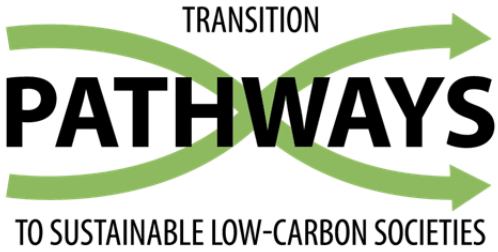

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Exploring transition pathways to sustainable, low carbon societies

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Criteria for analysis of case studies according to the different approaches of analysis

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Preface

This document is the outcome of the PATHWAYS project under Task 3.1, “Further elaboration of case studies and participative action experiments”. The document lays out the method for research and analysis of case studies in WP3. This includes some theoretical background information on case study analysis, the rationale for an analytic framework and a manual for the research to be performed. Moreover, the document provides more detailed information specifically on the LivingLab case study approach.

With this document, the rationale is laid out for Task 3.3 “Analysis of case studies” and Task 3.4 “Meta-Analysis”, which will complement and enrich the findings in Task 3.2 “Participative action research” and Task 3.3.

Executive summary

The objectives of WP3 are to identify factors that enable or disable the transition to a sustainable, low-carbon and resource efficient society for initiatives on the ground that resemble 'transitions in the making'. The focus is laid on interactive patterns of stakeholders, their social practices, norms and attitudes so as to understand how transitions unfold and may be instigated on this very practical level. The findings on social networks, learning and preferences will be fed into the models of WP1, which will allow to take limitations and opportunities into account that arise from the interaction of actors and institutions. They will also be connected to WP2 to understand the relations between niche and initiative development. This document describes the theoretic framework for case study analysis, elaborates on participative action research, and provides the case study protocol.

Theoretic framework

The case studies should provide insights into real life transition pathways. They are to give information on the constellation of stakeholders involved in the process and on the policies supporting or hindering socio-technological innovation. Findings shall lead to conclusions that show how policy design needs to be (re-)arranged to understand and support those developments at the local initiative level. Consequently, the framework focuses on exactly those topics.

In order to explain causal linkages in cases, we will compare the patterns found in real life initiatives analysed to an ideal type initiative process derived from the literature and to the ideal type Pathways A and B. In the ideal type initiative, three phases can be distinguished within a case: *gestation period*, *development period* and *implementation period*. In order to cover all relevant information and allow for a systematic evaluation of the initiatives, the following overarching topics are defined:

1. Description of setting and context of initiative
2. Motivators for action
3. Stakeholders involved
4. Analysis of (institutional) support and involvement
5. Analysis of barriers
6. Evaluation of success of the initiative (scale, scope, speed, depth)

If, for any reasons, cases selected in the DOW prove not to be useful for analysis, alternative cases will be selected. Important selection criteria are that i) the alternative case should be located in the same domain as the previous one; ii) the focus needs to be on a small-scale project on a local level; iii) the initiative needs to represent the dynamics of pathway A or pathway B; iv) the initiative should have the potential to overthrow established socio-technical regimes; v) the initiative already reached the implementation period and first actions on the ground are visible; and finally, vi). access to data and actors in the initiative need to be available as interviews will be an important tool for primary data collection.

Elaboration of participative action: The Living Lab concept

To enable innovation processes that influence society, the involvement of users into the research process leading to such innovation can be helpful to ensure effectiveness and usability. The Living Lab approach for sustainable development is an embedded research process to enable innovation processes, in which users and other actors relevant for the context, actively participate in the development, testing and diffusion of products, services and system solutions, respectively. Generally, the Living Lab concept can be understood as a research design, which involves researchers, users and developers in an open innovative development process that establishes real life sustainable environments. The Living Lab approach offers two central benefits:

1. The Living Lab approach helps to understand behaviour of users, their habits and practices in terms of resource and energy consumption.
2. Even more importantly, the Living Lab approach actively involves transdisciplinary research that can fruitfully develop possibilities to intervene on consumer practices and therewith change social practices effectively.

The research conducted in the LivingLab concept consists of three phases: i) insight research, ii) development, and iii) field testing. In the first phase the status quo in the field of interest is explored and the required/potential level of change in social practices of households is analysed. We are specifically interested in abatement actions that may lead to significant savings in resource and energy consumption and do not require (major) capital investments or compensating effects of embodied energy. The development phase prepares the user and stakeholder integrated development of a transformational design. We analyse the effect of transformational design on consumer behaviour in order to gain in-depth knowledge of behavioural transition pathways. In this development phase, a workshop and design oriented scenarios are used to find a fitting transformational design in the application domain. Finally, Field Testing encompasses the implementation of transformational designs in a quasi-experimental setting that allows to observe the effect from intervening in social practices of households. We bring transformational designs into households and test for their triggering impact on long-term behavioural change. We evaluate the experiment by means of datalogging and focus group(s). The experiment is set up in Bottrop within the region Metropole Ruhr.

Case study protocol

The case study protocol is meant as a guideline for the case study research conducted in Task 3.3. It is to lead the focus of investigation in a way that the gathered information and individual analysis will result in a standardized case study including all aspects covered by the ideal type initiative and analysed in the framework for meta-analysis of case studies. The protocol predefines questions that should be covered for the cases in general and for each period within the cases. The questions could be answered on the grounds of primary data collection, especially via interviews of persons involved and secondary data (like websites, (newspaper) articles, etc.). To account for different views on the initiatives' process it would be ideal to have both inside actors as well as outside supporters and opponents. For data collection and analysis the usual criteria to ensure validity and reliability apply.

The questions set are meant to provide a guideline and orientation (not as a prescription). This implies that certain cases can deviate from the guideline or some parts can be omitted – such deviations will be indicated in the case description/analysis. The Case Study will serve to answer the following general research questions:

- What are the special interest groups at stake?
- What enables or disables the implementation of innovative policies in the real life?
- Which implications for policy can be drawn? How does policy design need to be rearranged in order to get stakeholders on board at any level?

Contents

1 Introduction

This document lays out the method for research and analysis of case studies in WP3. This includes some theoretical background information on the case study analysis to be performed , the rationale for an analytic framework for WP3 and a manual for the research to be performed. Furthermore, an ideal type initiative process is described, which is taken as basis for pattern matching in cross-case analysis. The protocol is to serve researchers as a guideline to compile data sets on initiatives comprising all information relevant for the analysis in WP 3 and to write a case study report based on this research.

The paper continues as follows: Section 2 reflects on the purpose and the research question of WP3 and its related case studies, followed by a theoretical framework for the case studies. It also provides a procedure for selecting case studies, in case of certain case studies suggested in the DOW prove not to be suitable. Section 3 elaborates on Task 3.2 of the project: participatory action research in a Living Lab approach. Finally, section 4 provides the case study protocol.

While this paper sets out to prepare and describe the research to be performed in WP3 it is likely to be enhanced or adapted to future occurrences, findings and results within the project, so that changes may be made throughout the course of the PATHWAYS project.

2 Theoretic framework for case study research in WP3

2.1 Theoretical background and rationale for the analytical framework

One of the three analytic strategies for case study analyses Yin (2003, p. 114) suggests is the development of a case description or "*framework for organizing the case study*". This section describes the framework.

However, before doing so, we shortly reflect on the purpose and the research question of WP3 and its related case studies. The case studies are analysed to provide insights into real life transition pathways. They are to give information on the constellation of stakeholders involved in the process and on the policies supporting or hindering socio-technological innovation. Findings shall lead to conclusions that show how policy design needs to be (re-)arranged to understand and support those developments at the local initiative level. Consequently, the framework focuses on exactly those topics. It is to give the researcher a scheme that allows a consistent assessment of all cases, leading to a precise compilation, comparison and analysis of information to result in condensed answers to the research questions.

An ideal type sketch of the time periods that an initiative passes is included in the framework for analysing the content of the cases. This will help to condense all findings into a timeline showing relevant processes in three phases: *gestation period*, *development period* and *implementation period*. The terms of this periodization are adapted to the context of this study from Van de Ven et al. (1999) who arranged process observation of field studies of innovation in a similar three phases model. Assessing the chronological sequence of the socio-technical innovation allows following events over time and helps to find causal relations (Yin 2003, p. 125). By comparing the events and chronology of all case studies, explanatory hypotheses (e.g. some events must occur before others will) and cross-case syntheses shall be derived.

In addition to establishing this framework for describing the cases, we will apply *pattern matching* as an analytical tool. Patterns consist of several dependent or independent variables. Yin (2003, p. 116) suggests comparing patterns of cases to predicted ones. Their matching strengthens the "*internal validity*" of the case study. We will hence compare the patterns found in the real life initiatives analysed in Task 3.3 and Task 3.4 to an ideal type initiative process derived from the literature. The type of pattern matching applied in this study helps to develop explanations for observed causal linkages. These explanations are compiled in an iterative process as suggested by Yin (2003, p. 122). Therefore, compared to other pattern matching tactics, the final explanation is not invariably defined at the beginning of the case analysis but will unfold in the research process.

The structure of the process is as follows: At first an initial proposition about how initiatives form and evolve is developed (see section 2.4). This proposition is to be taken as a model against which the case studies will be compared after they have been collected. Findings from the case studies can lead to a revision of the proposition if they show significant differences that are likely to be systematic for initiative development. Also this matching will help in deriving

implications for political support of initiatives as it will provide an overview of a whole set of related cases. The most important aspects are summarized in a condensed form in Figure 2.1.

a) Initial proposition about initiatives
b) Comparison of findings against proposition
c) Revision of proposition
d) Analysis of other details of case study
e) Comparison of revised proposition to other case studies

Figure 2.1: Summary of the explanation building process

For analysing the initiatives, we are interested in the progress, development and the outcome of the initiative. The outcome needs to be evaluated on two levels: One level addresses how the initiative is or was able to influence its environment with regard to the development of initiatives to niches. The other level refers directly to the initiative and analyses specific outcome, i.e. did the participants reach their objectives, and how did these objectives change? Hence, the target against which this is assessed does not necessarily have to be the one intended at the start of the initiative. In its course initial aims might show to be infeasible or alter with changing involvement of different stakeholders. The focus should therefore not be so much on the outcome itself but on the process that took the initiative there, specifically on the actions and circumstances that either supported or hindered the initiative both from inside the initiative and externally. Moreover it may be possible that the initiative is still going on, which is no problem for our purpose. Still we suggest that each initiative to be analysed should at least have crossed the point of realization, i.e. the actors involved have implemented the initiative well enough that the basic research questions stated above can be answered for each case.

2.2 Overarching research themes for analysis of case studies in PATHWAYS

Within transition theory it is postulated that innovations occur and take their first steps in niches that later may or may not evolve and diffuse into a new regime or alter the incumbent one. Bearing the title "Transitions in the making", WP3 is interested in the occurrences of such innovations through initiatives[1] with respect to the potential social, economic, political and technological dynamics – and their interplay – that may occur therein.

At this point it is useful to distinguish between the terms "initiative" and "niche". For PATHWAYS we suggest an approach to and a definition of niches as provided by Schot and Geels (2008): *„A core assumption of the SNM [Strategic Niche Management] approach is that sustainable innovation journeys can be facilitated by modulating of technological niches, i.e. protected spaces that allow nurturing and experimentation with the co-evolution of technology,*

[1] We have for now chosen the term „initiative" to indicate that especially the onset but also the whole cases to be studied may not follow an exact project logic model but be characterized by change in their process, e.g. of leadership, transformation from bottom-up approach to political or economic project, etc. In this we see "initiative" as a more encompassing term. Your case may still fall under the classic concept of a "project".

user practices, and regulatory structures. [...] SNM scholars argue that sustainable development requires interrelated social and technical change. In that respect, they build on the work of sociologists of technology who argue that technological and social change are interrelated. [...] They also recognise that the rise of modernity created conditions in which technology actors usually focus on developing, testing and optimising technology, but neglect the embedding in broader societal goals, or leave it to a later stage." (Schot and Geels (2008), p. 538).

Accordingly, niches are then confined spaces where novel artefacts (technology, processes, business models, social practices, etc.) are implemented, nurtured and experimented with and where the co-evolution of technology, user and social practices, regulatory structures and the (resulting) economies occur. Depending on the experiences gained and the degree and radicalism of novelty, these artefacts may later be scaled up and evolve to form a new regime or alter the incumbent regime in an incremental way. In this concept, the initiatives to be studied in WP3 underlie and form the emergence of niches, they then co-evolve with the niche level: "*On this point, Raven (2005) and Van Mierlo (2002) made a crucial contribution by signalling the need for distinguishing between local socio-technical projects and the niche level which consists of an emerging community that shares cognitive, formal and normative rules* […] (see Figure 2.2). *Niche development can then be conceptualised as progressing at two levels simultaneously: […] in local practices* [initiatives/projects] *and the global niche level. Sequences of local projects may gradually add up to an emerging field (niche) at the global level [...]. Developments may start with one or a few projects* [initiatives]*, carried by local networks of actors, who are interested in innovations for idiosyncratic or local reasons. The cognitive rules (such as expectations) that guide these projects are initially diffuse, broad and unstable. Local projects form test beds for these diffuse ideas and spaces for the elaboration of new ideas. If learning processes in local projects are compared and aggregated, the cognitive rules at the more global niche level may gradually become more articulated, specific and stable. In this conceptualisation, a technological niche is not only characterised by protection (which tends to be phased out slowly), but also by the locality and instability of rules and networks. The movement to a market niche does not only entail a movement to more exposure to selection pressures, but also to more stable shared rules (e.g. dominant designs).*" (ibid., p. 543)

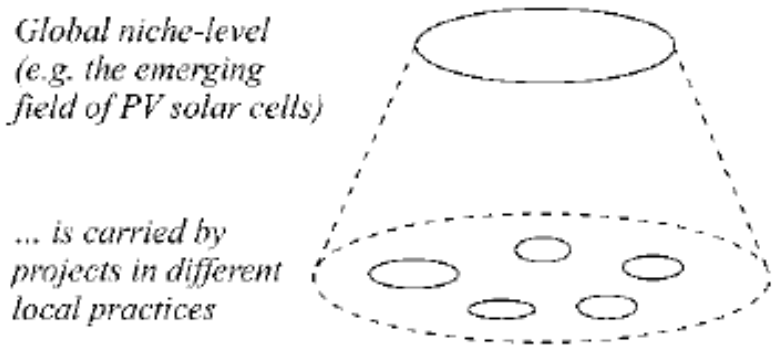

Figure 2.2: Relation of global niche level and local practices. (Geels and Raven 2006, p. 378 cited in Schot and Geels 2008, p. 543)

With respect to these postulations, PATHWAYS will not analyse initiatives in mere technological niches but aims to incorporate and highlight the interrelatedness of the economic, social, technological and political dimensions. However, the importance of the respective dimensions might differ significantly between the cases so that the resulting case studies may differ likewise.

WP3 relies on the working hypothesis that the processes associated with the initiatives we study are typically complex and dynamic with several feedback loops and possibly detours. As such, WP3 takes an exploratory and qualitative approach. The task of WP3 is hence to research cases of transitional initiatives and activities at the micro-level (within the niches), i.e. to analyse „real-life" phenomena, how they unfolded, and what their outcomes and impact were. We thus want to see what people and groups do in order to change or alter the existing regime, how they interact, and what they experience. Cases of WP3 aim to identify structures and patterns as well as the peculiarities of such initiatives and to derive implications from these findings for research and (political) practice. The cases will be characterized by the agents at work, their interactions, networks and the unfolding dynamics. Besides the different scale, focusing on groundwork and agency differentiates WP3 form the other work packages, which can generate interesting and useful complementary insights on transition processes. With regard to socio-technological aspects, the role of technology for transitions within the case and its interplay with the social and economic dynamics play a role. However, the case studies will be centered on (social) interactions and dynamics not on technological aspects per se. We will use the results to feed them into the findings for transitions of socio-technical regimes (WP2) and into the models and agents of WP1.

The following points present the overarching topics for the analysis to cover all relevant information and allow for a systematic evaluation. It is reflected in the case study protocol (Section 4).

1. Description of setting and context of initiative

In a first step, the context and setting of the case study is described. This includes a classification according to the five empirical domains of the project (electricity production, heating and cooling, transport and mobility, agriculture and food, and multifunctional land use and biodiversity) and background information on the niche in which the innovation initiative takes place (e.g. geographical site, historical background, number of employees) that are important to understand the contribution to transition pathways. Since initiative is (by purpose) an extensive term, this description will vary a lot in between cases.

2. Motivators for action

The focus of this part is on what motivated an initiative. Pressure on the landscape and therewith regime and niche, as well as individual influences inside the initiative are analysed. Examples for those are the need for an innovation or a charismatic person that has a brilliant idea and leads an initiative.

3. Stakeholders involved

In this section the special interest groups at stake are evaluated. As this question is the basis for analysing how policy design needs to be rearranged in order to get stakeholders on board at the local level, it is particularly important for WP3.4 In this part of the analysis, the network of the initiative will as well be examined. It focuses on the development and the implementation period.

4. Analysis of (institutional) support and involvement

An overall aim of PATHWAYS is to indicate how transition pathways can be promoted. Therefore, it is important to analyse what current (institutional) support initiatives experience and how they can profit of it. Some examples for such support are financial aid of different sources, the provision of affordable premises or support through expert knowledge. As support can as well be certain legislation, the analysis has to be done for all three periods.

5. Analysis of barriers

To promote transition pathways it is important to not only support initiatives but as well to diminish barriers that prevent initiatives from forming and innovations from diffusing. Barriers can be obstacles arising from external institutions (e.g. legislation, opposing citizen groups,…) or internal organizational issues. The barriers that occur in the assessed case studies will be summarised for the development of solutions at a later stage.

6. Evaluation of success of the initiative (scale, scope, speed, depth)

By scale we focus on geographic factors, meaning is the initiative a city program, does or did it affect the whole region, a city district…? Scope stands for the distinct environment of an innovation, linkages between different socio-technical dimensions (e.g. technical, ecological, political,…) and how many dimensions changed during the process. Furthermore it regards the specialization. The keywords speed and depth indicate how fast the gestation, development and diffusion went and how far reaching the triggered innovation was or still is. All in all, in this step, the effect of the initiative on the niche and its diffusion to the regime is described. Depending on the timescale of the case study, some effects to the landscape might as well be visible. Finally, the outcome of the transition and (either initial aim or goals adopted over time) is analysed.

2.3 Methodological discourse on ideal types and heuristics

The logic of ideal types is to apply explanations taken from theory and historical processes to the currently examined initiative (Geels and Schot 2010). Turnheim (2012) summarises how those historical processes have been characterised by different social scientists. The first characteristic is the unfolding of processes. Van de Ven and Poole (2005) postulate that for understanding a change process, it is essential to understand how it unfolded. Many models therefore establish ideal progression patterns to elaborate explanations and interpretations thereafter.

In the refined analysis of each single case study, comparing the actual case to the linear ideal case helps to detect irregularities. Furthermore, researchers can concentrate on combining different temporalities (Sewell 2005) of different actors and multiple processes (Aminzade 1992) overlapping within the framework established by the ideal case. Sewell (1996) postulates, that for an analysis that presupposes temporality, discontinuous events and unpredictable occurrences, changes of causal structures have to be considered as well. This means that "*the very logic by which consequences follow from occurrences or circumstances*" might change (p. 264).

2.4 Description of an ideal type initiative

The next pages form the description of an ideal type initiative process. It is provided to create a common idea of the subject under research. This is important, as the theoretic construct of an initiative is not self-explaining and an ideal-type may help to clarify and better understand the unit of analysis (Groß et al. 2005). Therefore, the following description is meant to be a sketch, which will be enlarged and enriched before the pattern matching process. It is also rather abstract since it is meant to fit initiatives both within Pathways A or B. The differences predicted regarding main actors, depth, speed and scope for the two pathways are presented subsequent to the description of the phase model.

The points presented in this chapter will be used as starting propositions for the pattern matching approach explained in chapter 1. It will hence also guide the comparative analysis of the cases and the questions laid out in the case study protocol. For this outline, we draw from literature on innovation (projects), microsociology, and citizens' action groups.

As stated in part 2, the term initiative is an extensive term explicitly chosen to indicate that not only planned innovation projects for transitional purposes but also bottom-up actions can be regarded in this study. Therefore, the group of stakeholders and their related interests in an initiative can differ to a greater extent between the cases analysed in this WP.

2.4.1 General aspects

In the early literature on innovation projects, several stage wise models and linear (cyclical) models of adaptive trial and error were postulated (e.g. March and Olsen 1975; Schroeder et al. 1989). However, empirical evidence tends to identify different patterns to this theoretical picture for innovation projects. For example, Van de Ven et al. (1999) observe that, over time, not only the initial idea of the innovation might change, but also the role and engagement of entrepreneurs, and the network of participants and stakeholders. They also find that the "real" process of innovation projects tend to deviate very strongly from the logic models that used to plan them. The outcome of an innovation project is therefore mostly undetermined and the process can be very complicated. Many of the reasons for this may be found in the imponderability of human and organizational interaction. To derive an ideal type we will take these findings into account.

As the impact of policy on initiatives is one of the central interests of this WP it may be interesting to show what factors have been found to positively influence the perception of an initiative on the public level and hence lead to more support and eventually to more success. Schneider-Wilkes (2001) identified the following factors from empirical analyses of work of several citizens´ action groups:

1. A high level of competence regarding conceptual and thematic matters sets a solid base for the implementation of the initiative.
2. A high level of political competences, including knowledge of network or gathering of informal contacts facilitates the establishment.
3. By having a continuity of at least some persons involved the initiative appears more stable and reliable.
4. A creative and steady public relations work guarantees wider public awareness.
5. Acquiring a big circle of sympathisers (e.g. by regular letters) results in higher positive perception of the initiative.
6. The integration of an initiative into regional organisations strengthens the background and widens the circle of sympathisers.
7. Cooperation with other initiatives on the same topic and with scientific partners raises the level of competence and trustworthiness.
8. If all stakeholders are integrated in the development process, the positive perception of the initiative will be high.
9. The initiative needs to acquire sufficient means of finance to be successful.

These propositions provide very good hints for the focus of the case study analysis to be carried out in this WP. We will use them for comparison with the findings made in the respective cases and hence also include them in the phase model underlying our analysis.

2.4.2 Three periods of action

In this study, we proceed by using a three-period-model to describe the cases as introduced by Van de Ven et al. (1999). They intended to develop a general phase model concluding their observations on innovation projects. For the purpose of our project, we changed the names initial and development period to the term gestation and development period. As we focus on the action on the ground the implementation of an initiative is essential. We thus only analyse initiatives that are actually carried out and therefore decide to call the third period implementation period rather than implementation/termination period as done by Van de Ven et al. The phases and their content are depicted in Table 2.1.

Table 2.1: Ideal type phases of an initiative with respective content

Gestation period	Development period	Implementation period (Termination/Diffusion)

• Initiation/ formation
• First idea + goals
• First movers
• Formation of action group
• First plan of resource allocation
• Emergence of action plan
	• Agents take preparatory action on the ground, their ideas are opened to a wider public.
	• Other stakeholders become active
	  - Coalitions form
	  - Opposition emerges
	• Reconfiguration of plans and goals while initiative unfolds (according to tested feasibility)
	• Initiative changes/evolves
	• Resources are gathered
	• New alliances may be formed
		• Implementation starts
		• Agents take concrete action on the ground
		• Resources are allocated
		• Practical feasibility is tested
		• Support/ opposition may emerge/ re-emerge/ change
		• Again measures and plans may have to change
		• Outcome:
		  - Establishment (local success)
		  - Diffusion (spill over)
		  - Failure

As already stated we assume that the processes of the initiatives we study are typically complex and dynamic with several feedback loops and possibly detours. The pattern of an ideal type initiative obviously should not cover all complexities that can be seen in reality. The description will be arranged in three parts according to its maturity. It starts in the gestation period, in which the initiative forms and passes the development period, in which the initiative becomes public and first stakeholder involvement happens. Many initiatives already fail after these two periods due to technical infeasibility, social constrains etc. For analytical closure of our case study analysis, we want to examine only cases that reach the final third period in which implementation starts and agents take concrete action on the ground. In this period the success or failure of the initiative then shows. We hence label this period “implementation period”.

The three period model offers the possibility to differentiate the starting points of each period. While during the first period solely internal planning takes place, the second period starts when the initiative is made public. The starting point of the last period is the concrete action and implementation of the initiative. By explicitly allowing detours or reconfiguration of plans and goals in the second period, we avoid back loops to previous phases and therefore make a strictly chronological description of initiatives possible. In the next paragraphs each period is described in more detail.

Gestation period

At the beginning of an initiative, there are one or several agents with an idea for an improvement of the current situation or a solution for a perceived problem (Meyer 2002).[2] These actors can either be individual people or groups, or be part of organisations (e.g. NGOS, firms) (Fagerberg 2003). They develop their idea and aim at making the solution publicly available. In research on innovation a certain gestation period is often observed in which the stage for the innovation is set. The actual initiation may be triggered by an event, which indicates the need for a change (Van de Ven et al. 1999). This concept can be transferred to the evolution of initiatives. The formation process of the initiative starts with such a triggering event implying that the action taken or the innovation performed is dependent on the context of these individuals (Nye and Hargreaves 2010). In the first period, the process is of a preparatory nature. The agents[3] form or gather an action group, make a plan how the idea is to be implemented, what resources are needed and how they should be allocated. Main support for the initiative at this stage is the enthusiasm of the group, its personal concern with the problem at hand and the belief that success can be achieved. Furthermore, there can be external developments such as developments in legislation that could potentially open up opportunities for the initiative (e.g. laws restricting CO_2 emissions in city centers favour e-mobility). In this period the initiative remains confined to a small circle in which the idea/innovation is formed and reformed until the agents decide to take the initiative into a wider public. This period thus comes to an end when the actors decide to enact the action plan by taking their ideas on to a public fore and by gathering resources for their cause.

Development period

After this important decision in the first period, the second period starts with making the initiative public. The protagonists of the initiative take first preparatory actions on the ground, resources are gathered and initially allocated (Johnson et al. 2004) and first stakeholder involvement takes place. This leads to a greater level of exposure and thus on the one hand to a formation of coalitions and the building of social capital (Pretty and Ward 2001), on the other hand to the emergence of resistance and oppositions. Moreover, because of this the idea and initiative may potentially experience higher pressure and therefore more rapid periods of change here. As Nye and Hargreaves (2010) point out: “the right thing(s)” are constantly (re)defined and (re)negotiated in unfolding social contexts of interaction and […] these dynamic relationships shape the enactment of behaviour in reflexive ways.” (Nye and Hargreaves 2010, 139) In this context Schneider-Wilkes (2001) states findings of Nowack (1988) who points out that the size of a supporting network depends on the ability of all relevant stakeholders to form an alliance, the relevance of the initiative to the citizens and the place of residence and the degree of local informal communication. He thereby shows how important but also influential the interaction in the local context is.

[2] Meyer writes about the implementation of formal projects. However, we suggest that this observation holds for formal and informal projects as well.

[3] On the preconditions of actually taking action from attitude or beliefs in environmentally orientated activities see Nye and Hargreaves (2010).

Resistance can form no matter what issue the initiative deals with. One reason for this phenomenon is called "inertia" and was already described by Schumpeter in 1934 as "resistance to new ways" of people. Some stakeholders might as well have objections due to a different perception of the initiative. E.g. Lieshout et al. (2011) analyse the argumentation of several stakeholder groups in a municipal decision process and come to the conclusions that the different groups have different scale frames[4]. These different frames lead to different priorities and evaluations and thus to not everybody valuing a process the way the initiators do.

In the course of discussing and evaluating the initiative, gathering resources etc., the initial plan might change and the goals are altered if they seem unrealistic and theoretically infeasible or reveal to not lead to or be the actual intended outcome. After these adjustments, the final goal is set according to which the success of the initiative is measured in the last period (Nye and Hargreaves 2010).

Implementation period

When the concrete action finally takes place and the initiative is implemented, the implementation period begins and the practical feasibility is tested. That is, the agents of the initiative actually implement their plans by taking measures and employing their resources on the ground and thus turn their plans into reality. Within this process they may again face obstacles and hence adaptation is still possible and likely to occur (see above). We are therefore interested in what changes were brought about in the actual implementation of the plans and how "reality" interfered with them in this stage. Outcome and success will then have to be measured according to the goals set at the end of the development period.

Again, supportive and/or opposing groups can form or re-emerge that were not aware of the initiative in the last period or did not perceive the full scope of it and therefore were not active. Now it shows, whether the adaption and adjustment process in the previous periods led to an action plan able to cope with opposition. If it does not and the opposition is too strong, this might lead to the failure of the initiative. Failure can as well occur due to overestimation of the need for the added value the initiative generates and a consequent lack of adoption. Another important reason for failure can be a lack of resources. These lacking resources can be of monetary or personal nature, the latter for example resulting from a lack of knowledge (Johnson et al. 2004).

The following categories for potential trajectories of failure can be postulated:

- Legitimacy (objectively assessed)
- Acceptability (includes subjective valuation of actors)
- Resource mobilisation (ecological, financial, moral support)
- Organisational slack (motivation)

[4] Lieshout et al. (2011) refer to scale frames as an individual interpretation process, according to the perception of reality. This can vary among individuals and organisations according to different experiences, goals, knowledge etc.

If the initiative receives enough support and is accepted locally first success is reached. The scope of success can be measured by comparing the actual outcome with the goals defined in the development period. After a local success there might as well be diffusion to other areas. In the literature many descriptions for the process of diffusion can be found. An ideal type model is the S-shaped curve shown in Figure 2.3, indicating a first slow adoption, followed by a steep increase of users and ending with market saturation (Rogers 2010). In tune with our expectancy towards the unfolding of initiatives it will be interesting to see how their development deviates from this. Besides the spatial expansion of the sphere of activity of the initial initiative, replication counts as diffusion process as well.

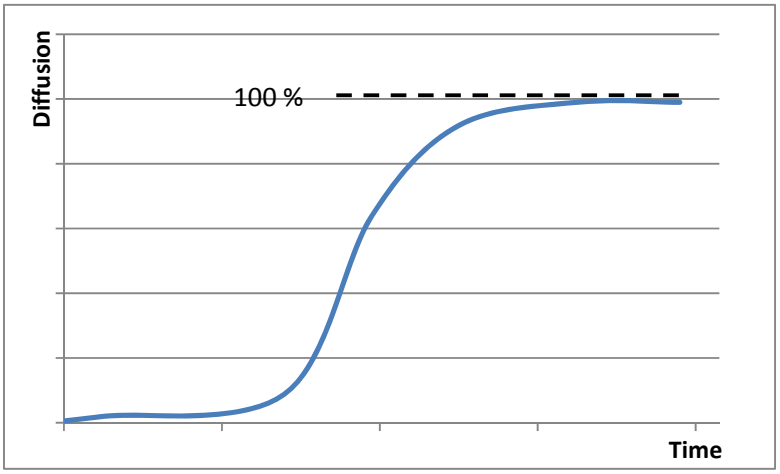

Figure 2.3: Exemplary S-curve describing diffusion process of innovations

Pathways A and B differ from one another in several ways. On the one hand, pathway attributes like speed, depth, scope and directionality are different, on the other hand, other interacting elements are visible.

Actors in Pathway A are often incumbents, meaning existing industry actors and national governments. The focus of those initiatives is on the gradual adjustments of the current socio-technological regime by replacing or extending incumbent technologies or management styles by innovations. This Pathway can be characterized by technical component substitution in order to achieve a sustainable, low-carbon society while leaving things like user practices, lifestyles or governance arrangements unchanged. Therefore, only minor institutional adjustments on regulations, norms etc. are needed. This allows an innovation to diffuse quickly and the pathway to develop relatively rapid (in years or a decade). With regard to the degree of radicalness of change, here framed as depth, there are only incremental technological changes. The scope is as well low as only components of the socio-technical system change. The directionality of the development trajectory is assumed to follow linear progression without setbacks, multi cycles etc.

Pathway B aims at a broader regime change. Lead actors in initiatives belonging to Pathway B are often new entrants, social movements and other civil society actors. The initiative might not only apply new innovative technologies, but a new organisational form can as well be part of the innovation system. Characteristic is that the changes introduced in the initiative need to be accompanied by behavioural or societal changes. These major changes need to take place in all institutional forms and change ways of thinking and doing.

When analysing initiatives that as of yet only existed for a short to medium time, it will only be possible to assume the changes that a diffusion of the initiative will bring in the future or that are necessary to lead to diffusion. Due to the limited speed of transition pathways the development of a niche, a broad regime or even landscape change is not visible with the analytical lens of an initiative and thus broader institutional changes can only be recorded within the initiative. The reason for this is speed: When analysing the speed of an initiative more closely, especially for Pathway B, there is a mismatch between the inner-initiative speed and the one in the surrounding system. Within the initiative, the speed is high and actors pick-up the new socio-technical order. The transformation process outside the initiative is slow due to the multiple elements and institutions that see radical changes. Thus it may take decades to fulfil the transformation that can be described as a multi-dimensional change in means of scope. All in all a change in technologies, markets, organisations, culture etc. can be seen. Due to radicalness and multidimensionality the initiative will face setbacks and possibly multiple cycles of reorganisation and reinvention. This is in contrast to the general idea of a pathway that is assumed to be a linear progression without reversals.

2.5 Selection of case studies

In WP3.3 case studies in each of the five research domains electricity production, heating and cooling, transport and mobility, agriculture and food, and multifunctional land use and biodiversity will be analysed. The cases to be researched therein have already been specified in the project's DOW. If cases reveal for whatever reason to not be manageable as comprehensive case study a new case is chosen as substitute. In the following the relevant selection criteria are presented.

The case should be located in the same domain as the previous one. The focus needs to be on an initiative, which implies that it is a small-scale project on a local level (regional level at most). The initiative needs to represent the dynamics of pathway A or pathway B. This means that it works on or with a socio-technological innovation leading to an adequate improvement in regard to the transformation towards a sustainable, resource efficient, low-carbon, climate-resilient, and biodiversity rich society. Furthermore, the initiative should have the potential to overthrow established socio-technical regimes. Examples for technological innovations for Pathway A and B are summarised in Table 1.2d in the project´s Description of Work. For clarification: The initiative does not need invent such a technology, the first-time implementation of it in a distinct region is sufficient. The focus may just as well be on the social innovation side.

Another important criterion for the case to be suitable for the study under WP3.3 is that the initiative already reached the implementation period and first actions on the ground are visible. Moreover, access to data and actors in the initiative need to be available as interviews will be an important tool for primary data collection. The organisational for and who started the initiative is not relevant for selection. The action can either be initiated by a private person, citizen organisation, a company or municipal bodies. Essential is that the first mover is identifiable and a network of actors evolved during the three periods. This is the basis for the research on constellation of stakeholder networks, the effect of policy design on initiatives and therewith transformation processes and how norms, habits, social practices and social context shape preferences.

While most case studies in WP3.3 are already identified, case studies for the meta analysis in WP3.4 are yet to be found. They will second and enrich the analysis by drawing from findings from already existing cases in literature. The identification process for those cases starts with looking on the domain of the described initiative. The next criterion is the geographical location. In this study, we focus on initiatives in countries in which the consortium members are located: Netherlands, United Kingdom, Italy, Germany, Sweden and Portugal. Furthermore, to allow for a comprehensive analysis covering all research questions a certain availability of data and degree of detail needs to be ensured for these cases as well. To capture as many insights and influences as possible, we want to analyse a diverse range of initiatives and therefore take the organisational form of initiative into account in WP3.4. Therewith implications for policies for different social actors can be analysed. The procedure for case study selection is shown in Figure 2.4.

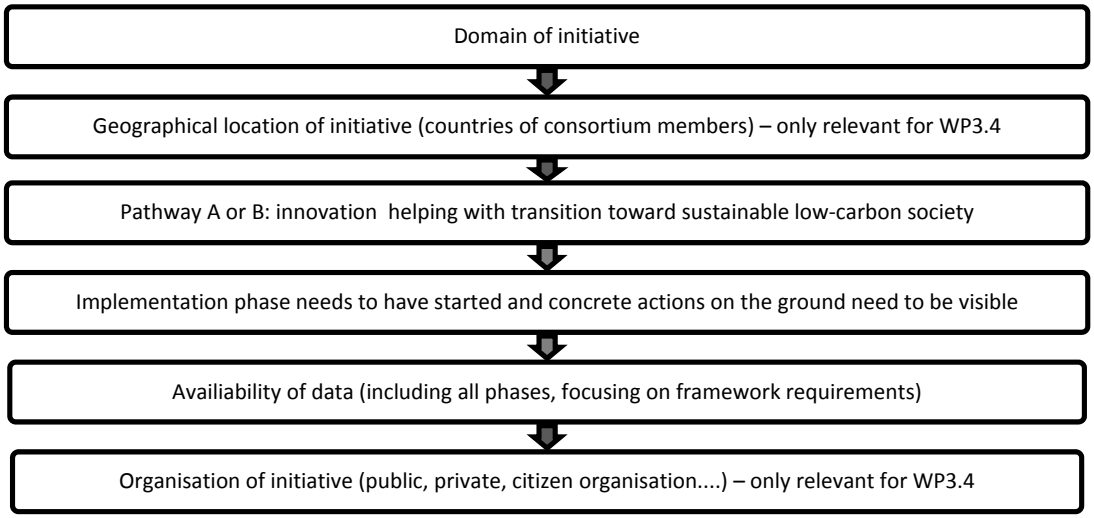

Figure 2.4: Procedure for case study selection in WP3.4

2.6 Possible biases arising from framework

To conclude the framework, we want to raise awareness for possible biases that it might include. Most prominent is the "success-bias". As pointed out in the description of the ideal type initiative, we only analyse cases that reach the implementation period. So, even if an initiative cannot reach its planned outcome or completely fails in the last period, it might have been more successful than many other initiatives. This needs to be taken into account when drawing overall conclusions for all case studies in WP3. However, we are also interested in the scaling up of initiatives into niches and success factors for policy implications so that a focus on initiatives with at least some level of success/perseverance is required.

A second bias that could be established arises due to pinning the periodization of cases to administrative events that are highly linked to external visibility of the initiative (making the initiative pubic; carrying out first actions on the ground). This could lead to a "top-down" or "planning bias". When working on the cases, it is therefore important to keep in mind, that those events were only chosen as they are supposed to exist in all cases at least once and therefore help to structure them in a common way. It is possible (and probable) that other "hinge points" are identified in the research process that are more relevant which will later be highlighted. Initiatives may also undergo these phases more than once in their evolution.

Bearing those two possible biases in mind, the framework can function as a sound background for the work in WP3.

3 Further elaboration of participatory action research in a Living Lab approach

3.1 Introduction

To enable innovation processes that influence society, the involvement of users into the research process leading to such innovation can be helpful to ensure effectiveness and usability. This interactive approach draws on insights from action research (Lewin 1997). Action research assumes that scientific findings in some social contexts can be better achieved if professional researchers take up concrete social problems in reality and actively involve 'laymen' into their research, in order to try and intervene in existing social structures.

Following this concept, the Living Lab approach for sustainable development is an embedded research process to enable innovation processes, in which users and other actors, relevant for the context, actively participate in the development, testing and diffusion of products, services and system solutions, respectively. It can be adapted flexibly according to a defined research design. Thus, users and stakeholders can be involved at all or at specific stages of research, i.e. in the phases of defining a problem, designing the research strategy, creating results or in the (iterative) application of results. Generally, the Living Lab concept can be understood as a research design, which involves researchers, users and developers in an open innovative development process that establishes real life sustainable environments.

These interactive innovation processes take place in iterative steps in real life surroundings of users (user observation, field tests (user integration and co-creation)). It is led by criteria of sustainability und usability and aims to contribute to globally and universally applicable patterns of production and consumption (in compliance with efficiency, sufficiency, consistency). The objective is to early identify trends in the field of Sustainable Consumption and Production and to integrate relevant actors along value chains (producers, handicraft, consumers, users, consultants) directly into the development of research strategies, the design and the testing process. Therein, the focus is set on resource and energy efficiency and sustainable lifestyles as well as basic innovations with an increased demand for change. Besides developing resource and energy efficient technologies and product-service systems, the main emphasis is put on contributing to a culture of more resource efficiency in economy and lifestyles (Low Resource and Carbon Society) (Geibler et al. 2013).

Taking up the idea of open innovation and user-oriented design, the approach additionally draws on results of research in systemic innovation and social studies of technological development. Integrating the thesis of co-evolution of innovation trajectories (Rip and Kemp 1998), it can be concluded that sustainability innovations, which are meant to be successful in the long-term, can only be developed in an experimental and interactive setting. Transition studies have concerned themselves extensively with the possibilities for using insights on the path-dependent developments of socio-technical systems for managing sustainability transitions. In this context, eco-innovations play an important role. An eco-innovation is understood as the development and diffusion of a new technological, organisational, institutional or social solution to a problem that helps to sustain environmental goods and contributes to a globally and long-term applicable business models and consumer levels (Fichter

et al. 2013). However, their potential contributions to sustainable development often do not fully materialise due to a lack of diffusion, imperfect utilisation or unintended side effects (Liedtke et al. 2012). In this respect, Sustainability Living Labs are considered as a reflexive user-integrating research infrastructure that seeks to respond to these problems. In the last decades a large number of product and service innovations with sustainability potential have been brought to market, without large-scale integration of users during innovation processes such as technological innovations of energy efficient household devices or social innovations in terms of behavioural change (e.g. car sharing). Due to this, these innovations often do not perform in the intended way because of unexpected user behaviour – either because of low user acceptance, wrong implementation and application or economically, socially and psychologically motivated rebound effects. For instance, studies show that the theoretical potential of high investment measures (e.g. retrofit insulation) to save heating energy is often not realized due to rebound effects (Majcen et al. 2013, Buhl 2014). Here, the Living Lab approach is used to support consumers to take advantage of their full resource and energy savings potentials. Also, studies have shown that the benefits of eco-designed innovations are hardly realised if designed without reference to user practices (Liedtke et al. 2013). We introduce the Sustainable Living Lab approach as a methodology to a user and stakeholder integrated action research strategy and assume that resource and energy consumption is mostly influenced by personal routines and subjective well-being.

Sustainable transition pathways, in which both technologically efficient development and social innovation need to be embraced, require a Sustainable Living Lab approach, because new functional social practices, which support sustainable use of resources, in connection with a specific technology can conceptualize routine behaviour. This behaviour can be both enabled and constrained by structural features from real life..

In this regard, the Living Lab approach offers two central benefits:

1) The Living Lab approach helps to understand behaviour of users, their habits and practices in terms of resource and energy consumption.
2) Even more important the Living Lab approach comes with transdisciplinary research that can fruitfully develop possibilities to intervene on consumer practices and therewith change social practices effectively.

In sum, the concept supports co-creative research and development by involving different stakeholders, especially users, in the innovation process for sensing, developing, validating and refining complex solutions in multiple and evolving real life contexts. It strives to shape long-term behavioural transition pathways by involving researchers, designers, producers and end users. The transdisciplinary research distinguishes this concept from other approaches, which revert to traditional methods. In this regard heterogeneous empirical methods are applied to studying behaviour.

3.2 Research Design

In Task 3.2 we combine quantitative social research on representative households with transdisciplinary research in the Living Lab approach. We strive to integrate mixed methods of econometric analysis and action research on households. Then, we can give insights in consumer preferences and practices as well as mechanism of innovation processes. The research in Task 3.2 allows to test for niche innovations and analyse their potential to alter social practices for the sake of effective resource and energy savings.

The innovation processes are examined using observational techniques and prototypes positioned in existing homes for studies on sustainable living. The Living Labs are designed to provide a context in which users can interact with and report on sustainable innovations and share experiences on living routines. Central to Living Labs is the development and application of user centred research methodologies which can provide insights into the usability and adoption of sustainable innovations for industry, public and academic stakeholders.

The Wuppertal Institute has advanced this research methodology in several related projects, focussing on sustainability innovations and integrating users and stakeholders. A three phase model of research is in the centre of this approach (Figure 3.1).

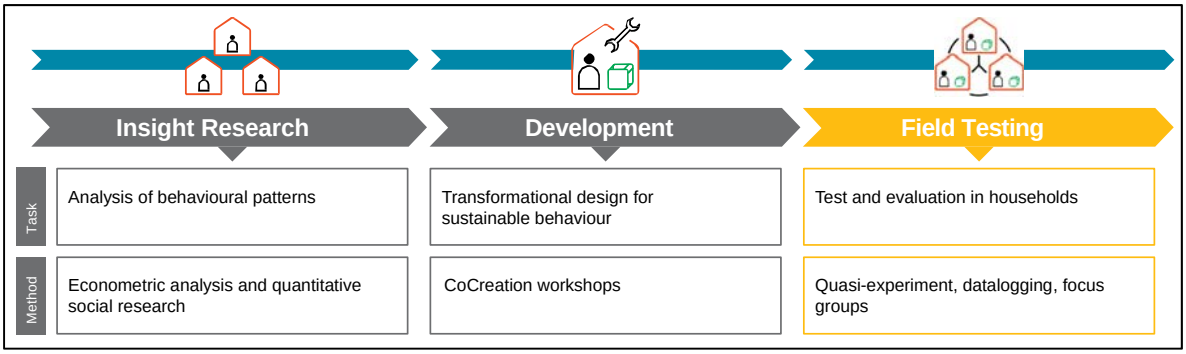

Figure 3.1: overview of the conducted phases in a Living Lab research design. Based on Liedtke et al. (in press)

3.2.1 Insight Research

In the first phase the status quo in the field of interest is explored and the required/potential level of change in social practices of households is analysed. In Pathways therefore, we analyse representative consumption patterns in complex demand systems across the envisaged application domains of Task 3.2. We test for ecological and economic impacts of potential pathways in the domains of heat. We aim to focus on broader behavioural and cultural changes that support B-pathways, i.e. broader regime transformation (see table 1.2d in DOW). We are specifically interested in abatement actions that may lead to significant savings in resource and energy consumption and do not require (major) capital investments or compensating effects of embodied energy. From a microeconomic point of view, such actions are cost-effective measures to significantly reduce energy and resource use. From a socio-cultural perspective, the

actions aim directly at changing social practices in the long run. However, this is when rebound effects enter the arena of research in favour of an encompassing analysis of B-pathways. The question arises, if those reductions in the aftermath of abatement actions hold true when accounting for e.g. emerging monetary savings, i.e., to what extent are those resource and energy savings compensated by re-spendings of the saved money in an unfavourable way.

Moreover, we gain knowledge of potential and actual savings of resources of pathway B through a representative analysis of demand systems of households in Germany. We analyse complex demand systems by econometric analysis of the final expenditures of households in the Sample Survey of Income and Expenditure, the official statistics on the standards of living of households in Germany. An ecological assessment may be provided by estimating potential and realised savings of resource use in terms of material inputs (see Buhl 2014 for example). This will lay the basis for the analysis of complex consumer behaviour and practices in the Living Lab approach.

3.2.2 Development

A second phase prepares the user and stakeholder integrated development of a transformational design. We analyse the effect of transformational design on consumer behaviour in order to gain in-depth knowledge of behavioural transition pathways. Because a transformational design is supposed to actively shape users' attitudes and practices by empowering self-improvement and quality of life. They aim to address intrinsic motivations of changing practices rather than to rely on extrinsic incentives such as monetary savings from behavioural change. Thus, abatement actions turn into behavioural sufficiency in households. Transformational designs of abatement actions and sustainable products are supposed to intervene and disturb sustainably adverse routines in a playful way and hence drive the user to reflect routines and behaviour. Feedback and gamification (i.w.s.) are therefore seen as relevant strategies to effectively address resource and energy consumption in households (Karlin et al. 2014). They can initiate behavioural transitions in order to change routine social practices with high resource and energy consumption (Laschke et al. 2011, Liedtke et al. 2013).

In this development phase, a workshop and design oriented scenarios (DOS) are used to find a fitting transformational design in the application domain. The choice of the transformational design will build on previous research on everyday routines in the domain at the Wuppertal Institute. We will seek further knowledge on why consumers are not able to alter social practices, which transition points these may offer and which actors within this context need to be addressed. According to the scheme presented above, we will invite stakeholders along the value chain from designers, suppliers to end-users to participate in the development phase. Based on those insights, we will then be able to develop and test transformational interventions. E.g. in a co-creation setting: We will generate a range of possible design interventions based on the insights gathered in the phases before. "The co-creation process can be a series of workshops in which participants will be asked to work with design researchers to develop ideas for new products, services and systems that could help them reduce energy consumption at home. The objective will be to generate ideas, test hypotheses and to

incorporate the participants' personal knowledge and expertise into the design process. The co-creation sessions should provide an interactive, informal and imaginative space where participants are inspired to come" (Baedeker et al. 2013).

Based on those insights, transformational design objects have been developed in related projects. An elaborated and tested example of transformational objects is the shower calendar designed to encourage water savings (see Figure 3.2 for design concept).

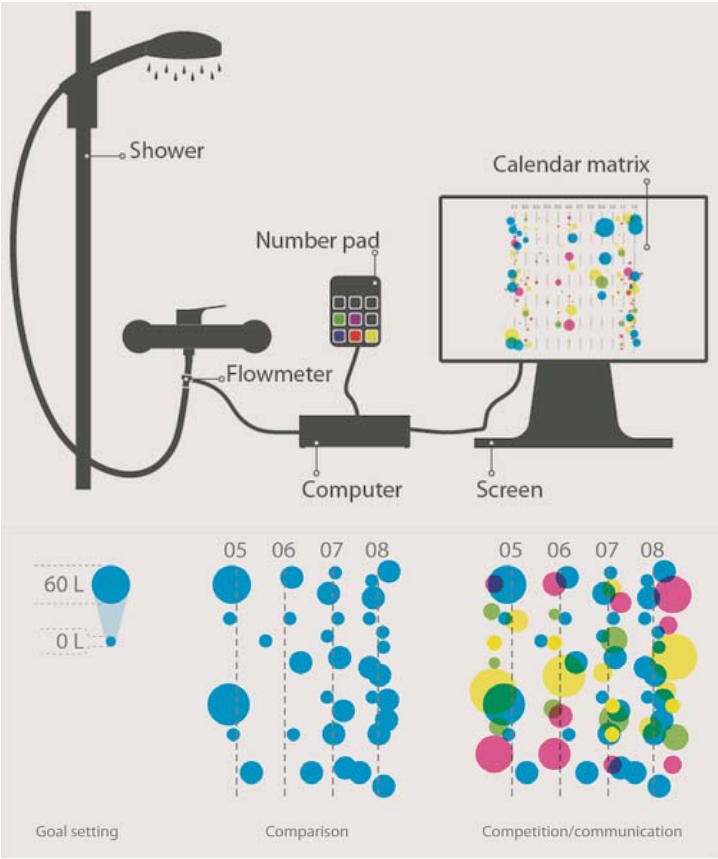

Figure 3.2: Shower calendar[5] – set up and intervening principles. Source: Laschke et al. (2011)

Users identify themselves by pressing a button. A large dot of the user's personal colour appears at the current date in a calendar-like matrix. The dot represents 60 litres. The different colours identify different people, thereby providing an individualized feedback over time. In general, Transformational objects come with irony, choice and are not deliberately smart. In this regard, the concept below employs feedback principles of „goal setting, comparison, competition, and communication" (Laschke et al. 2011). For heating, no prototypes have been realised yet. The design of intervening transformational objects may orientate on the principles described above.

[5] For more information see http://www.pleasurabletroublemakers.com/#/shower-calendar/

3.2.3 Field Testing

Main emphasis of Task 3.2 is on the third phase of the Living Lab approach. Field Testing encompasses the implementation of transformational designs in a quasi-experimental setting that allows to observe the effect from intervening in social practices of households. We bring transformational designs into households and test for their triggering impact on long-term behavioural change. Transformational designs in our setting are envisaged to be low cost niche innovations that are supposed to provide relatively effective reductions of resource and energy consumption in households mainly based on change in behaviour. We hence test and evaluate for behavioural change and contribute to research on behavioural transition. We evaluate the experiment by means of datalogging and focus group(s). Datalogging informs about energy consumption in households throughout the test phase. A focus group helps to understand drivers and barriers to behavioural transition pathways from a qualitative perspective. In extension to co-creation workshops in the development phase, both will help to understand mechanisms and struggles of adoption and diffusion of eco-innovations.

3.3 Innovation City Ruhr as setting for research

The experiment is set up in Bottrop within the region Metropole Ruhr. Placed in Bottrop is "*Innovation City Ruhr*", a pilot area for climate-optimised urban reconstruction unique in Europe. Involved are about 70 leading companies from the Ruhr area and North Rhine-Westphalia. As a densely populated region that is traditionally characterised by heavy industry and coal-based energy supply the Ruhr area faces a particular challenge of energy transformation in order to cope with climate and structural change. Innovation City is thus an important opportunity to become a world pioneer in climate protection technologies. In the long run, the aim is to transfer the findings and the gained knowledge to other comparable European towns.

The idea of Innovation City Ruhr, Model Town Bottrop, is to transform a complete city district with a population of about 70,000 into an exemplary district for energy efficiency. The concrete aim is to reduce CO_2 emissions by 50 per cent by the year 2020 and to improve the quality of life through better standards of housing (living). Since 2010 more than 100 projects addressing different fields of action (living, working, energy, mobility, city and activation) have already been proposed. Large private and commercial investments have already been implemented. In the process of implementation of these projects, governments, business and sciences are working closely together and in concert with citizens. The idea of the Innovation City Ruhr project is an energy transition that is initiated and supported "from the bottom". As a transdisciplinary setting, Innovation City Ruhr is based on strong citizen involvement because the citizens of Bottrop have the opportunity to participate through contributing individual suggestions and visions for the future of the city. E.g. households are now becoming energy producers instead of only being energy consumers. Innovative technologies like intelligent energy management systems and energy related modernisation measures of individual buildings contribute to increasing energy efficiency and advantages also for adjacent buildings[6].

[6] For more information see: http://www.icruhr.de

Through these efforts Innovation City Bottrop has become a flagship initiative for the German *Energiewende* in North Rhine-Westfalia. Bottrop was selected because it won the competition of the Initiativkreis Ruhr with a large participatory blueprint for a low-carbon transition process in which 16 cities participated. The cities which participated in Innovation City competition have now created a network in order to learn from the experiments and solutions developed in Bottrop. This shows that the Innovation City Ruhr is a "Realexperiment" for the whole Ruhr area, North rhine-Westphalia and for the German energy transition (Schepelmann et al. 2013). The InnovationCity Ruhr project is controlled and co-ordinated by the InnovationCity Management GmbH which is an official partner of Pathways. Participants in the development phase of the participative action research as well as the households in field-testing are recruited together with the InnovationCity Management.

3.4 Overview of Research Design

In the end, we provide a representative analysis of pathways B in the arrays of heat and to some extent in food by conducting an econometric analysis of complex demand systems and potential rebound effects. In addition, we analyse the benefit of transformational and participatory research that is supposed to intervene effectively by empowering intrinsic motivation rather than extrinsic incentives of pathways B.

Task	Representative analysis of behavioural change and consumption patterns (Insight Research)	Research Design Experiment (Development and Field Testing)	Test and Evaluation (Field Testing)
2014/Q3			
2014/Q4			
2015/Q1	M2.3.1		
2015/Q2			
2015/Q3		M2.3.2	
2015/Q4			
2016/Q1			
2016/Q2			
2016/Q3			M2.3.3
2016/Q4			

M2.3.1 Working Paper on behavioural change and rebound effects
M2.3.2 Draft of development and quasi-experimental research
M2.3.3 Working Paper on findings of PAR

4 Case Study Protocol

4.1 Introduction

The objectives of WP3 are to identify factors that enable or disable the transition to a sustainable, low-carbon and resource efficient society for initiatives on the ground that resemble 'transitions in the making'. The focus is laid on interactive patterns of stakeholders, their social practices, norms and attitudes so as to understand how transitions unfold and may be instigated on this very practical level. The findings on social networks, learning and preferences will be fed into the models of WP1, which will allow to take limitations and opportunities into account that arise from the interaction of actors and institutions. They will also be connected to WP2 to understand the relations between niche and initiative development.

This case study protocol is meant as a guideline for the case study research conducted in Task 3.3. It is to lead the focus of investigation in a way that the gathered information and individual analysis will result in a standardized case study including all aspects covered by the ideal type initiative and analysed in the framework for meta-analysis of case studies. We will hence predefine questions that should be covered for the cases in general and for each period within the cases. We suggest answering them on the grounds of primary data collection, especially via interviews of persons involved and secondary data (like websites, (newspaper) articles, etc.). To account for different views on the initiatives' process it would be ideal to have both inside actors as well as outside supporters and opponents. For data collection and analysis the usual criteria to ensure validity and reliability apply.

The questions set are meant to provide a guideline and orientation (not as a prescription). This implies that certain cases can deviate from the guideline or some parts can be omitted – this should be indicated it in the case description/analysis. We suggest that the case study report be formulated following the questions below. Each report should have a length of 20-30 and no more than 40 pages (potential appendices not included). Graphics can help to facilitate the communication of complex relations. For example, to indicate how the network of an initiative evolves over time, a graphic of all stakeholders involved, their interrelations and positions towards the initiative could be compiled at the end of each period.

The Case Study will serve to answer the following general research questions (from DOW):

- What are the special interest groups at stake?
- What enables or disables the implementation of innovative policies in the real life?
- Which implications for policy can be drawn? How does policy design need to be rearranged in order to get stakeholders on board at any level?

4.2 Background of the Initiative and Overview

0.1 Data sheet. The initial questionnaire provided for each case can be used as data sheet preceding each case study report. The questionnaire can hence be updated an enriched based on the findings and added to the report for a quick and illustrative overview.

0.2 Executive summary of the initiative with timeline of the most important events. This part introduces the case study, enabling the reader and analyst to understand the content of the case, what the outcomes were and what major insight for the aims of Pathways could be derived.

0.3 General background of the case, with overarching developments, trends, political issues, etc. that spurred the initiative. It is important to learn if there were general developments in the case's environment that led to the emergence of the initiative or influenced its progress. A focus should be on country specific developments and how norms, habits, social practices and the social context shape preferences and decisions. It is important to locate the case within the general development of the domain in the specific country and if possible provide findings from the literature on the state of the domain/innovation in general.

4.3 Methods applied

This section informs the reader about the specific methods applied, quality of data etc. The following questions might be helpful:
M.1 Which methods were used in data collection?
M.2 Which data were collected?
M.3 Which instruments did you use to analyse the data?
M.4 Were there problems regarding reliability and validity? What has been done to amend these?

4.4 In-detail description of the case

4.4.1 Gestation period

1.1 When and where did the initiative form? Was there a triggering event? Were there motivators for action? The question aims at information on the time and place of the formation of the initiative. E.g. the need for the initiative might have existed already some time before a first mover started it. It is possible that some kind of triggering event acted as starting point.

1.2 What were the first idea and the first goal of the initiative? Initiatives often form in order to improve a current situation or to offer a solution to a perceived problem. Therefore, in a first step it is important to find out, what the reason underlying the initiative was and what the respective goals were.

1.3 Who was (were) the first mover(s)? What enabled him/her/them? The first mover or initiator of the initiative can for example be the person who first had the idea on which the initiative is based. In any case, the first mover perceives that he or she is capable to take action and to realise the goal. The first mover does not necessarily have to be a single person but can instead be a group of people and/or organizations. Where there any characteristics like special knowledge making him/ her/ them especially suitable for being first mover?

1.4 How did the first action group form? What size did it have? This part describes the process in which the initiative acquired its first members. How many members were they and who were they (names; if possible, qualification, motivation)?

1.5 What did the first plan of resource assembly and allocation look like? This part focuses on how the initiative initially organized itself and e.g. how financial resources were planned for the development and implementation of the initiative, how many persons were working for it etc. It is entirely possible that there was no initial plan but that the initiative emerged through some informal momentum. In that case it would be important to learn how the organization and resource allocation process evolved informally.

1.6 What concrete measures were included in the first action plan? Measures stated in the first action plan could be preparatory steps such as the development of a network with distinct steps to approach different stakeholders, develop partnerships, internal organisational issues, etc. It is possible that steps already belonging to the implementation and actual carrying out were included in the plan.

1.7 What was the role of governance in this period? Who directed the initiative? Was there governmental participation, support or opposition? Who was targeted by those actions, what measures were applied and on what level (national, EU vs. global)?

1.8 Were there any other relevant events/occurrences/details in the gestation period not covered by one of the questions above? Have there been any events in the gestation period that determined important steps or measures in the period that are not covered by the former questions? Which were they? What was their contribution?

4.4.2 Development period

2.1 How long did this period approximately last?

2.2 When (after what time since the first mover became active) did agents take first preparatory actions? To answer this question, an estimate on how long the gestation period lasted should be given. Was there a specific event at which the first movers felt the time for going public had come? How was that point determined?

2.3 What were the first steps in this period? The first steps could for example be the preparatory steps mentioned in 1.6. Organisational issues could for example be the search for a location, for personnel etc. Besides a list of first steps, this question aims to detect issues neglected by the initiative that later turned out to be important.

2.4 How were resources gathered? After having made a plan of what resources are needed in the gestation period, in this period, the action group needs to gather its resources. How was that performed? Which resources were they? What were the effects on the initiative?

2.5 Who was affected by the initiative in this phase and how did stakeholder involvement take place? This question addresses which members of the local society were affected by the initiative and how they were addressed and involved in the process. Stakeholders can be citizens (either individual or organised in groups), organisations, companies, and municipal organisations, etc. While some of the stakeholders might have profited from the initiative, others might have been negatively influenced or might have even feel threatened. Some stakeholders might as well have been affected, but did not care about the initiative and are therefore not visible to the action group.

2.6 Was there support or barriers? In what way and by whom? This questions aim at the reactions the initiative face from external sources. Which support and which barriers did the initiative receive/have to face? Support and barriers can both be found on different levels. While there can be legislative matters e.g. laws promoting emission reduced traffic in city centers, they can as well be of financial or an idealistic nature.

2.7 Were there frictions between the gestation and the development period? E.g. did important members change? Did the initiative's members discover that they had missed something that needed immediate response?

2.8 Was a reconfiguration of plans and goals necessary? Why? When the first mover or group of first movers starts to articulate their goal and the initiative is exposed to external influences, the initial plan might be altered. If this happened. What were the reasons for this?

2.9 What changes were there? This question can be answered comparing the initial plan and goal with the new, altered ones. The focus point should be on the difference between them and why the change was seen as a necessity, advantage or chance.

2.10 Who were the main drivers in this period? Were there changes in the personnel or organisation of the initiative? Not only plans and goals of an initiative can change, persons (or groups/organizations) or organization might change as well. Some people involved in the initiative might lose interest, others might stop their involvement due to a lack of time or other, personal reasons, while still others join, etc.

2.11 What was the role of governance in this period? Who directed the initiative? Was there governmental participation, support or opposition? Who was targeted by those actions, what measures were applied and on what level (national, EU vs. global)?

2.12 Any other relevant findings in the development period not covered by one of the questions above.

4.4.3 Implementation period (Termination/Diffusion)

3.1 How long did this period approximately last?

3.2 Who were the main drivers in this period? Did they change with regard to the earlier periods?

3.3 What were the steps of implementation? Which practical steps of action were taken to implement the initiative on the ground? The answer to this question therefore not only addresses the means themselves, but as well the differences and as well issues neglected by the initiative that in the future revealed to have been important.

3.4 Did the plans of the initiative proof to be feasible? If not, what was the reason? As this period is basically about taking operational action feasibility equals the success or failure of the initiative. To prevent later initiatives from failing, it is important to analyse the reasons why plans did not work out as planned and why this was not foreseeable and lead to a change of plan and/or actions. E.g. lack of finance or institutional back-up.

3.5 Were there frictions between this and the earlier periods? E.g. did important members change? Did the initiative's members discover that they had missed something that needed immediate response?

3.6 Was a reconfiguration of plans and goals necessary? Why? When the first mover or group of first movers starts to articulate their goal and the initiative is exposed to external influences, the initial plan might be altered. What were the reasons for this?

3.7 Which changes occurred? This question can be answered comparing the initial plan and goal with the new, altered ones. The focus point should be on the difference between them and why the change was seen as a necessity, advantage or chance.

3.8 Was there support or barriers? In what way? Not only in the development period, but as well in the implementation period is it possible for the initiative to receive support or to be confronted with barriers. As possibly more stakeholders become aware of the initiative during implementation, this point is very important for the outcome. New alliances as well as oppositions can form. Support / opposition may change and should be described. Who were the supporters/opponents in this period? What changes were there? Did support/opposition increase or decrease? How did the network evolve, etc.?

3.9 Who was affected by the initiative in this phase and how did stakeholder involvement take place? This question addresses which members of the local society were affected by the initiative and how they were addressed and involved in the process. Stakeholders can be citizens (either individual or organised in groups), organisations, companies, and municipal organisations, etc. While some of the stakeholders might have profited from the initiative, others might have been negatively influenced or might have even feel threatened. Some

stakeholders might as well have been affected, but did not care about the initiative and are therefore not visible to the action group.

3.10 What was the role of governance in this period? Who directed the initiative? Was there governmental participation, support or opposition? Who was targeted by those actions, what measures were applied and on what level (national, EU vs. global)?

3.11 What was the outcome of the initiative? Was it successful or did it fail? The outcome is to be assessed on two levels. The *first* focus is on the initiative itself: In case of success information is given with regard to scale, scope, speed and depth acquired. However, there might be cases in which the initiative did not meet the goals set before the start of the implementation period but still seems to have been successful in some other regard in retrospect. This would of course be very interesting as well. A focus is then put on how it was possible to change plans and actions during the implementation and what the final differences between the plans and the result were. Also, an initiative might still be ongoing and does not have a fixed end-point, then it is important to find a reasonable end-point for the investigation. The *second* focus is set on the environment of the initiative. A first evaluation of effects on socio-technological dimension is already included in the scope analysis. This point now aims at a clear assessment of how the initiative affected its surrounding with regard to a possible development to niche level.

3.12 If it was successful, has it been replicated? Did it come to diffusion/spill over? With a view to upscaling this question addresses whether the initiative stayed on a low regional level, diffused to other regions, was able to establish a niche or if it just stayed a single phenomenon, not diffusing at all. If the initiative vanished after some time this would as well be the place to state it.

3.13 Any other relevant details in the implementation period not covered by one of the questions above.

4.4.4 Summary/Synthesis

4.1 Short summary of the case and your findings.

4.2 In what ways did the initiative deviate from the ideal type? If the findings are compared to the ideal type, are there major deviations? Can you explain these? (E.g. overlap or leapfrogging of periods, altogether different process, etc.).

4.3 How is this initiative related to Pathway A or B? How does the case fit into the different Pathways and why?

4.4 What results are significant to the PATHWAYS project and why? (WP3 and PATHWAYS in general) What are the potential major contributions of the case with regard to the research questions of WP3?

- Who were the special interest groups at stake?
- What enabled or disabled the implementation of this initiative in the real life?
- Which implications for policy can be drawn? (How does policy design need to be rearranged in order to get stakeholders on board at any level?)
- Are there direct implications to other parts of PATHWAYS? E.g. what does this case imply with regard to multi-level integration in WP 4?

4.5 How do you judge the momentum of the initiative with regard to its potential of inducing either Pathway A or B? From your perspective, does the initiative have sufficient depth, scope and speed to effectively introduce one of the Pathways?

4.6 What are the implications to be drawn for initiatives in general from your findings? With all the limitations that result from investigating a single case, are there findings that you find are exemplary and should be considered on a general basis?

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