eat together at a big table in the fruit orchard, these dinners are not per definition linked to the garden; these dinners are a spontaneous activity on summer days by any neighbor, food is prepared at home or on the barbeque. This means there is always meat involved. A few neighbors are not eager or willing to eat vegetables from the garden, and therefore vegetables from the garden are only used as an exception. Eating together is mostly a social event; it is about having a good time together with your neighbors and friends.

Disposal of food waste

Growing your own food provides opportunities to close loops; food residues can be composted and reused as fertilizer for growing new vegetables. In each case there was a compost, but it was not used for food waste produced at home. Compost is mainly used to dispose weeds, leaves, twigs and other things found on the garden itself. Unavoidable food losses and food waste from food consumed on the garden is thrown on the compost heap. This suggests that when food is consumed in another place or way than regularly – lets say out of the house -, people also deal differently with food. There is a reversed situation here; to throw away food losses and waste created on the garden as usual would require practitioners to collect and take it home, but obviously it is more convenient to throw them on the compost heap.

Differences in Image: Vision

Putting these two cases next to each other reveals the Gandhi Garden to be more innovative and/or radical than the 'Garden at the river Meuse' is. The Gandhi Garden initiative has a vision for an alternative economy emphasizing values like inclusiveness, sustainability, peace and justice. Participants in the Gandhi Garden share this vision and try to apply this vision and values in the community garden and their daily life. This effects the image that practitioners have throughout the whole practice and is reflected in their performance as indicated above. The 'Garden at the River Meuse' does not share such a strong vision for change. The main goal is to share time together and do nice things together with their neighbors. The shared image is here less about growing food in a sustainable manner; rather, practitioners share a desire to do something effective together, such as growing food in the garden, but also constructing benches and other chores. In this sense the 'Garden at the river Meuse' initiative is less radical from a sustainable food perspective. Nevertheless, there are participants within the 'Garden at

the river Meuse' group that perform in more sustainable way; for instance, they experiment with different varieties and forgotten vegetables, or hold a vision for a more sustainable food system in which urban agriculture plays a major role. So, these persons influence the growing process in the garden, also challenging some other participants' vision on food. Yet their visions are not shared in such a strong way as in the Gandhi Garden. Both cases have thus different visions and share different values, and the extent to which the vision and values are shared among the participants differs in the two cases too. This is essential for communities to successfully 'do things differently' and to reproduce these alternative practices (Seyfang 2007).

Differences in Skills: growing expertise.

The difference in visions also comes with a big difference in growing skills. Within the Gandhi Garden group a few hold expert knowledge in permaculture, organic farming, and biodynamic farming. This means everything on the garden is organic and grown according to permaculture principles. At the 'Garden at the river Meuse' Participants have been growing vegetables based on learning-by-doing and occasionally asking friends and family for advice. This results in a 'we do with what we have' attitude and way of working. It also affects the production; at the Gandhi Garden they work in a larger scale, with more expertise, but also in a more complicated manner and with much more organizational issues, while at the 'Garden at the river Meuse' they work on a smaller scale, yet some are really dedicated to it and thereby getting quite some vegetables for their own.

Conclusion and Discussion

Within this study social practice theory has proven to be a useful framework to analyze and understand the practice of urban food provisioning. This framework enabled to analyze and understand the on-going dynamics of the everyday life of these community gardeners, in which practices sustain, reproduce and potentially change. As such we can conclude that looking at community gardens from a practice perspective provides valuable and interesting insights and adds to the findings of previous research on urban agriculture. This research confirms some of the expectations for community gardens such as the educational, social and recreational value of community gardens and urban agriculture. But the use of the practice model by Shove using Stuff, Skills and Image as core elements of a practice also revealed how and what aspects enable and barrier food provisioning practices to change, sustain and reproduce. In general we can see that there is not only potential for change, but that there are also barriers that limit the extent of changing sustainable food practices. These are important insights if we want to better understand how urban agriculture can play a role in a transition to more sustainable food practices.

A second conclusion is that there are not only innovative developments in the studied practice pointing to enhancing sustainability, but also similarities or shared elements with (less sustainable) mainstream food provisioning practices. These shared elements often represent opportunities that are not yet benefited. One illustration from the cases is the use of compost within a neighborhood, which can directly facilitate the closing of loops within the garden and the neighborhood. By the use of the extended Skill-Image Stuff model, we understand that there are multiple barriers, such as routine habits and an existing waste treatment system that do not require such behavior, as well as lack of knowledge and skills, or even the motivation and norms (image) that would stimulate such behavior. We have also seen that there is potential for composting food losses, so that nutrients are reintroduced in the urban metabolism. As such we can see that parts of the

'old' practice form a barrier for this behavior and thus for change. The parts shared with the 'old' food provisioning practice do not have to be negative though. It is possible to identify several food experience and this could be linked to the taxonomy of Halkier (2009); food for pleasure, food as necessity, planned and controlled food and food for health. Halkier (2009) argued that food as necessity has the least potential for change towards sustainability and the results confirm this. However, Halkier also concludes that there is potential if sustainability is already part of it, and thus integrating growing your own –preferably in a sustainable way- is one step closer to integrating sustainability even in such food practices.

A third conclusion is that the role of the participants is important in the evolution, reproduction, changing and sustaining of urban food provisioning practices. This has two implications; first, a theoretical implication, as (some) social practice models tend to neglect the role and diversity of performers in practices, and second, this may have implications in how we can understand the opportunities of community gardens for more sustainable food provisioning practices. Different roles mean that people experience working in a community garden differently, but also contribute and engage in it differently, leading to different learning experiences resulting in different skills and knowledge development. This research shows that the role people take in the community gardens is related to how people deal with food in their daily life outside the community garden. As we have seen people have different engagements in food practice; some are very creative and love to experiment, while other stick to simple or controlled food practices. We can also see this in their role in the community garden; for instance participants who tend to experiment more with planting different vegetables, and take initiative to make suggestions for change are often also those who experiment more in the kitchen. Although this might be a personal, it also influences how other people work, e.g. role division, in the garden and thereby influences their learning processes, e.g. bringing new stuff and skills in the garden.

From the results and conclusions of this study several opportunities and implications for sustainability can be highlighted, also depending on the goals and vision of the initiatives. Looking at the consumption of the practitioners in the cases some have become more willing to buy organic, since they work in the garden but mainly as part of their entire experience of engaging more with food. Working in the community garden is an activity in line with this growing engagement. Also, a shared growing awareness and sharing discussions on the food system stimulate this choice, which was especially the case in the Gandhi Garden. There is also a growing awareness on seasonality, although the representation of seasonal shopping is limited to what supermarkets and stores provide. Learning is a valued process both for adults and for children. Participants acknowledged they learned more about plant and vegetables growth, and experience own grown food as having a better taste. Deelstra and Girardet (2000) argued that such learning may enhance the influence urban dwellers have on the way food is produced as they will better understand what sort of inputs are used in the farming process and can therefore more quickly respond to harmful environmental practices. The findings in this study are not conclusive on this; the causal effect of this learning on the food practice is difficult to identify and may need further study. Furthermore in this study learning and changing perception and consumption patterns are integral to social practices; there is no one causal between knowledge and performance, as it both based on learning-by-doing and doing-from-learning. The food production of both cases was too low to provide a major share of the participants' fruit and vegetable consumption. This has influence on how these vegetables are perceived; it is an addition, a treat, but not a substitution. On the production side the two cases have a major difference; one case aims at producing food in such a way that it contributes to an alternative economy, while in the other case producing

food is only a part of it, the garden mainly facilitates a neighborhood preference for non-edible or edible gardening. In both cases this highlights the importance of social sustainability. We do not want to suggest causality between urban gardening in social cohesion, but the social aspects are certainly important aspects for the practitioners themselves. The two cases thus show how community gardens can contribute to sustainability in different ways, where one is more focused on social cohesion and community aspects, and the other aims to work towards an alternative economy by producing food in an alternative environmental-friendly and social way in which community aspects are of course important too. This shows that growing food is not only part of the food provisioning practice, as it is also a hobby and a social activity.

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Discussion Report

Melanie Studer, Delft University of Technology

Moderator, Tom Baulier, ULB

Organisation of the session

The working session on Individual Change and Alternative Consumption Niches was moderated by Tom Baulier and was organized as follows:

- First, there were 10 minutes presentations by (1) Marlyne Sahakian on a paper entitled 'Learning from demonstration projects on sustainable food and energy practices', and (2) Carmen Vercauteren et al. on a paper entitled 'community gardens as learning spaces for sustainable food practices'
- Followed by a discussion moderated by the chair Tom Baulier

Main discussion points on the paper by Marlyne Sahakian

Georgina Guillen raises the question of the follow-up of demonstration projects. The author answers that some demonstration project focus on an impact at the niche level but it is not certain whether they can lead to regime change. Jaco Quist adds that there is still limited research on long-term impact of demonstration projects.

The issues of perceptions and social norms came up in the discussion when the author mentions that in the Philippines (one of the countries of her case studies), whilst traditional bamboo houses with thick walls are rather energy efficient, Phillipinos see modern glass building as much more attractive despite their poorer energy efficiency. Adina Dumitru adds that the associations people have with modernity is a cross-cultural issue. For example, in East-European countries during the communist regime, nothing was wasted, but nowadays waste has almost become a sign of wealth. In China, cycling used to be a common practice, but nowadays it is associated with low status as there is the image that the modern person should drive a car. Research is needed on how to shape messages that show the values of some traditions.

Main discussion points on the paper by Carmen Vercauteren et al.

A discussion about the interpretation of practices in different cultures emerges when the author notes that, surprisingly, in one of her community garden case studies, the excess cabbage was thrown away. Eleni Iacovidou and Georgina Guillen mention both that in some countries, food waste is seen as a sin whereas in other, finishing your whole plate is considered a sign of greediness or of malnourishment. If the excess cabbage would occur in another culture, it would have perhaps automatically been shared among other people.

Another topic of discussion evolves around the motivation to start new practices and how motivations can shift in time. The author notes that in her two case studies there were notable differences of motivation to join a community garden; in one case people were motivated by the socializing aspect and not by the sustainable food production aspect, whereas in the other case people were driven by idealistic visions of a sustainable world. Eleni Iacovidou adds that in a community garden case study in Milan, people initially joined because they were unemployed and wanted to eat cheap food, but then they maintained the practice because of social and community reasons.

General discussion

As both papers presented in this session used a social practice approach, the discussion revolved mainly around the usefulness, challenges and future outlook of this approach. One point of discussion for instance was that practices are interrelated. For example, the practice of eating is related to the practice of getting together as a family. Such an interrelationship gives both opportunities and challenges. A challenge is for instance to define what a practice is and where to set the boundaries. On the other hand, the interrelationship between practices can lead to the discovery of what is really important to focus on and it can give a backdoor entrance to certain issues. For example, if one studies the practices in community gardens, one could discover that social bonding is more important than producing food so one could better focus on the former aspect.

The relative importance of both money and social context for changing practices was also discussed. There are cases where money is determinant, as well as cases where it is not can be observed. Carmen Vercauteren refers to people involved in organic community gardening, but who, despite having a strong vision of eating organic food, could not afford buying organic in the supermarket. By contrast, Marlyne Sahakian mentions an example where another factor like social status was more important than money. In one of her case studies, one person who invested in solar panels on his roofs said: "Do you think of ROI when you buy a couch?". Walter Wehrmeyer emphasizes the key role of social context and leadership. For example, Michelle Obama's involvement in community gardening is affecting mainstreaming this practice in the US.

A research agenda for social practice theory was also put forward. Ricardo García-Mira suggests that practice theory could be linked to theory of social learning. Adina Dumitru suggests that the time dimension should be better integrated in order to understand the relationship between practices and time. She argues that for instance the work a-lot-and-spend culture is linked to very consumerist practices, but on the other hand leisure activities have been found to have a high ecological footprint in general. Marlyne Sahakian responds that time use methods, like diaries, are sometimes used in practice research.

Other further research questions raised include: How to facilitate changing practices? How to mainstream sustainable practices? How to kill unsustainable practices? What are the limits of mainstreaming sustainable practices? For instance how does taking into account the context and creating diversity combine with mainstreaming? How can alternative practices (e.g community sharing and urban gardening) be linked? How can the social practice theory be translated for policy makers?

III

Reporting & Wrap Up

Discussion on working sessions

Gábor Király

Budapest Business School

Chairs: Tom Bauler & Katharina Umpfenbach

During the plenary sessions three key, slightly overlapping themes were discussed: the issue of values, the issue of constraints and the issue of individual vs. societal transformations.

Participants emphasized that values were one of the main issues discussed throughout the workshop. Although everyone agreed that the dominant values of our societies need to be changed in order to move to a more sustainable society, there were considerable disagreements whether this can be done.

One topic in relation with values was about the question of conflicting values in one's life. People may have values related to sustainability and a more responsible way of life but they also have values which are at odds with sustainability. Moreover, they face with choices everyday which make acting and behaving according to these sustainable values difficult. Research, therefore, should also focus on the how to disentangle this web of conflicting values and help communities to strengthen sustainable values in their lives and practices.

The issue of the value-behaviour gap is also discussed. As the main theories on values and value change demonstrate, values remain fairly consistent over time. That means that values do not change easily. Moreover, recent research in psychology shows that the assumption that a given value acts as a precursor for behaviour is often proven false. In many cases, it goes the other way, people perceive how they behave, they rationalize their behaviour and that affects their identity and self-image. But that also raises the question of how different (social) contexts affect and guide people's behaviour and how to design them in such a way to instigate sustainable behaviour.

The second main topic was about constraints, which was also raised several times during the workshop. Constraints do not have to be perceived only in a negative manner because constraints are needed to nudge people and communities to become more sustainable. It was also underlined that resource consumption is embedded in everyday social practices mainly in consumption and people feel the right to consume more (buy a second car, have a second house) if they can afford it. Constraints therefore are necessary to limit the overall burden on the environment, however, they are very difficult to introduce in societies where free will and freedom of choice is understood as a basic and unalienable human right. Positive examples were also mentioned, such as the restrictions on smoking in public spaces. Although this has harmed the rights of a minority group but helped the rest of the society to live a healthier life. This regulation was introduced in a top-down manner and in a few weeks radically changed the behaviour of those involved. Radical behaviour changes toward sustainability therefore seem possible, if we accept top-down regulations intervening in our life. Choice architecture or choice editing was also mentioned as ways to nudge people to behave in a more sustainable way by making sustainable options easier to access while increasing the cost of using unsustainable practices.

The last main topic discussed was the dichotomy between individual and social transformations. The question was raised do we need both to catalyse transformations, and if so in what order. There was a general agreement in the group that proponents of Transition Management often overlooked the role of individual transformations in social change. Thus, more attention should

be paid to this level as well. However, participant did not agree on the relationship between individual and social transformations.

Three different arguments emerged from the debate on this issue. The first argument was about the combined nature of social and individual change. These have to go hand in hand in order to effectively change the status quo. The second argument stated that the role of social contexts is paramount. If social contexts change and some opportunities emerge, individuals and communities will change their behaviour and social practices without being forced to do so. The third position emphasized the role of systemic change. According to this position, people do not have to be persuaded in order to change their behaviour they will simply adapt to changes (instigated in a top-down manner) in their social and material environment. Apart from these positions, an important concern was raised about individual responsibility emphasizing that the dominant neo-liberal discourse has a tendency to push the responsibility for social phenomena and social change to the individual level. At the same time, little was said about the sustainability of big companies and industries. So, while discussing individual transformations we have to be aware that there is a risk that by shifting the blame on people, the responsibility of the private sector stays out of these discussions.

Final Discussion & Wrap-Up

Matthew Bach

DRIFT

Chairs: Jaco Quist & Julia Wittmayer

The final session of the workshop consisted of a series of short summaries from all plenary and working sessions. The wrap-up was led by Julia Wittmayer and Jaco Quist, who sought to highlight the overall questions of the workshop, while providing practical follow-up information.

Sessions

Session 1A explored how to match backcasting with theoretical ambitions (e.g., how to address human needs) and looked at how these roadmaps could be taken forward. No real conflict was found between backcasting and transition management, though it remains necessary to find a way for them to coexist and for researchers to connect the outcomes of their application. The session also considered what could be learnt from other countries and cultures. Finally, the question of needs and aspirations was addressed, i.e. how can we make a sustainable life more desirable?

Session 1B brought together a number of case studies (e.g., innovative value creation models) and considered the possibility and desirability of scaling these new models. Questions linking both papers included: making the goals of niches and new models explicit, and the links that exist between niches and the market economy, leading to questions of power. Further questions were posed:

- Are these 'marginal elements' really going to make a major difference in the way our economy works?
- Are these models thinking strategically, will they become mainstream or remain isolated initiatives? How do we involve actors beyond the usual suspects? Do we need to plan mainstreaming strategically or is it emergent?

In Session 2A, the need for a better understanding of consumption and production was highlighted, especially regarding the conceptualization of sustainability for models of sustainable ecological behavior. Reference was made to a finding by Garcia Mira et al. that barely five percent of interviewed persons had an understanding of sustainability. These points led to the question of whether sustainability is socially (re-) defined or pre-defined.

A general discussion on sustainability ensued exploring different conceptualizations of the concept:

- Rauschmayer argued that it could be looked at from the personal level in terms of inter-generational justice and that the challenge is to deal with individuals, while wanting to change the system and avoiding to provoke feelings of helplessness. Overall, structuring the debate is a key problem: what is really the problem, what is really at stake?
- Backhaus argued that inter-generational justice is also very systemic and definitions can be looked at from all levels. She added that the problem is linking the environmental sphere to individual behaviour.

- Pesch argued that 'sustainability' has several meanings and that it was simply a concept used as a boundary object in the 1980s to bridge the gap environmentalists and industry. Today, we have two options: accepting existing definitions or moving away from it.
- Avelino made reference to a figure by Hopwood et al. (2005) that maps the numerous perspectives on sustainability. The full reference is: B. Hopwood, M. Mellor, G. O'Brien, Sustainable development: mapping different approaches, *Sustainable Development*, 13 (2005) 38-52, <http://onlinelibrary.wiley.com/doi/10.1002/sd.244/full>.

In Session 2B, Avelino and Frantzeskaki looked at the drivers and barriers to the self-organization of local energy initiatives through a number of case studies. They tried to adapt the transition management framework by adding levels (e.g., niche-regime, undercurrent). Wehrmeyer et al. studied how young people work quite successfully in doing a backcasting exercise.

Final questions and follow up

1. What are the main outcomes of this workshop?
2. What have we learnt on pathways, scenarios and backcasting for sustainable lifestyles?
3. What are the next steps for further research and piloting?

OUTCOMES & NEXT STEPS

Participants are positive on the workshop, its format focusing on discussion and interaction, and to have had the opportunity to discuss results from different projects using pathways, scenarios and backcasting for sustainable lifestyles, and to relate the individual level to the niche or alternative practice level, as well as the level of transitions, pathways and long-term futures. With regard to the format, it was mentioned that several changes in the format compared to earlier SCORAI workshops contributed positively to the workshop; (1) having a workshop of one and half day, instead of one day, (2) discussing two papers in one discussion session, and (3) having working sessions focusing on interaction and sharing results and experiences of participants.

It was also mentioned that bringing a range of perspectives and disciplines together on the main theme of the workshop was also fruitful. For instance, Garcia Mira noted that the theoretical and practical issues of sustainability must be addressed through different approaches, disciplines and theories, and that bridging projects is essential (macro-consortia, network calls, etc.). Quist answered that new networks would be the next step and that there used to be expert and network calls by the EU. A great example is the SCORE (Sustainable Consumption Research Exchange) network led by Arnold Tukker that addressed sustainable consumption and production from different angles, such as consumption, business, design and system innovation policy. A follow-up initiative could focus on bringing together additional perspectives on sustainable consumption like the individual perspective, group perspective and society perspective, connecting disciplines like psychology, economics, sociology, and policy studies. Existing conferences and networks are relevant too, of which the following were mentioned.

SCORAI

SCORAI was inspired by the SCORE network project, which was active for some years. It was very successful, but was not continued when the funding ended. The idea was picked up in the US, where SCORAI North America was created, first as a listserv and small workshops. SCORAI

Europe was founded at Bregenz to emphasize consumption. It also has a listserv (ca. 120 members), organizes workshops along a similar format, and is tied to SCORAI North America. SCORAI is a completely voluntary organization that is bottom-up and participatory. SCORAI Europe has held workshops in Bregenz, Istanbul, Munster, etc. – all are found online (scorai.org), including papers and discussions, and has been active at the European Roundtable(s) on Sustainable Consumption and Production.

There are three upcoming workshops: two in 2014 – one in Switzerland on interdisciplinarity and one in London (summer/autumn) focusing the action part of sustainability research – and one in 2015 in Hungary on practice, equity within limits, living a good life. A call for papers can be found on the website.

IAPS

The International Association for People-Environment Studies biennial conferences: 2012 in Glasgow, 2014 in Timisoara, Romania on transitions to sustainable societies (www.iaps2014Timisoara.org), and 2016 in Lund, Sweden 300-400 participants are expected and the conferences include young researchers' workshops, etc. . Dumitru, as the co-chair of next year's conference, encouraged more interaction between the two networks.

ERSCP

The European Roundtable on Sustainable Consumption and Production is a series of conferences since the early 1990s that have a major focus on sustainable consumption and are linked to the Journal of Cleaner Production. The next conference entitled 'The Europe We Want' will take place 14-16 October 2014 in Slovenia.

IST

Finally, reference is made to the International conferences on Sustainability Transitions (IST). The 5th IST (IST2014) will take place on 27-29 August 2014 in Utrecht, The Netherlands.

Next steps

Finally, it is announced that workshop proceedings will be made and that all papers at the workshop can be included. The deadline for updated drafts has been set 10 days after the workshop, which is also the deadline for texts by discussants and discussion reports by the minute takers. Building a special issue on the workshop papers has been considered by the organisers, but this appeared to be complicated due to the diversity of papers and lack of capacity on the short term. However, developing a special issue call on visions and pathways will be considered by some of the organisers later on, but then follow-up sessions at one or several conferences in 2014 might be needed..

IV

APPENDICES

I: Workshop Programme

Monday, 7 October 2013

Time	Event	Location
12:00-13:15	Lunch (12:00 – 13:15)	Room M5-35
13:15 – 13:30	Welcome by Julia Wittmayer & Jaco Quist	Room M3-03
13:30 – 14:30	Plenary Session 1A: Vision & pathway methodologies for sustainable lifestyles <ul style="list-style-type: none"> Guilen & Nicolau, <i>BIG 2050: because living sustainably today is possible</i> Quist et al: <i>Combining backcasting and transition management: in the community arena</i> 	Chair: Derk Loorbach Discussant: Walter Wehrmeyer Notetaker: Freija van Duijne
14:30-15:30	Plenary Session 1B: Principles and Innovative Value Creation for Sustainable Consumption Pathways <ul style="list-style-type: none"> Backhaus, Van Lente, <i>Organising principles of pathways towards sustainable consumption</i> Voytenko, Mont, <i>Innovative value creation models for sustainable living</i> 	Chair: Derk Loorbach Discussant: Marlyne Sahakian Notetaker: Katerina Umpfenbach
Coffee Break		

16.00 – 17.00	Plenary Session 2A: Individual and structural factors in Pathways for sustainable consumption <ul style="list-style-type: none"> Rauschmayer, Schapke, Bauler, <i>Governance of Sustainability Transitions: Interrelating TM, practice theory and capability approach</i> Garcia Mira et al, <i>Testing Causal Models of Behavior to define pathways for change in organisations: results from the LoCAW project</i> 	Chair: Tom Bauler Discussant: Niki Frantzeskaki Notetaker: Robert Rattle
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17.00 – 18.00	Plenary Session 2B: Self-organising versus facilitated pathway development: differences & similarities <ul style="list-style-type: none"> Avelino, Frantzeskaki, Drivers and barriers for the self-organisation of sustainable energy transitions Wehrmeyer, Iacovidou, Coke, Transition pathways of pupils and professionals across 6 EU countries 	Chair: Tom Bauler Discussant: Udo Pesch Notetaker: Niko Schöpke	Room M3-03
Dinner (19:00 –) Bazar, Witte de Withstraat 16			

Tuesday, 8 October 2013

Time	Event		Location
09:00 – 10:30	Working Session 3A: Bottom-up Participatory Methods for visions & scenarios <ul style="list-style-type: none"> Pesch. Stakeholder participation: if there is nothing at stake? Wittmayer et al, Enhancing the transformative potential for communities 	Moderator: Katharina Umpfenbach Notetaker: Marlyne Sahakian	Room M3-03
	Working Session 3B: Backcasting, Scenario Analysis and Pathway development <ul style="list-style-type: none"> Dumitru et al. Pathways to sustainable change in organisations Pataki (et al.). Systems' mapping for sustainable consumption 	Moderator: Jaco Quist Notetaker: Melanie Studer	Room M5-35
Coffee Break (Rooms M3-03 & M5-35)			

11:00 – 12:30	Working Session 4A: Drivers and Barriers for Pathways and Transitions to sustainable lifestyles & communities <ul style="list-style-type: none"> Lodder, Avelino. Exploring design thinking to empower citizens in sustainable infrastructures Schöpke, Raggamby et al. Learning and empowerment Breuker, Mourik, Towards more flexible end-user energy consumption patterns & end-user lifestyles 	Moderator: Julia Wittmayer Notetaker: Julia Backhaus	Room M3-03
	Working Session 4B: Potential of Individual Change and Alternative Consumption Niches <ul style="list-style-type: none"> Sahakian. Learning from demonstration projects on sustainable food and energy practices 	Moderator: Tom Bauler Notetaker:	Room M5-35

	<ul style="list-style-type: none"> • Vercauteren et al. Community Gardening as learning spaces for sustainable food practices 	Melanie Studer	
Lunch (Room M5-35)			
13:30 – 14:30	Plenary Session 5A: Reporting & discussion on working sessions – what are the implications & complementarities, what has been learnt?	<i>Chairs:</i> Tom Bauler & Katharina Umpfenbach <i>Notetaker:</i> Gábor Király	Room M3-03
Coffee Break			
15:00 – 16:00	Plenary Session 5B: Final Discussion & Wrap-Up	<i>Chairs:</i> Jaco Quist & Julia Wittmayer <i>Note taker:</i> Matthew Bach	Room M3-03

Full Papers

1. Rauschmayer, Schöpke and Bauler. Interrelating individual and structural change
2. Guilen and Nicolau. BIG 2050: because living sustainably today is possible
3. Backhaus and van Lente. Organising principles of pathways towards more sustainable consumption
4. Voytenko, Mont. Innovative value creation models for sustainable living
5. Garcia-Mira (et al.). Testing causal models of behaviour
6. Avelino, Frantzeskaki. Drivers and barriers for Self-organization of sustainable energy transitions
7. Quist (et al.). Combining backcasting and transition management:
8. Wehrmeyer, Iacovidou, Coke, Transition pathways of pupils and professionals across 6 EU countries

Short Papers

1. Pesch and Mulder. Stakeholder participation
2. Sahakian. Learning from demonstration projects on sustainable food and energy practices
3. Breukers and Mourik. Towards more flexible end-user energy consumption patterns
4. Dumitru (et al.). Pathways to sustainable change in organisations
5. Pataki (et al.). Systems' mapping for sustainable consumption
6. Lodder, Avelino, Braungart. Exploring design thinking to empower citizens in sustainable infrastructures
7. Schöpke, von Raggamby (et al.). Learning and empowerment
8. Wittmayer (et al.). Enhancing the transformative potential for communities
9. Vercauteren et al. Community Gardening as learning spaces for sustainable food practices

Note Takers

1. Julia Backhaus
2. Dr. Marlyne Sahakian
3. Dr. Freija van Duijne
4. Melanie Studer (only Tuesday)
5. Matthew Bach (Drift)
6. Niko Schöpke
7. Robert Rattle
8. Katerina Umpfenbach
9. Gábor Király

Discussants (offered)

1. Derk Loorbach
2. Felix Rauschmayer
3. Flor Avelino
4. Freija van Duijne
5. Georgina Guilen
6. Jaco Quist
7. Katerina Umpfenbach
8. Mariana Nicolau
9. Marlyne Sahakian
10. Niki Franzeskaki
11. Robert Rattle
12. Udo Pesch
13. Walter Wehrmeyer

II: Participants List

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III. CALL FOR PAPERS

Pathways, scenarios and backcasting for sustainable and low-carbon lifestyles: Comparing methods, cases and results

Introduction

In 2009 the call 'ENV.2010.4.2.3-1 Foresight to enhance behavioural and societal changes enabling the transition towards sustainable paths in Europe' was launched. It called for bottom-up approaches addressing the question of how to overcome the gap between awareness of the behavioural and societal issues at stake and the concrete engagement in sustainability driven action, as individuals and as a society. Analysis of enabling and constraining factors for pathways towards low-carbon and sustainable lifestyles should be fed into scenario development and backcasting exercises in order to identify potential paths to engaging on an integrated effort to support the transition to a sustainable Europe. The research should address questions such as how to engage individuals and collectives on sustainable paths; what is needed in order to address the barriers and make the most of the drivers for sustainable development in terms of a) new policy mixes and b) new and innovative mechanisms for cooperation and partnerships between actors in public, private sector and the civil society.

In this call three projects were granted that started late 2010 or early 2011: InContext (<http://incontext-fp7.eu>), Low Carbon at Work <http://www.locaw-fp7.com> and CRISP (<http://www.crisp-futures.eu>) and they are briefly described in the box below.

InContext stands for 'Individuals in Context: supportive environments for sustainable living' and focuses on the interaction and reconciliation of internal and external contexts for individual and collective pathways to sustainable living. It includes local transition experiments and backcasting in three communities in three different countries, analysis of alternative consumption and production practices and aims at developing an action-based methodology that communities can apply themselves.

Low Carbon at Work (LOCAW) focuses on the drivers of and barriers to sustainable lifestyles and how these constrain and enable the everyday practices and behaviours within larger organizations. The project includes (i) the analysis of the patterns of production and consumption in the workplace and their resulting GHG emissions; (ii)

organizational strategies to reduce emissions and implement EU regulations regarding the greening of their production processes (iii) everyday practices and behaviours at work of employees on different levels of decision-making within the organization, and the relationship between behaviours and practices at work and behaviours and practices outside work, as well as the drivers and barriers for implementation of **sustainable** practices and behaviours in the workplace.

CRISP stands for 'CReating Innovative Sustainability Pathways' and seeks to identify potential pathways that will aid the EU towards the transition to a sustainable, low carbon Europe. CRISP works on developing profoundly different visions – and their implementation trajectories – and has adopted Transition Management (TM) as a methodology to develop practical, radical and implementable visions. Transition management (TM) distinguishes between three interdependent levels, namely macro (society and economy overall), meso (organisations and specific entities within the macro level) and micro (lifestyles, individuals, households) and will be combined with innovation system elements

Workshop: Aim & focus

By now (mid 2013) the three projects have generated most of their results with regard to bottom-up vision and pathway development towards sustainable lifestyles, not only within communities and regions, but also at work. Moreover, several other initiatives like transition towns and grassroots innovations have diffused further and many more research projects in which pathways and transitions are key, such as SPREAD and RESPONDER, have been started or completed. Therefore, it is a good moment to bring together results and approaches from all these different participatory and bottom-up endeavours.

The **aim** of the workshop is therefore to present and discuss papers and results in order to exchange and compare concepts, methodologies and results from the three projects mentioned, as well as from related projects and to discuss and disseminate them among the participants of the workshop. An additional aim is to search for similarities, complementarities and further lessons to be learnt, not only for researchers and practitioners, but also to develop additional recommendations with regard to pathway development and facilitation to the EU. It is expected that this workshop will shed more light on developments in Transition Management and backcasting with regard to involvement of end-users, citizens, employees/workers, consumers and communities and how this can and should complement more widely applied multi-stakeholder led initiatives and top-down initiatives led by the government targeting the provision system rather than the consumption system or empowering local communities.

Two types of contributions are welcomed;

1. Full papers that present comprehensive results and/or methodologies and that will be fed in paper presentation and discussion sessions. Deadline for abstracts of 500 words is on **August 20**, deadline for full papers between 6,000 and 10,000 words is on **September 28, 2013**.
2. Short papers, case descriptions or methodological evaluations that will be fed into working sessions evolving around (i) bottom-up & participatory vision and scenario development, (ii) scenario & backcasting analysis, as well as pathway development, (iii) drivers for and barriers to transitions towards sustainable lifestyles and communities, (iv) potential of individual change and alternative consumption niches. Deadline for abstracts of 350 words is on **August 20**, deadline for full drafts of between 4,000 and 6,000 words is on **September 28, 2013**.

Workshop format

The workshop is inspired by earlier SCORAI Europe workshops . Workshop format

SCORAI workshops are designed to maximize discussion and interaction. Space is limited to 25-30 participants, including authors, and will be filled on a **first-come-first-serve basis** and **accepted abstracts**. All participants are strongly encouraged to **read the papers in advance**, which will be distributed one weeks prior to the event. In each panel, authors will be asked to briefly introduce their key points; discussants assigned to each panel will lead the debate, with participants also engaging in the exchanges and capturing summaries. In the participation form that follows, **we are asking for volunteers to act as discussants and note-takers**.

Focus

What can be learnt from the ongoing research is that the (active) involvement of citizens, employees, consumers and end-users as the next challenge in sustainability transitions. Moreover, the workshop may include, but is not limited to the following topics:

- Cases and methods applied to local transitions or consumption transitions, focusing on participation, visioning, and pathway development.
- Conceptualization of the individual consumer-citizen and how this relates to grassroots and alternative consumption practices.

- Comparison of methodologies addressing individual actors such as citizens or consumers in influencing transitions including lessons learned from other participatory methodologies addressing local communities and consumers, such as participatory backcasting, and Local Agenda 21.
- Cases exploring niches of alternative consumption, grassroots innovation niches, and local communities as sites of social innovation and their relevance for pathways towards low-carbon and sustainable lifestyles. In particular, we seek to compare and learn from cases in Energy and Food.

Organisers & Practicalities

Main organisers from the InContext project include Jaco Quist (TU Delft), Julia Wittmayer (Drift Erasmus University), Tom Bauler (ULB), and Katharina Umpfenbach (Ecologic Institute), but the programme has been developed together with the project coordinators of the LoCAW and CRISP projects and with SCORAI.

It will be a workshop of 1.5 days, starting at 12.00 hr on October 7 and ending on October 8, 18.00 hr. It will take place in the Netherlands, in Rotterdam at the Erasmus University. Participation will be on invitation and costs of accommodation will be funded by the InContext project. There will be some options for reimbursement of travels costs of participants having accepted abstracts and having no access to funding for their trip.

Timeline

July 15	Workshop Announcement / Call for Papers
August 20	Deadline for Abstracts / Expressions of Interest to attend the workshop
August 30	Notification of accepted abstracts & participation
September 28	Deadline for full and short papers
October 1	Intended distribution of papers & abstracts
October 7-8	Workshop of 20-30 people in Rotterdam, The Netherlands

We look forward to your participation in this important event.

On behalf of the organizing team from the InContext project,

Jaco Quist (TU Delft),

Julia Wittmayer (Drift Erasmus University),

Katharina Umpfenbach (Ecologic Institute),

Tom Bauler (ULB),

In collaboration with

SCORAI Europe (Sylvia Lorek, Marlyne Sahakian, Julia Backhaus)

CRISP project (Walter Wehrmayer, University of Surrey)

LoCAW project (Ricardo Garcia Mira, University of Corunna)

IV. Picture Gallery

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