Energy transition and behavioural change in rural areas

The role of energy cooperatives

Working Paper no 60

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Abstract

The overall aim of this study is to investigate energy transition processes in rural areas by paying particular attention to the role of energy cooperatives in these processes. The study should mainly uncover, if and under which conditions energy cooperatives provide favourable structures for initialising transition processes in rural areas and involving relevant stakeholders. A particular focus will be on the question of agency in energy transition processes and the internal drivers and motivations of the people to become involved in energy cooperatives.

The theoretical background of the study is the transition theory and transition management (TM) concept, which we complement by drawing on Practice Theory and social learning in order to explain behavioural changes.

The study mainly builds on an empirical case study in the Rhön-Grabfeld district in Northern Bavaria (Germany). Several energy cooperatives were formed there recently through the support and promotion a small rural consultancy. In addition, the results from the case study will be complemented by and compared with other case studies from Denmark and Spain taken from the literature.

One of the main research question will be, to what extent energy cooperatives can be considered a good practice example for participatory involvement in transition processes and to what extent does this have an influence on the inner drivers/motivations of actors in this transition, possibly leading to behavioural changes.

Contribution to the Project

WP 201 will contribute insights about transition theories by including an inside view of actors. It will contribute to enhance this approach by analysing three case studies. Here, the collective level is studied through the niche level (see transition approaches), i.e. through relatively structured networks constituted of (social) innovators and early movers/innovators developing, structuring and diffusing alternative practices, along specific rules, norms, roles (institutionalisation process). The case studies will contribute to the understanding of driving forces of individual actors and on behavioural regularities of frontrunners, who act as change agents in finding innovative solutions to societal challenges. Moreover, by dealing with the implementation of energy coopertives in rural areas, it will uncover how cooperative structures can facilitate a transition to more sustainable energy production and to which extent cooperatives can change environmental behaviour.

Keywords:

Academic research, Behavioural economics, Post-industrialisation, Social development, Social innovation, Socio-ecological transition, Transition research

Jel codes:

D83, Q01, Q28

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Figures

Executive Summary

A key assumption of this study is that systematic failures in the achievement of sustainability objectives can not be solved by governmental interventions alone, but require gradual and radical changes in subsystems of the overall socio-economic system. These can be driven by social and technological innovations and societal bottom-up transitions involving citizens, business, and civil society who become frontrunners in their specific environments.

In the European Union, social and technological innovations are not only needed in cities but also in rural areas, which face specific challenges as a result of global trends and further enhanced by the economic crisis. These challenges include an ageing population, high unemployment rates, social disparities and the lack of adaptive potential to the global market.

Scope and objectives

This study mainly uncovers if and under which conditions energy cooperatives provide favourable structures for initialising a sustainable implementation of renewable energies in rural areas. A particular focus lies on the role of frontrunners in energy transition processes and the motivations of the people to become involved in energy cooperatives. The study also investigates if and to what extent engagement in energy cooperatives fosters (environmental) behaviour change among their members.

The analytical approach of the study is embedded in the perspective on transitions to sustainable development. We considered the Multilevel Perspective (MLP) delineating changes in socio-technical regimes as well as Transition Management (TM) providing a governance framework for transitions, to be a comprehensive approach to analyse the dynamics and drivers of changes in regions, in economic sectors like the (renewable) energy sector and in the society as a whole. By linking transition experiments in rural areas to energy cooperatives and to behavioural change, this study is apparently the first of its kind.

Three case studies

The empirical analysis mainly builds on a case study in the Rhön-Grabfeld district in Northern Bavaria (Germany). Several energy cooperatives were formed there recently through the support and promotion of Agrokraft, a small rural consultancy, primarily with the aim of raising the added value of the region and to foster rural development. After gaining experience with the installation of roof-top and ground-mounted Photovoltaic (PV) systems, the first energy cooperative was formed in 2008 to invest in a biogas combined heat and power station. Other cooperatives soon followed and have more recently embraced wind power plants. The case study was assumed to be a good example of the successful promotion of renewable energies in rural areas leading to various benefits for the region and the people living in this district. Different kinds of data and information were gathered in interviews during two site visits with the use of an online questionnaire and a screening of background documents.

The results from the case study are complemented by and compared with two other case studies from Denmark and Spain taken from the literature in order to allow for some general conclusions on the role of cooperatives in energy transition processes.

Main results

The case studies revealed some factors/characteristics that are crucial for the promotion of renewable energies in rural areas.

- Legal framework favouring renewable energies over fossil energies, enabling a secure investment environment
- Funding to support initial activities that do not yet generate income
- Frontrunners deeply rooted in the region and of high reputation among population
- Established networks of actors and stakeholders
- General attitude and willingness towards change among at least some parts of the population
- A simple, convincing and highly inclusive concept
- Spaces and capacities for open dialogues

The case studies also revealed that, in addition to being a pure investment opportunity, energy cooperatives offer the opportunity for participation and engagement of local citizens and can therefore be seen as a useful driver of transition experiments. They increase acceptance for renewable energy installations by being open to all citizens in the affected region and generate profit for the community as well as for each individual. However, as the case study in Spain illustrates, a cooperative can also operate at a supra-regional level and offer its members some of the same benefits of smaller more local cooperative energy projects.

Concerning the potential of energy cooperatives in changing (environmental) behaviour, the results can be summarised as follows:

- It is mainly altruistic motives rather than profit-driven motivations that drive people to become a member of an energy cooperative.
- The most relevant behavioural change occurred in energy consumption and financial investments.
- While the engagement in energy cooperatives had an effect on the environmental behaviour of the members, for every field of behaviour at least two thirds of the respondents did not perceive an effect or were unsure.
- The gender balance of respondents and the level of activity in energy cooperatives clearly show a notable male dominance.

While the study revealed that cooperative structures could to some extent foster changes in behaviour towards more sustainable practices, these results are not yet consolidated and require more evidence from other contexts.

Conclusions and recommendations

In conclusion, our study demonstrates the high value of cooperatives in the economic and societal development of rural areas. While energy transition is the focus of this study, the

strengths of cooperatives in transition experiments, namely their high potential for social inclusion, participation, capacity building as well as their contribution to foster local economies and to support community activities, can also be transferred to other transition contexts.

Policy makers should consider that sustainable transformation of energy systems is not only about diffusing the right technology but that action needs to take place at local level with local conditions and requirements. Therefore, measures and programmes should also support regional and local actors to build capacities through funding, to enhance skills through education and trainings and to disentangle unnecessary regulations or obscure responsibilities.

Taking into account human factors, which, according to our study, play a significant role in transition processes, we propose a paradigm shift in policies towards what we call an “enabling policy”.

1. Introduction

1.1 Background

Despite numerous concepts and strategies to foster sustainable development from governments and different societal actors, the global economic system is still characterised by a high and continuously increasing depletion of natural resources, further degradation and contamination of natural systems, increasing GHG emissions and a continuous decline of biodiversity. At the same time, the world population is expected to grow up to 9 billion until 2050 and inequality of wealth within and between countries worldwide is increasing. This means, that a radical change of our economy is needed to substantially reduce the resource flow, to shift societies towards a low-carbon living model and to ensure food security and well-being for all people around the world. However, path dependencies building on existing technological, governance-, knowledge-, and power structures are among the reasons why non-incremental, fundamental and structural transformations are currently impeded and only occur in certain niches.

Some argue, that these systematic failures can not be solved by governmental interventions alone, but require gradual and radical changes in subsystems of the overall socio-economic system (Geels, 2002) mainly provided by societal bottom-up transitions involving citizens, business, and civil society who become frontrunners[1] in their specific environments. These transitions have to be built on different kinds of innovation. Besides the development and diffusion of green technologies (technological innovations), new business, services, organisation and behavioural structures and models (social innovations) play a major role in societal transitions.

As “primary arenas of social movements and other civil society social experiments” (Gerometta et al., 2005) cities and urban areas are the major origin of social innovation initiatives also due to their advantages in terms of infrastructure, population density, social and cultural diversity. But innovations are also needed in rural areas, which, compared to cities, face other challenges caused by major global trends and the economic crisis, such as an ageing population, high unemployment rates, social disparities and the lack of adaptive potential to the global market.

[1] Another term often used in this context is “change agents”, whereas we do not see a major difference to “frontrunners”, which we will use throughout the report due its prevailing usage in transition theory.

Agriculture and industry used to be the traditional economic sectors in rural areas, but the tertiary sector, especially tourism, has become more significant in many European regions in the last decades (European Citizens' Panel, 2007, p. 10; Matthews, 2007, p. 4). While the economic importance of agriculture is under continuous decline accounting only for 14% of employment and 4% of gross value added (GVA) in 2008, it still occupies the greatest share of the EU's land. On average, 45% of land in the EU was used for agriculture in 2007 (European Citizens' Panel, 2007, p. 6; European Commission, 2011a, p. 34). In some regions, mainly in new Member States, there is still a heavy reliance on agriculture for their incomes and economic development (European Network for Rural Development, 2013). In general, income and employment are lower in rural than in urban areas of the EU. On average, the salaries of rural employees in rural areas are only 83% in relation to the urban workforce, although rural incomes have caught up in recent years especially the new Member States (European Commission, 2011a, p. 34). The economic crisis hit the rural areas more severely due to the comparably fragile economic situation (European Commission, 2011b, p. 5). Most notably the increased cost of fuels and land and, as a result, of agricultural products has put additional stress on rural regions (European Citizens' Panel, 2007, p. 21).

Rural areas are additionally influenced by demographic changes, by depopulation or repopulation depending on the area. In total, the proportion of the rural population in the EU has remained fairly constant in recent decades (Matthews, 2007, p. 2). Besides deindustrialisation and abandoning farming in some areas, depopulation in rural areas is mainly driven by the outmigration of young people (European Commission, 2011a, p. 32). Southern Member States suffer most from this trend, while Northern regions and less developed areas in the new Member States face a strong migration of mostly female inhabitants to cities (Matthews, 2007, p. 4). These major trends often correspond with problematic and mutually reinforcing consequences such as reduced access to services, mainly in the areas of health, education, transport and information technologies.

However, with the promotion and continuous expansion of renewable energies, the industrial sector has become a vital factor in creating new job and income opportunities in rural areas (European Citizens' Panel, 2007, p. 5). As a result, the energy transition in Germany and other European countries have redirected some of the focus of economic development to rural areas.

Since most renewable energy installations require land and space for its broad application[2], rural areas have been promoted as the key areas for their installation. Within the expansion of renewable energies, often driven by governmental subsidies or legislative frameworks, rural areas in the EU are already undergoing an economic transition with new actors, businesses and alliances coming into play seeking for new income opportunities.

The question, however is, whether the promotion of renewable energies in rural areas is also a sustainable development of rural economies. Local governments, stakeholders and networks are increasingly challenged by the fast expansion of renewable energies, which is not necessarily driven by local actors, but often by external investors and highly professionalised experts. In order to catch up with these developments, rural actors and institutions have to build knowledge and capacities, find new organisation and communications forms and create their own business models to keep the economic value in the region.

A part of the solution can be energy cooperatives, which have been increasingly recognised as a beneficial form of energy generation as they follow a rather community-based approach to energy development. This includes a high level of participation due to low entry costs for the individual, an emphasis on local scales and a high potential for building up knowledge and capacities (see e.g. Viardot, 2013). Energy cooperatives form the backbone of this study. They are used as an entry point to learn more about patterns and elements of development towards more renewable energies in rural areas and about inner drivers and motivation of people engaged in these processes.

1.2 Scope and objectives of the study

The study should mainly uncover if and under which conditions energy cooperatives provide favourable structures for initialising a sustainable implementation of renewable energies in rural areas. A particular focus will be on the role of frontrunners in energy transition processes and the internal drivers and motivations of local people to become involved in energy cooperatives.

As the theoretical background of the study, we chose the Multilevel Perspective (MLP) on transitions as a descriptive model well as the Transition Management (TM) concept, which

[22] Most obviously bioenergy needs land for the biomass to be produced for biogas plants or biofuels but also the application of (larger-scale) wind, hydro and solar power needs space which is not acceptably available in urban areas.

assumes that while societal transitions are long-term and very complex, they can to some extent be influenced by supporting policy measures (see e.g. Grin et al., 2010; Loorbach, 2007; Rotmans et al., 2001). A key component of studies on transition is to scrutinise the dynamics of niche actors within the dominant structures, cultures and practices (called “regimes”), which will be taken up in the study (see chapter 2.1).

The study mainly builds on an empirical case study in the Rhön-Grabfeld district in Northern Bavaria (Germany). Several energy cooperatives were formed there recently through the support and promotion of Agrokraft, a small rural consultancy, primarily with the aim of raising the added value of the region and to foster rural development. A rather secondary motivation was the intention to boost the shift from fossil fuel dependency to renewable energy at local level. After gaining experience with the installation of roof-top and ground-mounted Photovoltaic (PV) systems, the first energy cooperative was formed in 2008 to invest in a biogas combined heat and power station. Other cooperatives soon followed and have more recently embraced wind power plants (see chapter 4.1). The case study was assumed to be a good example of successful promotion of renewable energies in rural areas leading to various benefits for the region and the people living in this area.

In addition, the results from the case study will be complemented by and compared with other case studies from Denmark and Spain taken from the literature in order to allow for some general conclusions on the role of cooperatives in energy transition processes.

Hence, the study consists of three major components:

- Examining how energy cooperatives are embedded in networks of rural actors and what effect they have on rural development and the process towards more sustainable energy production.
- Specifying the key characteristics (strengths and weaknesses) and governance structures (objectives, decision taking and participation) of energy cooperatives based on practical experiences made in Northern Bavaria, Denmark and Spain.
- Uncovering the motivation of people engaged in the networks promoting rural development and of those participating in energy cooperatives, as well as discovering to what extent such engagement leads to further sustainable action in other fields such as mobility, food consumption, etc.

The study is structured as follows:

In the subsequent sections of chapter 1, we will provide some further background information on the German energy transition (also called ‘Energiewende’ in German). Germany provides a unique example of how common targets lead to specific measures towards a general long-term shift from fossil to renewable energies. Since our main case study has been conducted in Northern Bavaria, this background information is needed to understand the settings in which the development of renewable energies in that particular region has taken place. This chapter is complemented by a brief overview on the occurrence of energy cooperatives in Europe to obtain an idea as to what extent the results can be transferred to the European context. We elaborate more on this question in the chapter 5 discussion.

The theoretical background of the study is elaborated in chapter 2. There, we provide a very brief overview on the different strands in transition theory and explain why we see the Multilevel Perspective and the Transition Management as reasonable concepts to be applied within the context of the study. Included in this chapter is an introduction to Practice Theory a useful amendment to transition theory, in order to emphasise the role of individual and organisational behaviour (change).

Chapter 3 describes the methodological approach of the study, which draws mainly on the different methodological steps applied in the case study in Northern Bavaria.

In chapter 4, we report on the results and insights gained from the case study on energy transition in Northern Bavaria as well as from two additional case studies in Denmark and Spain covered by a literature analysis. The results include the general background of the case studies, details about the process promoting renewable energies in the regions, the role of frontrunners and details about the role energy cooperatives played in the process. Moreover, the section presents the results from a survey among members of energy cooperatives in Northern Bavaria, which asks respondents for changes in their awareness and (environmental) behaviour as a result of the engagement in an energy cooperative.

Chapter 5 highlights some relevant discussion points, reflecting in particular the main drivers of renewable energies in rural areas, the role of energy cooperatives in sustainability transitions and their potential effect on behavioural change.

Finally, in chapter 6, we summarise the main findings of the study and derive selected recommendations for policy.

1.3 The German energy transition as laboratory for energy transitions

Although the term ‘energy transition’ (or ‘*Energiewende*’ in German) was only coined after the Fukushima accident in 2011, the redirection of German energy policy towards massive expansion of renewable energy and improved energy efficiency dates much further back. It has several roots:

- a profound and continuous rejection of nuclear power plants by the majority of Germany’s population, particularly since Tschernobyl,
- early commitments to ambitious greenhouse gas reduction targets, and
- high acceptance for renewable energy technologies (including the willingness to pay for their initially higher costs) which a few ardent proponents in the German Parliament managed to translate into a viable support mechanism, the Renewable Energy Law (‘EEG’ in German).

The continuous support of the German population and the momentum of the emerging renewable energy sector contributed to a situation where first the decarbonisation targets and, after the Fukushima accident, also the phase-out of nuclear energy turned into cross-party consensus. In the Energy Concept of September 2010, the government laid down the current

target set. To bring about greenhouse gas emission reductions of -80 to -95% by 2050 (compared to 1990 levels), the government aims to half primary energy consumption and increase total renewable energy deployment to 60% of all energy consumed over the same time frame. In the electricity sector, renewable are to provide 80% of all power consumption by 2050 (BMWi and BMU, 2012). After the Fukushima accident in 2011, the government amended the energy concept to implement the decision to shut down all of Germany's nuclear power plants by 2022. Thereby, it reconfirmed the first phase-out decision of 2000 which had been rolled back in 2010.

Although a coherent energy policy framework with targets is important as a long-term signal to market participants, the support instruments underlying the targets matter far more for the actual build-up of renewable capacity. In the case of Germany, the dynamic expansion of renewable energies in the power sector can be clearly attributed to the introduction of the feed-in-tariffs in 1991 and their expansion in 2000 (Laird and Stefes, 2009).

The strength of the renewable energy sources act (EEG) is that it enables private and professional investors to build renewable energy plants of different types and sizes with limited financial risk and little red tape. It does so by stipulating

1) technology-specific feed-in tariff guaranteed for about 20 years;

2) guaranteed access to the electricity grid provided by the grid operator; and

3) priority grid access of renewable electricity.

The costs for the feed-in tariffs paid out to producers of renewable energy are recovered through a levy on electricity prices paid by all consumers (with some exceptions for high energy users in industry).

The financial incentives created by this legal framework led to an unprecedented boost in decentralised renewable capacities in Germany since 2000, the largest share of which is owned by private investors, farmers and, increasingly, energy cooperatives. On average, the expansion has been achieved at lower costs per unit compared to quota systems because the investor's risk and transaction costs are relatively low, leading to lower financing costs (Butler and Neuhoff, 2008).

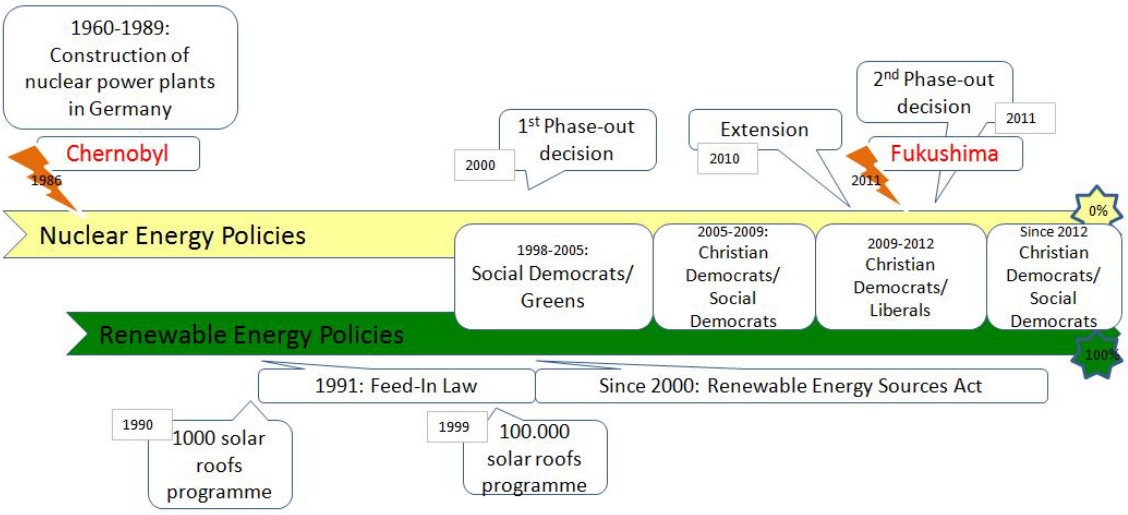

Figure 1: The political process of the energy transition in Germany

Source: own

The EEG created a protected space in the energy market that allowed a niche technology, niche market actors and niche business models to grow and mature. While fossil fuel generation capacities are largely owned by major utilities (EnBW, RWE, E.on and Vattenfall) and local utilities ('Stadtwerke'), the largest share of renewable energy capacities is owned by private persons and farmers. In 2010, they made up 40% and 11%, respectively followed by project developers (14%) and banks (11%). This participation of private persons and farmers is especially high for PV systems, wind power and biogas and biomass installations (Maron et al., 2011).

It can be argued that renewable energies have now turned from a niche into a force transforming the power system regime in Germany (see chapter 5.1). In 2013, they provided roughly a quarter of all electricity consumed. Levelised generation costs per kwh for solar and onshore wind plants are now in the range of costs for electricity from gas-fired plants and in certain locations wind and solar energy is cheaper (Kost et al., 2013). Wind and solar plants, which have high investment, but virtually no running costs, have also fundamentally altered price dynamics on the power market where – on average – they push prices down. At the same time the renewable energy levy rose substantially with the rise in installations. Finally, renewable have profound impacts on the shape and operation of the electricity grid, moving the generation centre from the south where most of Germany's nuclear plants are located to the North and East, the centre of onshore wind generation. Given the fluctuating availability of sun and wind, grid operators also face new challenges with respect to balancing demand and supply.

As a consequence of these developments, the EEG has been amended several times since 2000 and another amendment will be proposed in 2014 by the newly elected government. Although the details of reform are still being negotiated, the Coalition Agreement already hints at several avenues of change. Inter alia, the government plans to introduce a mechanism for

limiting total added capacity per year and it intends to change from a pre-set feed-in tariff to a market premium system where plant operators receive the market price for electricity and an additional premium (CDU, CSU, SPD, 2013). The intention is to make generation of renewable electricity more responsive to the dynamics of demand and supply in the power system. It remains to be seen how these amendments, which will only apply to new plants not to existing ones, will impact different types of investors.

The EEG did not only transform Germany's energy policy regime, the model also spread in Europe and globally. According to REN21 (REN21, 2013, p. 68) 71 countries had feed-in-tariffs in place in 2012 while only 22 countries used renewable energy quotas, the second most known support mechanism. In the EU, 19 out of 28 Member States used feed-in-tariffs, one of which is the UK, which had originally established quotas, but has gradually moved towards measures similar to feed-in-tariffs.

1.4 Occurrence and characteristics of energy cooperatives in the EU

2012 was named by the UN as the year of International Cooperatives and according to the European Commission, one third of all European citizens (123 million Europeans) are members of cooperatives employing some 5.4 million people (EC). In total, more citizens have invested in cooperative ventures than in the stock market. Across Europe, a progressive movement of cooperatives has emerged in the development and distribution of renewable energy. REScoop 20-20-20, an Intelligent Energy Europe Program launched by twelve organisations in seven countries to create a Federation for renewable energy cooperatives in Europe, estimates that the number of renewable energy cooperatives throughout Europe is approximately 2,000 (REScoop, 2013). Energy cooperatives offer some special characteristics compared to limited liability companies.

They are

1) **democratic** as all members of a cooperative have one vote independently of their financial contribution, which prevents the dominance of majority owners;

2) **open and flexible** as throughout the existence of a cooperative, additional citizens can get engaged and new projects can be initiated;

3) **secure** as each cooperative is required to join a cooperative auditing association, which offers support and consultancy but also regular checks to prevent financial losses.

In addition, energy cooperatives do not have to produce a prospectus, which substantially reduces the costs for setting up a participatory project.

The rapid development of renewable energy cooperatives in rural areas is taking place across Europe, but there are some cultural and national distinctions. Denmark is well known for its established history in the development of community led energy projects, particularly in wind energy, which started in the 1970s (Olesen et al., 2002). In Denmark, support for renewable

wind energy started as a citizen led movement and was highly decentralised emphasizing community ownership. Several factors are attributed to Denmark´s rapid uptake of wind energy including the strength of the anti-nuclear movement, grass-roots participation by early industrial entrepreneurs producing turbines, and the early development of interest organisations such as the Organisation for Renewable Energy, the Association of Danish Wind Power Owners and the Association of Danish Mill Manufacturers (Schreuer and Weismeier-Sammer, 2010).

In the Netherlands, citizen ownership has also played an important role for wind power development, and was pushed forward by small private investors, mainly farmers (Schreuer and Weismeier-Sammer, 2010). Political policy support in the Netherlands was initially unfavourable to small-scale private investors but has become more supportive in the late 1990s, resulting from the liberalisation of the energy market (Breukers and Wolsink, 2007).

In Germany, where legal conditions strongly favoured renewable energies over fossil energies (see chapter 1.3) also citizen led renewable energy installations are widespread, particularly in relation to wind energy. A large amount of installed capacity is owned by citizen led wind parks (Toke et al., 2008) and shared ownership in PV installations is also prevalent in Germany. Rather than being a purely social movement, the citizen push for renewable energy in Germany can be characterised as profit-driven (Bolinger, 2001). In other words, citizens were particularly motivated by the expectation that investments in renewable energy would be financially advantageous, more so than in Denmark (and Sweden).

In the UK, citizen led development and participation in renewable energy projects has been less significant. Some literature attributes this to the fact that the policy environment in the UK has and continues to favour large-scale installations and corporate ownership, particularly in wind power while other literature point out that the policy environment results in part from the fact that the UK lacks a strong alternative energy movement (Toke et al., (2008), Breukers and Wolsink, 2007).

In Eastern and Central Europe, the creation of decentralized renewable energy cooperatives has not accelerated in the same way. This may result from the region’s historical experience with cooperatives that were closely bound to the political system of communism. Estonia, however, is an exception and through a public relations campaign advertising cooperatives as “peoples’ capitalism”, the country has made strides in reducing its reliance on Russian gas, and developed its own cooperative energy productive market.

Renewable energy cooperatives are coming together across Europe to cooperate with one another, sharing best practices to identify and overcome challenges. The ReScoop 20-20-20 project is selecting thirty case studies of best-practices for cooperatives and has started to create a portfolio of cooperative models.[3] Information and experience sharing has been an important impetus for the generation of renewable energy cooperatives in countries that have to overcome barriers of social acceptance. Estonia for instance is interested in establishing biogas energy to reduce its reliance on Russian gas, and is learning from Swedish and German examples (PP4 University of Tartu, 2010).

[3] For more information: http://www.rescoop.eu/

2. Theoretical background

The analytical approach of the study is embedded in the perspective on transitions to sustainable development mainly developed in Grin et al. (2010). The authors chose a threefold approach towards an understanding of transitions: a complex system analysis, a socio-technical perspective and a governance perspective.

More specifically, we considered the multilevel perspective (MLP) delineating changes in socio-technical regimes as well as Transition Management (TM) providing a governance framework for transitions, to be a comprehensive approach to analyse the dynamics and drivers of changes in regions such as the Rhön-Grabfeld district, in economic sectors like the (renewable) energy sector and in the society as a whole. Both approaches can help understanding and explaining the interplay between institutional and legal settings (in our case the German renewable energy act see chapter 1.1.1), the emergence and impacts of new organisational forms (the energy cooperatives) and the individuals driving (frontrunners) or supporting (members of energy cooperatives) these developments.

Based In the context of the MLP, we consider energy cooperatives as a part of niche activities towards the implementation of renewable energies challenging the mostly fossil fuel-based energy regime at regional and national level. We will discuss in chapter 5 to what extent renewable energies can still be regarded as niche and how far they have already changed the energy regime.

Given the emphasis of our research on energy cooperatives we use the TM approach to look beyond the socio-technical perspective taken by the MLP to analyse phases and drivers of transition at regional level within the so called “transition arena”. TM will also be used to analyse the extent policies influenced and drove the changing dynamics in the regional energy system (see also chapter 5 and the conclusions in chapter 6).

In addition, and as part of the TM approach, the model of “transition experiments” supports our investigation of micro activities through the establishment of energy cooperatives and their role in driving and reshaping regional developments. Transition experiments can be defined as “innovation projects with a societal challenge as a starting point for learning aimed at contributing to a transition” (van den Bosch, 2010). As the case studies show, different challenges indeed kicked off the forming of energy cooperatives and other innovation initiatives in a certain region, which can be called transition experiments.

The additional research question, if the involvement in an energy cooperative has any effects on the individual’s awareness concerning sustainability issues or/and has even led to changes towards more sustainable behaviour cannot be answered within the framework of TM and MLP alone. In a literature review, Antal et al. (2012) provided a comprehensive overview on behavioural perspectives on transitions. They identified an analytical gap between the rather “abstract and high level view” taken by the TM literature on transition governance undermining the role of agents` behaviour and “the great deal of knowledge” gained in various disciplines dealing with individual behaviour and behavioural changes (Antal et al., 2012). Chapter 2.2 does

not aim to close this gap, but it will introduce Practice Theory as an additional lens to understand the behaviour changes observed in the case studies.

2.1 Transition to sustainable development

Transitions theory can be seen as a framework for finding solutions to persistent and complex societal problems. It is built on the premise that resolving these problems will involve long-term processes of structural transformation in which a society or subsystem of society fundamentally changes. In socio-technical transitions, these changes take place through system innovations, which fundamentally change the structure of the system and the relations between the participants. The idea of transition, which originates from an integrated systems perspective, can be defined as a shift in a system from one dynamic equilibrium to another, and is marked by a highly non-linear process of change. Slow change can be followed by rapid change in a multi-level process that involves the co-evolution of different subsystems, leading to irreversible patterns of change. From a research perspective, the multi-level and multidimensional perspective on long-term structural changes in transitions implies theory building and observations on various interactions between technology, policy/power/politics, economic/business/markets and culture/discourse/public opinion (Geels, 2011). The literature on transition studies has seen an enormous increase in the recent years. Under the roof of transition theory a wide range of research strands has developed from different perspectives (see Markard et al., 2012). Due to the numerous environmental and social challenges of our times transition theory has more and more evolved in the direction towards a transition to sustainable development, which can be defined as long-term, multi-dimensional, and fundamental transformation processes through which established socio-technical systems shift to more sustainable modes of production and consumption (Markard et al., 2012).

Van den Bergh et al. (2011) distinguish between four approaches to research on sustainability transitions: the innovation systems approach, the multi-level perspective (MLP) approach, which is closely linked to the approach of strategic niche management (SNM), the transition management (TM) approach based on complex system analysis and evolutionary-economic views and multi-agent modelling of transitions. Since the main differences, commonalities, strengths and weaknesses are described elsewhere (Markard and Truffer, 2008), and, as explained above, this study builds on the MLP and TM forming the analytical framework, this section restrict to a brief overview to the MLP and TM approach.

2.1.1 The Multi-Level Perspective (MLP)

The MLP resulted from a critique of innovation systems account emphasising the societal context in which new socio-technical configurations are embedded. The MLP distinguishes between niches (micro-), regime (meso-) and the socio-technical landscape (macro-level), which have their own characteristics and configuration of actors. They interact with each other in different ways.

Niches are highly dynamic systems where radical innovations emerge and disappear, where new ideas and technologies are found and tested before they (might) enter a broader market. (Geels, 2011) calls them 'protected spaces', where users have special demands and are willing to support emerging innovations.

Regimes are much less dynamic than niches with different kinds of rules stabilising the socio-technological system and preventing actors from change, for example cognitive routines and shared beliefs, capabilities and competences, lifestyles and user practices, favourable institutional arrangements and regulations, and binding contracts (Geels, 2011). Typical effects resulting from these rules are technological lock-ins, vested interests defending a certain status and reproduction instead of innovation. According to the MLP transitions can be defined as shifts from one regime to another regime, driven by dynamics from the micro- or the macro-level. Thus, regimes are of major interests from a research perspective on transitions.

The socio-technical landscape represents the wider societal context, in which regimes and niches are embedded or, in other words, the technical and material backdrop that sustains society (Geels, 2011). Key structural elements of the landscape level are demographical trends, political ideologies, societal values and macro-economic systems. Socio-technical landscapes usually change slowly and cannot be influenced by niche and regime actors in the short run.

The interaction between these levels are complex, dynamic and non-linear.

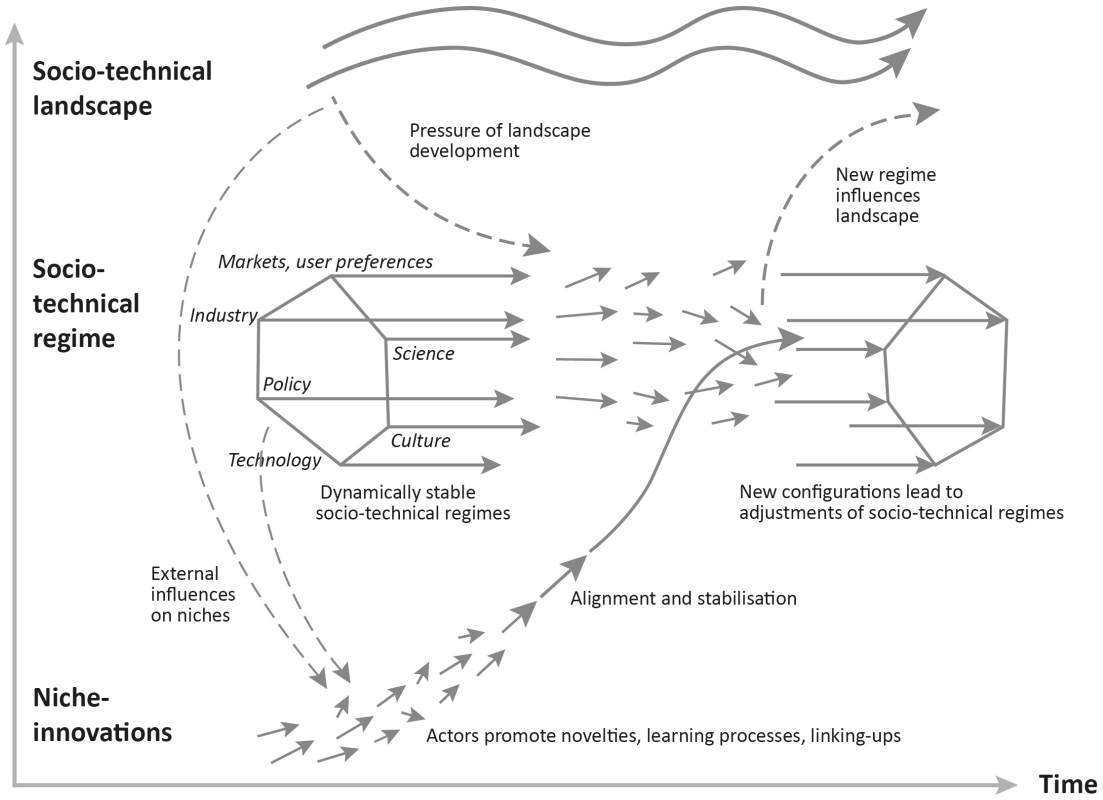

Figure 2: The Multi-Level Perspective of transition

Source: adapted from Geels (2011)

The interaction between these levels are complex, dynamic and non-linear. Innovations and usually take place in niches. However, these rarely happen in a linear or directed way. Instead, radical innovations might come up spontaneously at a certain time and under specific conditions and actors constellation, which form the required social network. Niches do not develop independently from regimes and landscapes but are influenced by expectations, networks and power structures. Nevertheless, niches can challenge the regime by new emerging technologies or ideas that might promise improvements or progress in regime (infra-) structures. Due to vested interests and other stabilising factors acting as barriers for innovations, novelties often remain in the niche for a long time until a window of opportunity opens up, which provides a break through of the innovation at regime level. Breakthroughs can be triggered by changes at landscape level (e.g. through new regulatory measures or shifts in consumer preferences), which challenge regimes to open up windows of opportunities. If a novelty has reached the regime level it would create a new competition with regime structures via markets and infrastructures leading to a new configuration of the regime and to adjustments at various regime levels and processes. Once having won the competition with regime structures the novelty can, over time, also impact on the beliefs, traditions and constitutions at landscape level. In conclusion, it is the complex interplay between the landscape and the niche level, which opens up opportunities at regime level for novelties to become influential, which at the long term can facilitate transition. A far more detailed description of driving factors of change is provided by Frantzeskaki and de Haan (2009) who differentiate between certain conditions-for-change (tension, stress and pressure) and a range of forces both stimulating or inhibiting transitional change (grouped in formation, support and triggering forces).

While each transition is different, one can generally distinguish between two types: *evolutionary transitions* – in which the outcome has not been planned and *goal oriented transitions* – in which public and private actors are guided by goals or visions of an end state. Transitions can take place in various sectors and systems such as in transport, energy or agri-food systems and involve a wide range of actors such as firms and industries, policy makers and politicians, consumers, civil society, engineers and researchers .

In the context of the study, this framework enables to explain the dynamics unleashed by the founding and establishment of energy cooperatives in a certain region and how this innovation can potentially challenge the energy regime in Germany and also in Europe. The MLP has been criticised for underplaying the role of agency in transitions. Smith et al., (2005) for example call for a greater attention to agency in the understandings of transitions in socio-technical regimes. While (Geels, 2011) reacted to this criticism defending the MLP he also sees room for further development, for example in the areas of rational choice, power struggles and cultural-discursive activities. While we do not address one of these aspects explicitly, we emphasise the role of frontrunners in our case studies.

2.1.2 Transition Management (TM)

Whereas the MLP refers to the general study and description of social transitions, transition management can be described as a new governance model aimed at facilitating and directing processes of societal change in the direction of sustainability. By taking sustainable development as a long-term goal, TM stipulates a normative decision and a prescriptive governance approach (Loorbach, 2007). TM thereby aims not at managing these transitions in terms of command and control, but rather in terms of influencing and adjusting. This is a subtle, evolutionary way of steering in which the direction and pace of transitions can be influenced but not directly controlled. Governance is understood in a broad sense of how social innovations interact with the dominant regimes rather than designing and implementing certain policy mechanisms. It therefore represents a continuous process of experimenting and learning, as opposed to governance with fixed goals and means. Social innovation is a core element of TM. The aim is to mobilise, guide, and accelerate social innovation (Loorbach, 2007).

Unlike the MLP focussing on a socio-technical perspective, TM includes a broader perspective building upon governance and complex system theory as well as upon practical experiences and experiments (Loorbach and Rotmans, 2010; Loorbach, 2007). However, the differentiation between micro-, meso- and macro level developed under the MLP also builds the analytical basis for TM with processes to be enhanced at multiple scales, for example stimulating niche development at micro level and finding new attractors at the macro level by developing sustainability visions (van den Bergh et al., 2011).

Regarded as a governance tool rather than a theory on transition, TM obviously has a stronger focus on societal actors such as governments, business, scientists, non-governmental organisations (NGOs) and intermediary organisations. Based on system theory, the TM approach assumes that these actors create formal and informal networks because of partially joint interests and the willingness to temporarily share certain resources in order to work for shared objectives (Loorbach, 2007).

The process of transition management is captured in a transition management cycle (see Loorbach, (2007)):

1) Structure the problem in question and establish and organize the transition arena.
2) Develop a transition agenda, images of sustainability and derive the necessary transition paths.
3) Establish and carry out transition experiments and mobilize the resulting transition networks.
4) Monitor, evaluate and learn lesson from the transition experiments, leading to adjustments in the vision, agenda and coalitions.

These four different phases of societal transitions are marked by four different types of actor behaviour, respectively: 1) strategic activities– relating to complex societal problems and creating alternative futures, 2) tactical activities – related to building up and breaking down system structures, 3) operational – related to short-term and everyday decisions and actions, and 4) reflexive – related to the evaluation of the existing situation at variations and their interrelation or misfit.

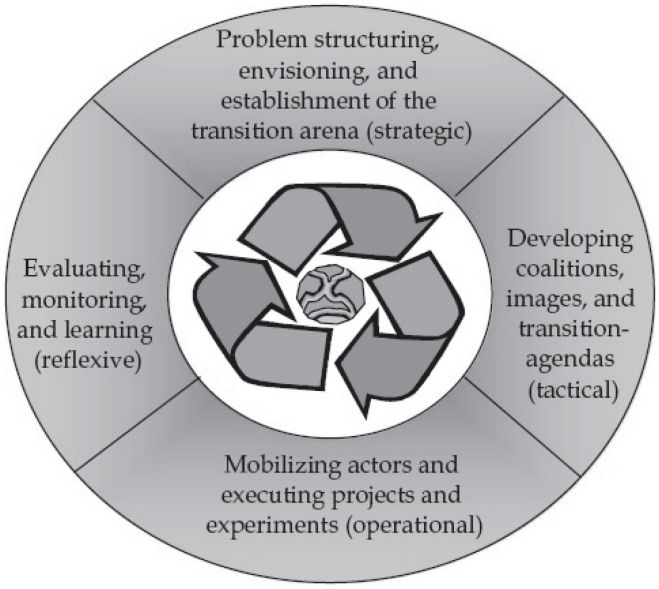

Figure 3: The transition management cycle

Source: Loorbach (2007)

TM was criticised for neglecting references to ways of living or patterns of demand (Shove and Walker, 2007), shortly to the role of individuals in the transition process and the psychological factors driving their behaviour (Rauschmayer and Omann, 2010). Also van den Bosch (2010) states with regard to the framework how to analyse transition experiments that "[…] studies mainly describe the learning processes in transition experiments at a system level and not at an individual or organisation level". We therefore enrich our theoretical background by briefly discussing the some behavioural issues of transitions, mainly by drawing on Practice Theory.

2.2 Behavioural changes in sustainability transitions

The model of the 'rational consumer' has dominated economic theory for a long time. Over the last decades, however, psychologists, behavioural economists and sociologists have clearly demonstrated that human decision making is far more complex than the simplified model of a well-informed, profit-maximising *homo economicus* assumes. In particular, people use mental shortcuts and are subject to a number of biases when taking decisions (Kahneman, 2011; Kahneman et al., 1982), they are strongly influenced by social norms and the behaviour of others around them and much of people's behaviour is habitual rather than based on informed decision-making (Jackson, 2005; Natural Scotland, 2013).

These complex influences on people's behaviour can to some extent explain why the adoption of more sustainable behaviour is so hard to achieve even if, as in the case of many energy efficiency measures, it is financially beneficial. It also sheds some light on why many policy

measures that consists in providing information to consumer are not as effective as intended (Shove, 2010).

In the context of this study we explicitly look for theoretical models that can help to explain the link between the people's engagement in cooperative structures and their overall environmental behaviour. More concretely, we are seeking to understand if the joint activities within cooperatives lead to changes in people's attitudes towards energy consumption and their daily environmental behaviour.

To do so, we build on two strains of theory, which emphasise the importance of competences and learning for behavioural change: Practice Theory and the concepts of social learning and empowerment.

2.2.1 Practice Theory

Practice Theory challenges the assumption that rational individuals take conscious consumption decisions based on their attitudes and values. Instead, it sees individuals as being engaged in everyday practices - like riding a bike, cooking, or showering. Taking these practices as the central unit of analysis gives a different view on consumption choice: consumption is a by-product of the practice, of what people "do" every day and what is meaningful to them, consumption is not an end in itself. Thus, people do not desire a car, but strive to go to work in a convenient, safe and private way.

Elizabeth Shove and her collaborators see practices as constituted by three types of elements: materials, competences and meaning (Shove et al., 2012; Southerton et al., 2011). If we take the example of bike riding, the materials involved are the bike itself, bike lanes and potentially a place to lock the bike. The required competences are the ability to ride a bike and the knowledge of traffic rules. Meanings can include aspirations to lead a healthy life, be free of traffic or environmental values.

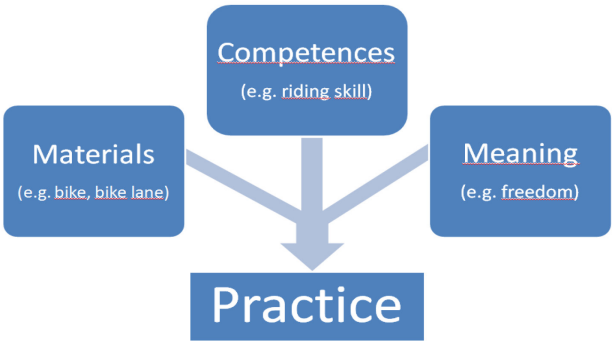

Figure 4: The tree elements constituting a "practice" in Practice Theory

Source: Shove et al., 2012

This perspective gives different implications for altering consumption patterns:

- Change in social practice is understood as emerging from the co-evolution of infrastructures, technologies, competences and social norms in a continuously ongoing process that cannot be controlled by any one actor, but only influenced.
- Social, i.e. shared practices, their elements, how they change and interact are the centre of the model, not the individual and his or her attitudes;
- Practices are seen as clearly situated in space and time, implying that the conditions which allow one practice to emerge in one place may not be replicable somewhere else.
- There are strong path dependencies in individual lives and communities, since the available materials and competences influence the options for choosing other practices in the future.

Thus, Practice Theory invites those who want to understand or spur behavioural change to focus on the actual doing of people, on the "how" instead of the "why". Also, it shifts the focus from individuals to groups of people engaging in the same practice, emphasising previous findings that behavioural change tends to happen in groups (The Scottish Government, 2010) and that new behaviours emerge more easily in networks, sometimes referred to as 'communities of practice'. It emphasises the importance of thinking about the availability of elements for more sustainable practices, i.e. the required infrastructures, competences and social norms enabling sustainable behaviour. In addition, Practice Theory sheds light on how links are made between elements to form a practice and how these links can undergo changes, e.g. the link between cars and the idea of freedom might be broken by clearly prioritising walking and biking in cities (Spurling et al., 2013).

Another implication is the rejection of the idea that behavioural change can be engineered: that policy-makers, campaigners or business men can know in advance, and fully control, the outcome of interventions. Practices emerge from a complex, continuously changing set of elements. Experimentation and trial and error processes therefore appear essential. Creation of the conditions and stimulus of emerging social innovations towards sustainability and their diffusion may be one way to go (Bauler et al., 2013).

With respect to cooperatives, the hypothesis is that the engagement in this new institutional setting alters both people's norms, attitudes and worldviews and their competences enabling them to adopt more sustainable behaviour also in other areas of their life.

3. Methodological approach

In the following section we describe our methodological approach to gain an understanding of the role of energy cooperatives in energy transition processes in rural areas as well as the drivers for individual participation in and commitment to individuals. Apart from literature, we build our research on reported personal experiences of people involved in the transition experiments, their participation, motivations and perceived behaviour changes.

Our approach encompassed two major components:

1) We carried out a **case study** in Northern Bavaria, which included two site visits at the district of Rhön-Grabfeld as well as an online questionnaire sent to the members of cooperatives from the area. We opted for the district of Rhön-Grabfeld as the subject of our case study because, while the region is widely known as a good example for the development of energy cooperatives and rural development, no systematic analysis of the concept and drivers of such development has been conducted so far. The majority of developments in the district have been initiated by one small rural consultancy named “Agrokraft” rooted deeply in the region, which offered us a focal point for our investigation. However, the focus on one single company and its network (interviewees included employees of Agrokraft, mayors in the region and chairpersons of energy cooperatives) also sets certain limitations to the study, mainly a lack of outer perspectives on the general process. At the same time, a more critical perspective on Agrokraft`s role in the region was not easy to obtain. The regional energy supplier, a potential opponent of the development driven by Agrokraft, did not accept a request for an interview and the identification and questioning of other potential critics (for example citizens not participating in energy cooperatives) was beyond the possible activities of this case study. We tried to account for these difficulties by critically assessing the outcomes of the interviews and confront the interviewees with potential concerns from an outside perspective. Mayors and chairpersons of energy cooperatives were interviewed without the presence of Agrokraft employees.

Furthermore, the social desirability bias (SDB) needs to be considered in these kinds of interviews. SDB means that respondents give answers that are influenced by what is socially accepted and desired to construct a positive image of themselves. In turn, it is also argued that the SDB is especially strong if respondents are asked socially sensitive questions and have to report on activities or opinions that are socially undesired (Van de Mortel, 2008). As the interviews conducted in this study foremost deal with descriptive and almost no personal contents, the SDB might be of less relevance in our study.

2) The case study was complemented by a literature review focussing on **other cases of successful implementation of energy cooperatives** and their role in regional and supra-regional transition processes. We collected relevant information from two other case studies based on a literature review, which included the implementation of energy cooperatives on the Island of Samsø, Denmark and through the Som Energia project in Spain. Besides scientific papers, the literature review also included grey literature sources such as reports, newspaper articles and websites.

In both steps we focussed on the question if and how energy cooperatives provide favourable structures for initialising transition experiments in rural areas and involving relevant stakeholders and other individuals. We paid special attention to frontrunners and networks, which are often hidden prerequisites for individuals to take action. We used this approach to investigate the internal drivers of individuals, thus achieving a more individual and psychological perspective on factors that drive economic and societal change in rural areas.

3.1 Case study in Northern Bavaria

The case study in the Rhön-Grabfeld District in the Northern part of Bavaria (Germany) constitutes the empirical part of the study. Agrokraft, the small rural consultancy in Rhön-Grabfeld, was the focal point of our investigation. Being the key frontrunners of the transition experiment in the district, the founders and employees of Agrokraft were well connected to all kinds of relevant actors in the region and could provide relevant contacts for interviewees and for the questionnaire. Moreover, having started and accompanied the transition experiment in the region from the bottom up, they were able to reconstruct the process from the very beginning and could report on the key factors that drove or hampered the expansion of energy cooperatives and the involvement of individuals and communities.

3.1.1 First site visit

We organised a first site visit with the aim of gathering firsthand information on the developments, the underlying prerequisites and important actors in the region. The site visit consisted of an extensive meeting with one of the founders as well as with three employees of Agrokraft. We addressed the following three open-ended questions:

- Q1: How did the transition experiment in the region start and why? What were the main factors behind it and which conditions facilitated or inhibited the process?
- Q2: What is the role of energy cooperatives in the transition experiment? What are the strengths and weaknesses of a cooperative?
- Q3: Whoa are the main actors in the region? Who are the main supporters and who are the main opponents?

We split the meeting into two parts in order to utilise different methods of interaction, thus adequately exchanging information and discussing the questions:

1) In the first part of the meeting, we addressed Q1 and Q2 in an open group discussion. Group discussions permit full participation and can establish consensus about specific questions, and bundle knowledge, experiences and point of views, despite being time consuming (Fuhrmann, 2011). We used a flipchart to sketch a timeline of the main developments. The group discussion was recorded in order to check details later.

2) In the second part of the meeting, we addressed Q3 by focusing on the actors and network surrounding Agrokraft. We aimed at identifying the main actors that have a stake in the founding

and organisation of energy cooperatives as well as actors supporting or opposing energy cooperatives (whereby opposition is mainly related to opposition against renewable energy projects rather than against the business form). We applied a Participatory Network Analysis (PNA), which provides an overview of the actors involved within a network and their interactions with each other. The network overview is developed in a semi-structured interview with one or a small group of homogeneous actors (not more than three). In the interview, the role of each actor and his or her interactions within the network are mapped. Past, present and future positions and interactions can be mapped to show the development of the network. The aim of this method is to gain information about the network structure; the role of actors, drivers and barriers in the development of the network; linkages between the network and institutions; its processes towards institutionalisation as well as communication and interaction within the network (Debourdeau et al., 2012). The findings of the PNA were documented during the interview as further specified in chapter 4.1.

3.1.2 Second site visit

The second site visit was organised with the aim of meeting different actors in the region. In particular, we focused on 1) deepening our understanding from the first visit on the role of energy cooperatives in the transition experiment including new views, explanations and examples; and 2) new insights into motivations, required conditions or underlying prerequisites for individual participation and engagement. The second area of interest can be further described with the following questions:

- Why do people get involved in an energy cooperative?
- How do they get involved?
- Are they taking on sustainable actions beyond the (possibly just financial) engagement in a cooperative?

We carried out personal semi-structured interviews with different actors to increase the possibility that targeted persons are more open with regards to sharing their perceptions and feelings. All interviews were recorded in order to later check the details.

In total, we conducted five interviews. First, we interviewed the second founder of Agrokraft, Mr. Matthias Klöffel. The questionnaire for Mr. Klöffel focussed on his motivations and inner drivers for his initial involvement and the role of energy cooperatives for rural development. Additional actors were selected based on the network analysis conducted during the first site visit, which included mayors and chairpersons of energy cooperatives. We met two mayors from the district to give us further firsthand information on recent developments on the local level and the specific role of energy cooperatives. We also asked if new areas of sustainable actions arise from the formation of energy cooperatives in the district. The interviews with two chairpersons of energy cooperatives from the district focussed on their motivations and inner drivers as well as those of the founders and members of the respective energy cooperative to form the cooperative, on the distribution of responsibilities and on potential follow-up activities.

3.1.3 Online questionnaire

In addition to the in-depth interviews with key stakeholders, we used an online questionnaire to ask members of energy cooperatives, including less active people who rather function as "observers" of the general development process, about their attitudes and awareness of issues related to the energy cooperatives and if their (environmental) behaviour has changed since their participation. More specifically, we wanted to gather more information on:

- the characteristics of the members of the cooperative,
- their motivation for joining a cooperative and
- in what way their membership affected their attitudes and behaviour.

We were particularly interested to discover whether a member's occupation, age or money invested had an influence on the motivation to join a cooperative and if a correlation existed between certain motivations to join the cooperative and a possible change in awareness and behaviour in related areas.

We compiled a questionnaire that mainly included closed, forced-choice answers, but also left space for individual answers. The aim was to keep the effort of filling the questionnaire reasonably low while at the same time giving the participant the opportunity to describe individual experiences. The closed format eased the subsequent analysis of the answers. Although bias is a risk when following this approach, with respondents considering a behavioural change only at the very moment they see the respective field, it was presumed that a question without any indications could have been misunderstood or misleading. Due to this bias risk, some results had to be handled with care (see further explanations in the 4.3).

We structured the questionnaire into four parts: the first part asked about the characteristics of the respondent, e.g. his or her age, gender, occupation and residence. The second part aimed at knowing more about the role the respondent plays in the cooperative and about their financial investment in the cooperative. Here we used closed categories combined with open space for individual answers. The third part focussed on the motivations for joining the cooperative. We offered different options such as lucrative investment, support of the community, or support of environmental protection and sustainable energy supply that needed to be rated (important, less important, unimportant) including also open space for individual answers. In the last part of the questionnaire we asked about the effects of joining an energy cooperative. Here we offered a checklist including e.g. a change in awareness or even behaviour in the areas of energy consumption, mobility, investment, nutrition, volunteering or political commitment as a result of the membership in the cooperative. We then related the answer to an open question about the way the behaviour was influenced. Finally, we asked an open question about any other effects that the participation may have had. The complete questionnaire can be found in Annex 1.

With the support of Agrokraft we invited via e-mail more than 750 cooperative members in the district to fill out the questionnaire. It was fully answered by 110 respondents. The sample size allowed us to give some indications on characteristics of energy cooperative members, motivations for participation and the possible influences of a membership on behaviour (see also Chapter 4.3.2).

4. Results

4.1 Energy transition in rural Northern Bavaria

Rhön-Grabfeld is the most Northern district of Bavaria. It has an overall area of 1.021,87 km² and a population of 80,224 people.[4] The Western part of the district is dominated by the Rhön, a low mountain range, which descends further into a hilly rural landscape with patches of forests. Around 50% of the land is used for agricultural purposes (Regierung von Unterfranken, n.d., LfStaD, 2013). The district government is located in Neustadt an der Saale.

In 2012, the unemployment rate was at 3.2% (Bundesagentur für Arbeit, 2013), which is comparably low in relation to the German average. Around a third of the population works in the service sector, while around two thirds work in the secondary sector. Only 0.8% of all employed persons (225 in total in 2010) work in agriculture and forestry. In 2004, Rhön-Grabfeld contained around 1500 agricultural holdings. The Bavarian Farmers' association in Rhön-Grabfeld has 2500 members, of which 1000 are active farmers (Klöffel, 2013).

In 2009, the GDP per capita of Rhön-Grabfeld was €26,549, which is below the Bavarian average (€33,897) (LK Rhön-Grabfeld, n.d.). It should be noted that Bavaria is an economically strong state in Germany,[5] and the amount of farms and people working in agriculture in Rhön-Grabfeld is above the German average. A third of all agricultural holdings (in terms of the number of individual businesses, not land area) in Germany are located in Bavaria (StMELF Bayern, 2012).

Challenges and political conditions

In 2000, the Rhön-Grabfeld District was confronted with several challenges, which were typical for rural areas in the EU and remain so today (see also chapter 1.1). Urbanisation and demographic change have led to a continuous decrease in the rural population. Mainly young people have left the region to find jobs or pursue higher education within cities, as opportunities in the rural region seemed limited.

[4] In December 2012

[5] in 2012, the GDP per capita was with almost 37 000 € 14% above German average (Statistisches Landesamt Baden-Württemberg, n.d.)

At the same time, the adoption of the Renewable Energy Act (EEG) provided a legal framework that presented the potential to revitalise rural areas through a (re)gained role as energy providers. The targeted promotion of renewable energies through feed-in tariffs and a guaranteed access to the electricity grid redirected the control over energy generation from large scale producers towards numerous small producers, most of whom were located in rural areas. Farmers, communities, citizens, project planners, rural consultancies and small private investors perceived this as an opportunity to launch investments in different kinds of energy plants with a potentially high return rate.

Rural areas in Germany, including the Rhön-Grabfeld district, were not only encountered with new opportunities but also with substantial challenges:

- How can investments be directed in a way to avoid negative side effects, such as an increase in land and leasing prices?
- How can it be assured that the money invested remains in the region and does not solely benefit external investors and project planners?
- How can the necessary knowledge and capacity building (with regard to technologies, planning, administrative structures and economic conditions) be managed in the region?

At the same time, professional project developers and investors from outside the region began to approach land owners, farmers and municipalities for the realisation of renewable energy projects on communal land. One of the largest energy companies in the world, Eon, already planned to construct a biogas plant in the Rhön-Grabfeld district.

Rural development at a crossroad

This fairly novel situation urged two key persons in the region, Matthias Klöffel and Rainer Diestel, to think about models and methods to accrue the most possible benefit to the region and the individuals living in the district through the upcoming acceleration of renewable energies.

The main motivation for Mr. Diestel and Mr. Klöffel to establish energy cooperatives in the Rhön-Grabfeld District came from a presentation held by Josef Göppel (a Bavarian parliamentarian of the Christian Democrats for the German Bundestag) about the future of rural

areas. In his presentation, he presented the life of Friedrich Wilhelm Raiffeisen[6], who created an unprecedented system of cooperatives in times of poverty and suppression to stabilise and increase the added value in rural areas.

Göppel`s presentation and the biography of Friedrich Wilhelm Raiffeisen (Braumann, 1970) inspired Mr. Diestel and Mr. Klöffel to use cooperatives as the main vehicle to spread renewable energies across the district, and thus ensuring maximum benefit for the local population.

More specifically, they aimed for the following objectives:

- Make use of the region's potential, keep the added value within the local population
- Improve quality of life and solidarity in the district
- Decrease production costs and create new income opportunities for farmers, the agricultural sector and citizens
- Maintain robust land lease contracts (long-term stability for farmers and agricultural production)

They started a new initiative aligning two key institutions: the farmers union and the machine lending circle. Both institutions had a high stake in agriculture and possibly high stakes in renewable energies as well as a high distribution potential due to their wide networks in the region. With the slogan "Agriculture: food and energy!" they began raising the awareness among farmers and other people working in the agricultural sector about the new income opportunity ahead, accompanied by clear information on how these potentials could be achieved. Mr. Klöffel and Mr. Diestel, well known in the region for their engagement, local knowledge and for holding key positions in the farmers association, were present at numerous public events and assemblies with local stakeholders and conducted several bilateral conversations.

At that time, many farmers asked the farmers association and later Agrokraft for support, largely to aid in decisions on leasing contracts and dealing with the requests from investors in renewable energies. This lack of knowledge and strategy gap created the impulse for a new field of action and for the founding of Agrokraft in 2006, a limited liability company acting as consultancy for the development of rural energy projects at the local level. Agrokraft developed

[6] Friedrich Wilhelm Raiffeisen (30 March 1818 – 11 March 1888) was a German mayor and cooperative pioneer. Several credit union systems and cooperative banks have been named after Raiffeisen, who pioneered rural credit unions.

a specific concept, which aimed to “keep the village’s money in the village”[7] and to allow as many people as possible to benefit from the renewable energies boom. Cooperatives became the backbone of the overall concept of Agrokraft, and many were founded numerously in the region. Since 2008, 21 energy cooperatives were formed in the district, differing in size and the renewable energy sources depending on the local context.

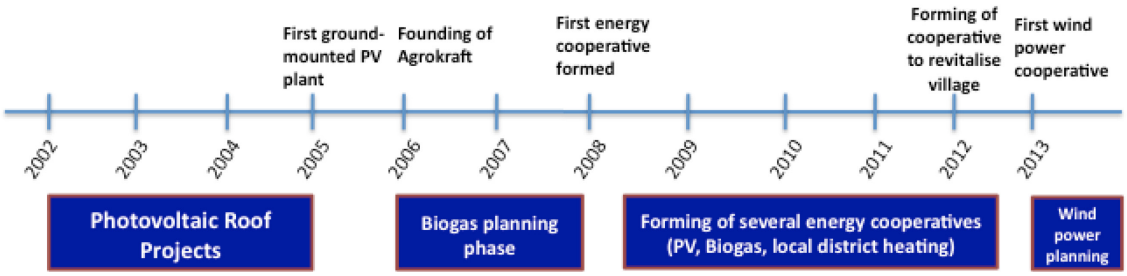

Figure 5: Temporal overview of the transition process in Rhön-Grabfeld

Agrokraft regarded the whole region as one company. Every piece of economic activity should derive from the region itself, resulting in a general understanding of “self-production, self-marketing and self-organisation”. This understanding stood in direct contrast to another development, which had already taken place in surrounding districts: external project developers mainly lease or buy land to install renewable energy plants and are the only ones who generate income from their operation. As a consequence, the additional demand for land drives up the lending and purchase prices; thereby hampering local land users with less capital endowment to maintain or expand their own production. Alternatively, another scenario for the region would have been if every farmer put up his or her own energy plant. This would lead to high competition for land and, if they were for bioenergy, for biomass. Consequently, neighbouring farmers would envy and distrust one another while risking proliferation of economically unviable plants due to insufficient knowledge/capacity.

Initially, the first energy cooperative in 2008had the goal of bundling demand for a larger scale photovoltaic installation on arable land, mainly to decrease investment and operational costs.

[7] Based on a motto from Friedrich Wilhelm Raiffeisen

With every initiation of an energy cooperative in the region, the principle of involving as many people as possible was followed. This meant in practice that everyone potentially interested in being involved was asked to actively and financially contribute to the development of a plant. With this concept, Mr. Klöffel and Mr. Diestel also convinced communal policy and decision makers (mayors) to support these projects as they did not only see new income opportunities but also chances to further social integration through joint projects.

Rural networks as a pre-condition for change

A substantial factor for the take-off of energy cooperatives in the region was the network of actors Agrokraft relied on. As already pointed out, Mr. Klöffel and Mr. Diestel were well known in the region, not only by farmers, entrepreneurs and citizens, but also by decision makers at the regional and local level. Through previous activities in their leadership positions in the farmers' association, they created a solid basis for trust and respect. As a result, it was quite easy for them to convince the right people to take up their idea and to act as multiplier in their own context. The first actors who needed to be excited and convinced by the idea of establishing energy cooperatives in their communities were the mayors of the region. Having known some of them for years from joint activities to promote rural development in the region as well, Mr. Klöffel and Mr. Diestel could build on an existing trustful relationship as well as support against potential opponents. But forming energy cooperatives requires the cooperation with and support of a wide range of actors from administration, business, civil society and individuals.

Figure 6 provides an overview of the network of actors who play substantial roles, opponents and mere observers of the transition experiment in the Rhön-Grabfeld district. With Agrokraft forming the centre of the network, the importance of actors decreases with increasing distance to the centre. Visible overlaps between the "bubbles" symbolise overlaps in people in reality. Arrows show a directed or mutual relationship between actors. Based on the participatory network analysis applied (see chapter 3.2.1), three major clusters of actors were distinguished:

- The first cluster includes the larger group of landowners: mainly farmers as well as the farmers' association ("Bauernverband"), the representative of the region ("Kreisobmann") and the organisation of farmers for machine lending ("Maschinenring").
- The second cluster is formed by the cooperatives: these were the ones initiated and supported by Agrokraft during the foundation process as well as during their operation until now. The cooperatives are led by unpaid volunteers, mainly pensioners with an interest in technology. This group further includes local representatives, local and social banks such as "Sparkassen", cooperative banks that are engaged in the cooperatives as well as local residents holding a share of the cooperatives.
- The third cluster includes the local administration authorities: the mayors, the district administrator with associated district offices (organised in a board called the "regional forum") as well as the department for rural development of the area of Lower Franconia with its newly employed energy experts, and the Bavarian State Ministry for agriculture.

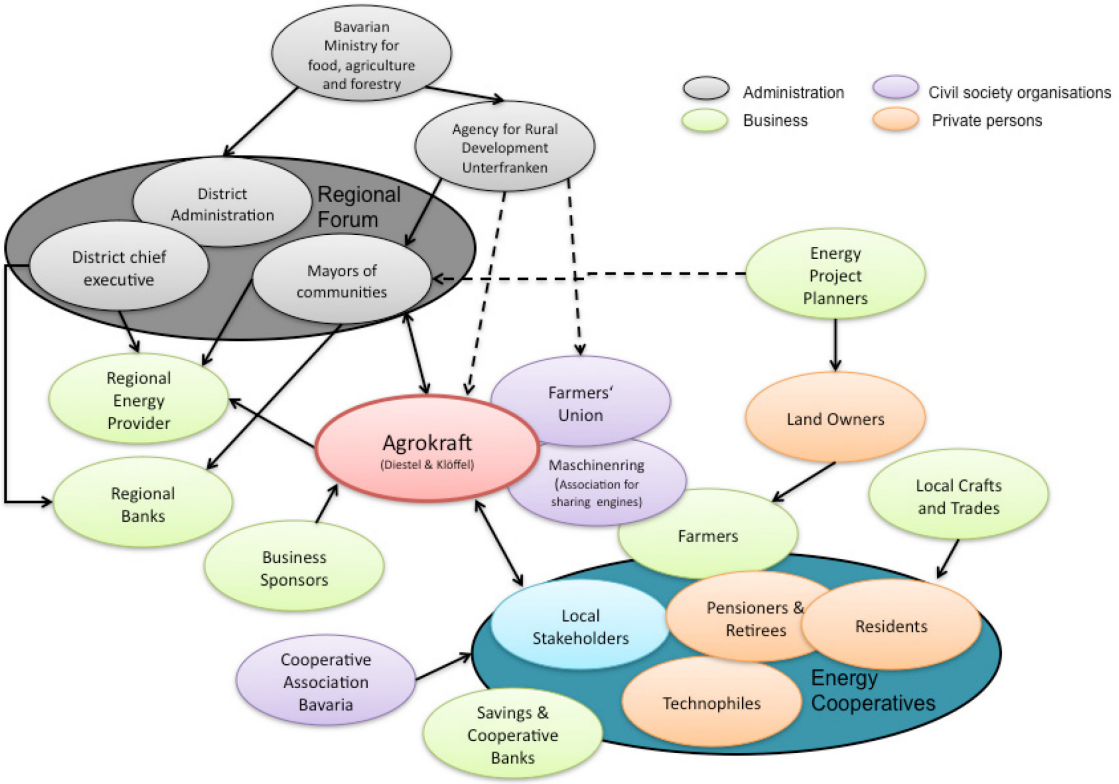

Figure 6: The nework of actors in the development of energy kooperatives in Rhön-Grabfeld

Source: Participatory Network Analysis (PNA) conducted with Agrokraft

In addition to these three major clusters, there are different kinds of actors who support and/or hamper the efforts of Agrokraft and the formation of energy cooperatives. Some of the most important ones are further described as follows.

1) The regional energy supplier plays an ambiguous role in the energy development of the region. As long as a direct partnership with the energy cooperatives is not established, they tend to act as a competitor to the local supplier for the energy market, especially under more competitive legal conditions (see chapter 1.1.1). This would also explain the rather reluctant attitudes, representatives from the local energy supplier showed, when they were asked to give an interview on their perception of the development in Rhön-Grabfeld.

2) As mentioned in previous sections, the primary interest of renewable energy project developers from outside is to obtain the required resources to realise their own energy plant without major contributions from local actors. This is why project developers could be regarded as the major opponent to the rather inclusive transition experiment ensured by the cooperatives. They compete for the same limited resource, which is mostly land for installations as well as for growing biomass in the case of bioenergy. However, in principle, new actor groups could also benefit from cooperation between a cooperative and a professional project developer given that

trust can be generated among the partners and synergies can be found. At any rate, energy cooperatives could potentially benefit from professional project developers.

3) Banks in general and regional banks in particular play a crucial role in rural development and the formation of energy cooperatives. Energy installations can be planned and established efficiently only if sufficient trust is built between the cooperative and their project and the bank funding the endeavour. The cooperatives in Rhön-Grabfeld had mixed experiences in this context. While the willingness to fund the energy projects seemed to exist in many cases, bureaucracy and insufficient reliability often delayed the process of the plant installation, which sometimes even threatened the implementation of the whole project. Hence, building good relationships with regional banks and other funding organisations seems crucial for rural transition experiment.

4) Agrokraft would not have been so successful in their work had no additional funding from sponsors been generated. There is a clear mismatch between funds and capacities needed to get a process started and promoted by frontrunners and the amount of money which is usually available. Sponsoring from wealthy entrepreneurs and "friends of Agrokraft" ensured that funding gaps could be bridged at times when no sufficient income could be generated out of the work. This raises the meaningful question if a transition experiment is only possible through the unconditional support of frontrunners by sponsors or other kinds of funding organisations.

Spreading the concept

Agrokraft's task is mainly to bring the right people together and give them advice on legal, institutional and operational matters when founding an energy cooperative. With this business model, they actually compete with the cooperative association, which also develop business models and energy concepts.

The more well-running energy cooperatives established, the more positive examples and best practices could be used as references to animate people to do the same. A key obstacle for such processes is, therefore, how to get started.

Initially, Mr. Klöffel and Mr. Diestel looked for areas within the district with particular strengths and where people were already active, inventive and well connected. These areas, the people and the established energy cooperatives formed the basis for spreading their idea throughout the region. This led to important experience Mr. Klöffel and Mr. Diestel gained in these

processes: the transition of rural areas towards more income, employment and well-being it is not simply about technology, but about the structures to diffuse the technology properly.

Agrokraft plans to apply the same cooperative concept to other products in addition to renewable energies, thus combining all relevant areas of rural development: agriculture, villages and energy. One future idea is to establish farmers' cooperatives based on the Raiffeisen model for the production of alternative products, such as aquaculture (fish ponds using the heat energy from renewable plants), vegetables and hazelnuts, the initial investment for which most farmers could not afford on their own while investors lack interest due to low return rates.[8]

With the development of their concept, financial support could also be mobilised. Projects run by Agrokraft received funding from several institutions and schemes, most importantly from the EU Fund for Rural Economic Development and Renovation. The projects were also awarded several prizes in federal programmes, for example for the most innovative region or as a "bioenergy village".

4.2 Key characteristics of energy cooperatives and their implementation in Northern Bavaria

No matter which kind of cooperative, they generally operate according to the same seven core principles and values, adopted by the International Cooperative Alliance (ICA, n.d.), these are: voluntary and open membership; democratic member control, economic participation by members; autonomy and independence; education, training and information; cooperation between cooperatives; and concern for community.

A key characteristic is of cooperatives is that they are owned by their members while conventional corporate entities are owned by investors (ICA, 2007). The main goal of a cooperatives is to deliver goods or services for its members (Viardot, 2013). Thus, cooperatives are not charitable by nature, unlike non-profit organizations, nor is their goal to distribute profits based on level of investment, unlike investor-owned businesses.

In Germany, the legal basis for cooperatives, the German Cooperative Law 2006 (Genossenschaftsgesetz, GenG), prescribes an organisational structure with an executive board consisting of at least two people, which is responsible for the management of the

[8] In its consumption of hazelnuts Germany is currently entirely dependent on imports mainly from Turkey

cooperative and a supervisory board consisting of at least three people, which has the power to supervise the executive board as well as to check the accounting records and the annual report. The members of both boards are elected by the general assembly, in which all members of the cooperative have one vote independently of their financial investment.

The amount of members within a cooperative is not restricted and is open to citizens at any point in time. To join, citizens have to pay a capital contribution. There are no legal restrictions about the structure of the shares of a cooperative, each cooperative can decide how many shares and to what price it sells. The contribution consists of a cooperative share and the amount of money the member wants to invest in projects, the subordinated loan. Interests paid depend on the profit of the project(s) in which the loan is invested. Members of a cooperative are liable for their share, and depending on the cooperatives statues also for a fixed number of additional shares; however, they are not liable for additional payments as they are not under reserve liability. Cooperatives are considered rather safe concerning insolvency, partly because they need approval of and are monitored by the association of cooperatives. In addition, energy cooperatives do not have to produce a prospectus, which substantially reduces the costs for setting up a participatory project.

Energy cooperatives in the district of Rhön-Grabfeld

The founders of Agrokraft started to develop cooperatives for renewable energy projects based on the concept of agricultural cooperatives (see chapter 4.1).

Examples include the energy cooperative Großbardorf, which installed a local heat grid, built a citizens solar power station and installed a photovoltaic system on the roof of the sportsclub (Bauer, 2012; GVB, 2013). The cooperative Friedrich Wilhelm Raiffeisen Energie eG (FWR) built a photovoltaic power station in Bad Neustadt (Rhön-Grabfeld) in 2008. The investment amounted to €1.1 million, which was financed with 70% foreign investment and 30% cooperative capital. The cooperative capital was provided by 38 members, who invested at least €2,000. This contribution of each of the members consisted of the cooperative share with a value of €100 and the subordinated loan with a contract period of 20 years with a value of at least €1,900. The period of the loan was set in line with the payment period of the feed-in tariff defined by the Renewable Energy Law (EEG). The interest rate of the subordinated loan was calculated at 5.5% (AEE and DGRV, 2013).

The cooperatives are led by unsalaried volunteers. In many cases, these are mostly male pensioners with an interest in energy technologies and community activities. Having sufficient time to run the cooperative seems to be a crucial factor for this as well as having held comparable positions during their work-life, e.g. as engineers or technicians.

The energy cooperatives also function as a focal point for local representatives and social banks such as “Sparkassen” or cooperative banks, which are often engaged in the cooperatives in addition to the local residents who purchase shares (see also Figure 6).

The success story of biogas plants

Compared to the rather simple installation of ground-mounted PV plants, biogas plants need a more detailed concept to enhance the benefit for many people in the region. In line with the principle of involving as many people as possible, Agrokraft asked all relevant farmers in the area surrounding a planned biogas facility if they were interested in becoming part of the cooperative. The underlying objective besides preventing envy was to ensure a continuous and reliable biomass supply from local sources for a larger scale biogas plant.

The key principle behind the energy cooperatives running biogas plants is the restriction of the distance to 10 km for biomass to be transported to the facility. The farmers adjacent to the biogas plant (who are also involved in the cooperative) could sell their biomass at a guaranteed price but also had to pick up the fermentation residues according to the amount supplied. The residues are then used as fertiliser. This principle of “closed cycles” should guarantee the environmental sustainability of the plant.

Moreover, all biogas plants are combined heat and power plants. The integrated heat concept allows a maximum use of the energy produced in the biogas plant and is set as an obligation, also to ensure the sustainability of the plant itself and to create co-benefits. In Rhön-Grabfeld, gardeners, malthouses and other producing companies use the heat for their operations.

As a result, four highly profitable biogas plants are operated by cooperatives in the district today. Another six biogas plants with a total of 160 farmers in nearby districts are also well-running. In contrast, roughly 200 farmers are running 200 plants in the neighbouring district Adensbach with some of them facing serious economic problems due to, among other factors, the purchasing of additional biomass and an average increase in leasing prices by 500 Euro/ha.

Is wind power setting limits to cooperative structures?

While energy cooperatives dealing with PV, biogas and local district heating have been predominantly successful in the Rhön-Grabfeld district, a more recent engagement in wind power plants has turned out to be a major risk for both cooperative members and Agrokraft itself. The planning process of a medium scale wind power plant requires a lot of financial investment which has to be pre-invested by the cooperative and poses risks to the planner and the constructor of the plant. Wind turbines have become controversial in some regions in Germany, mainly where many installations have accumulated and have a cumulative disturbing

effect on the landscape. Inhabitants of these regions raise more and more concerns about the decreasing aesthetic value of their land and also about potential ecological impacts. Wind turbines require an impact assessment, which should uncover among other things, if habitats of bird and bat species are affected by the planned installations. Wind turbines generally pose a risk for certain bird species that can crash into the wind turbines. If a bird species occurring in area of the potential wind park is protected under national or EU legislation, this in turn poses a risk for the implementation of the wind park.

This is especially true if legal conditions for the consideration of bird habitats change during the time of the planning process. In the pilot project on wind power for Agrokraft, this was precisely the case. The rules for wind turbines to keep distance from nests of protected species[9] have been extended, resulting in conditions for the realisation of the wind park that are far from being economically viable. The downturn of this project leaves Agrokraft and the involved energy cooperative with severe financial consequences, because there is no return to be expected on investments undertaken in the planning process. By the end of 2013, the future of the wind park is still uncertain as well as the future of Agrokraft, the main driving factor for the participatory development of renewable energies in Rhön-Grabfeld.

4.3 Behavioural change in rural energy transition

4.3.1 Motivations of frontrunners

The interviews with some of the key actors in the process of forming energy cooperatives in Rhön-Grabfeld clearly uncovered the frontrunners and also showed the important role they had in the energy transition process (see also chapter 4.1). The question to be tackled in this section is what drives and has driven these frontrunners to take action and to also take a leading role in the overall process.

As mentioned before, the founders of Agrokraft, Matthias Klöffel and Rainer Diestel were the major drivers to develop a vision, to put the vision into practice and to get various people involved in the process. Both describe themselves as a community type of character, who have always been active in community initiatives and interested in the general development

[9] In this case, it was the Red Kite (Milvus milvus), a raptor.

of their environment. This capability to some part came from their agricultural background, where cooperation has always been a crucial strategy to survive. Pooling individual strengths within a community has been the right means to improve the economic situation of the community and general quality of life in general. Both are convinced that realising joint projects have a strong connective effect on the community. Their positive but also elaborated vision of the future of the energy generation seemed very convincing to other community actors ranging from farmers to bankers, mayors, decision makers and mere citizens.

The general notion of people becoming engaged in cooperative processes was, according to the interviews with frontrunners, taking responsibility instead of waiting for others to determine their destiny and future. The frontrunners and cooperative activities also drove citizens of communities to first of all to think about future visions for the community and to put them into concepts and practices. This motivation is also associated with a certain level of disappointment in politics, public authorities and certain institutions (see also chapter 4.3.2).

Another relevant factor driving the commitment that was mainly mentioned by founders and chairpersons of the individual energy cooperative, is a general interest and enthusiasm for energy and technology. Some see themselves as pioneers in residential energy technologies such heat pumps or solar panels, which also aroused the interest (or suspicion) of neighbours and acquaintances. This general interest obviously lowered the inner barrier, other people without any relation to technologies might have, to deal with new and complicated energy technologies and to build up additional knowledge for broader applications.

Some stated that they took over leading position in the group, which steered the process of founding a cooperative – roles they would have usually not taken up in the past. Group processes were seen in other aspects as being responsible for revealing hidden abilities of some participants. Such people recognised within their engagement in community that their knowledge or experiences are valuable for others and the community as a whole.

A key factor which makes people involved in a joint project and which was frequently mentioned in the interviews as being very important is trust. Especially in rural areas, trust (in neighbours, institutions and authorities) is crucial to build alliances between often counteracting stakeholders. The frontrunners in Rhön-Grabfeld were asked what exactly built trust in them and in the cooperative projects. They came up with the following aspects:

- Tradition: With the farmers' association and the machine-sharing organisation, known and trusted institutions were involved in the founding of the process. It might be crucial that these institutions have a long history in the region and are acknowledged as being conservative rather than very innovative.
- Profile: The two Agrokraft founders also have a long personal history in the region. People know them from previous activities and have a generally positive reputation.
- Realism: Financial calculations need to be conservative and cautious, in order to increase the possibility that people get more out of project than expected. Such examples create a very good reference for future activities.

- Traceability: Deriving heat and electricity from the sun is recognisable for many people and not too complex to understand. Biogas requires more effort for people to understand the technology.
- Partners: A certain number of highly committed partners are needed to get a process started depending on the level of complexity and the scale.

It is quite obvious from these results that it is rather altruistic reasons that drive frontrunners in transition experiments. Egoistic motivations like striving for power, appreciation or even wealth were not mentioned once in the interviews, which of course do not automatically mean that they do not exist (see explanations on SDB in chapter 3).

4.3.2 Changes in awareness and behaviour as a result of participating in an energy cooperative

This chapter summarises the results from the questionnaire sent to members of energy cooperatives in the district. First, a short description of the overall sample is given, which highlights different compositions such as age, gender or occupation. Secondly, the motivation of the respondents to join an energy cooperative is examined. Finally, a possible change in awareness and behaviour as a result of the membership in an energy cooperative is analysed.

Description of the Sample

As the questionnaire was sent out to members of energy cooperatives in Rhön-Grabfeld, most of the respondents, namely 77%, also state this rural district as their place of residence. A further 10% comes from elsewhere in the region of lower Franconia, the district Rhön-Grabfeld belongs to. In total, 93% of the respondents live in the region Franconia in Bavaria, while the rest stated other parts of Bavaria, Hessen, Baden-Württemberg and North Rhine-Westphalia as their residence. The age of the respondents varies from 22 to 77 years, the average is 52 years. The gender composition is rather unbalanced; only 16% of the sample are female, while 84% are male.

The professional occupations of the respondents is rather diverse. The main group are white collar employees with 46%, followed by pensioners (15%) and blue-collar workers (10%). Public servants, self-employment and persons working in managerial positions are represented to a far lesser degree (see graph). Only 4% of the respondents were farmers.

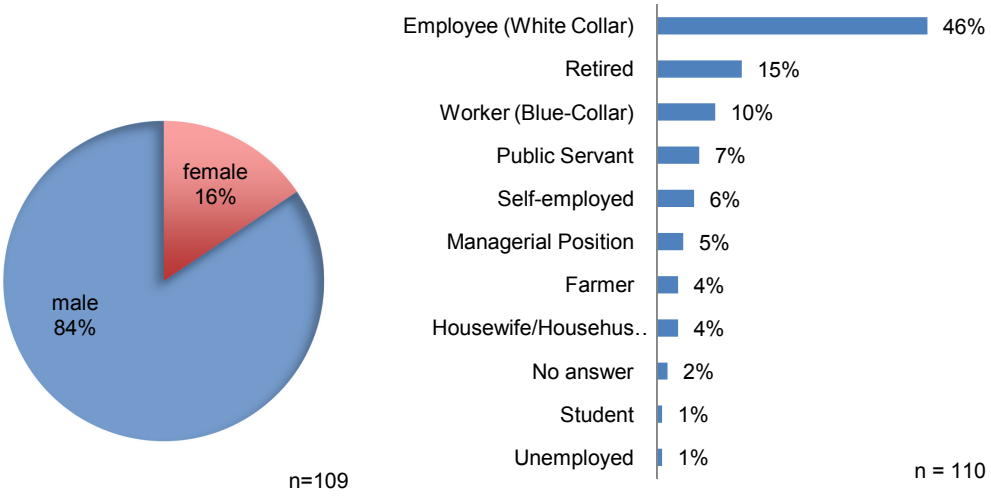

Figure 7: Gender split and occupation of respondents in sample

Concerning their role within the energy cooperative, 59% of the respondents classify themselves as (rather) passive members, while the rest see themselves either as (rather) active (15%) or even hold positions within the cooperative (totalling 26%) such as chair, member of the supervisory board or as tax advisor.

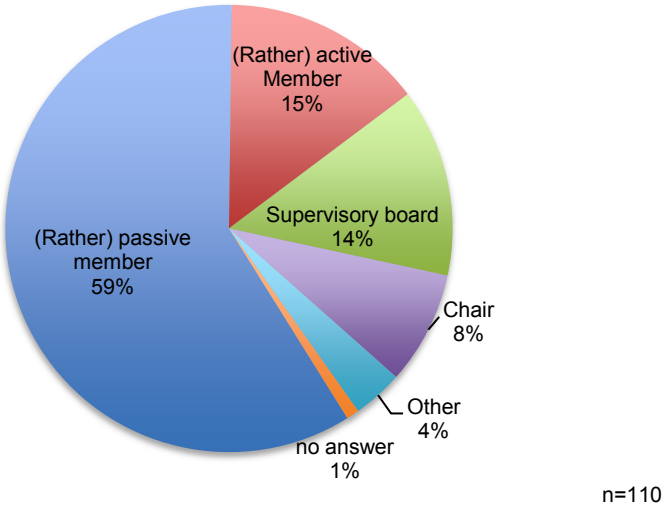

Figure 8: Position of respondents within energy cooperative

The amount invested in the respective energy cooperative varies between less than €100 to over €100.000. The largest majority of the respondents invested between €1001 and €10.000 (54%). To see whether a seperation exists between more passive members investing a lot of

money mainly due to financial reasons and very active members who invest a small or average amount, the correlation between the two variables was tested. The test showed that there is only little difference between the active[10] and passive members in the amount of money they spend.

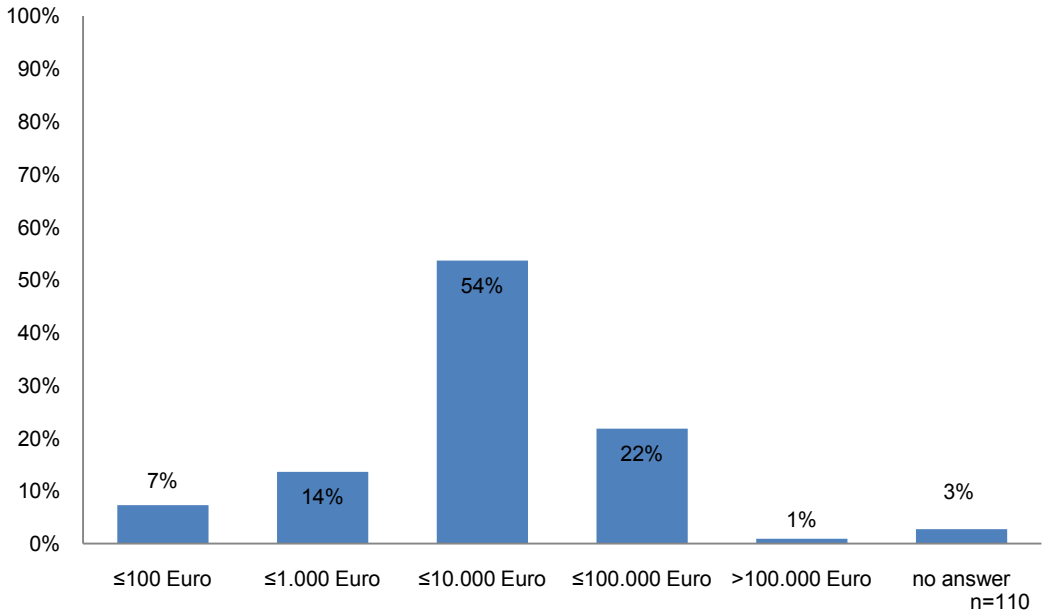

Figure 9: Amount of money invested in energy cooperative

Motivation to join the energy cooperative

In order to learn about the motivations of respondents to join an energy cooperative, they were asked about the importance of a set of indicated motivations. The motivation to protect the environment and to support sustainable energy supply was important to 89% of the respondents and only one respondent (i.e. < 1%) regarded this as not important. Supporting the community as a whole and a general interest in community projects was an important factor for 62% of the respondents, with 25% regarding support of the community and 29% seeing interest in

[10] Active members include those holding a position

community projects as less important factors. Membership in the cooperative as a lucrative investment was important to 37% and less important to 53%, only to 8% was it not important.

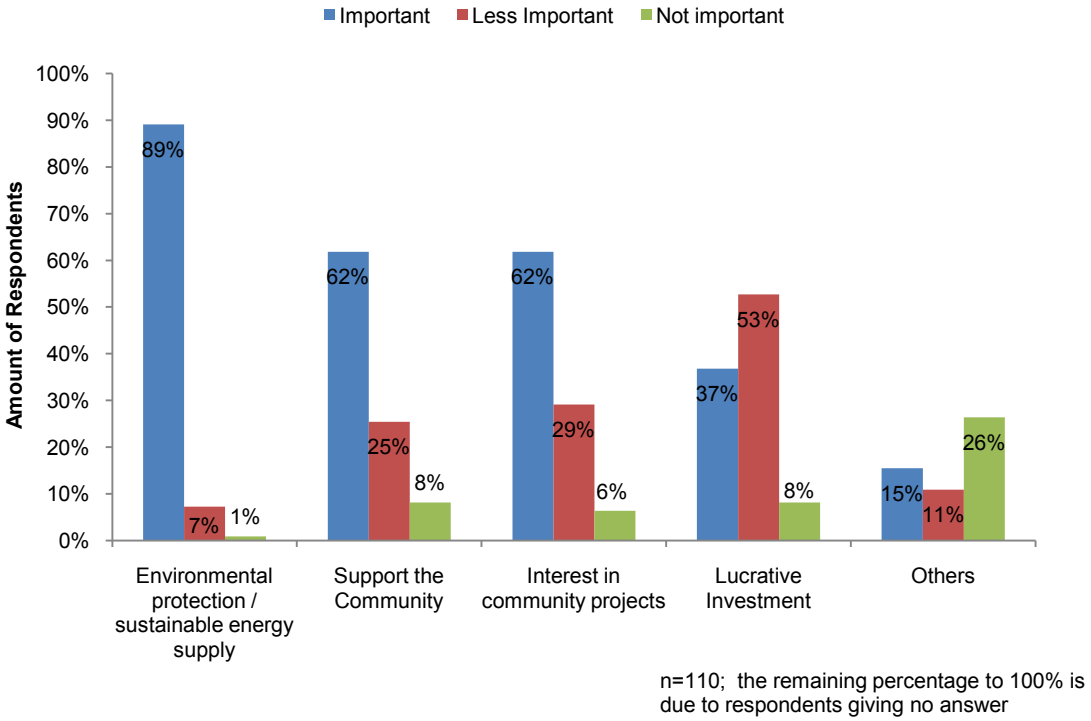

Figure 10: Motivation for joining energy cooperative

Further reasons to join an energy cooperative included (economic) support of the region and regional independence and resilience, discontent with energy politics and the management of the *Energiewende* as well as a general discontent with politics and utilities. The wish for a democratization of energy supply and profits made from energy generation fits in this same line of argument.

We further tested the correlation between the motivation and other variables such as age, gender, amount invested etc. In general, female respondents regarded community related factors and the protection of the environment as more important in their decision than the male respondents, while more men mentioned lucrative investment as a motivation than women (37% and 29% respectively). However, these differences vary only slightly and are therefore not significant.

For the distinction of motivations based on age, we categorized the sample in four age categories (20-40; 41-50; 51-60 and 61-77). It has to be noted, though, that the number of respondents within the age group varies between 11 and 44 respondents. It became clear that lucrative investment decreased in importance with a higher age of the respondents, the importance of all other factors increased with growing age of the respondents (se Figure 11). Interestingly, only 27% of respondents in the age group 20-40 regarded interest in community as an important motivation, while 61-71% of the rest of the sample did.

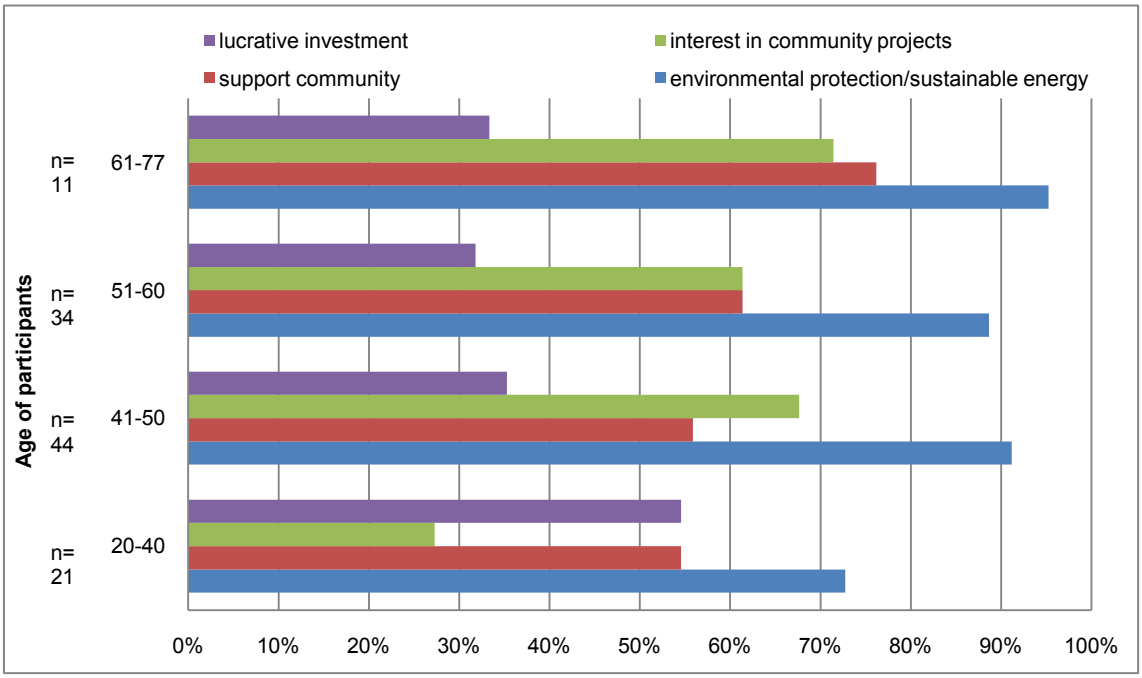

Figure 11: Motivation according to age

There is only a slight, though insignificant correlation between the amount of money invested in the cooperative and the hopes for a lucrative investment as one motivation. In general, environmental protection and support of sustainable energy outweighed by far the investment motive, which might either lead to the fact that investments in energy cooperatives are in general not seen as a lucrative investment or that (possibly due to social desirability bias) respondents rather focussed on altruistic arguments. However, a stronger differentiation could be observed between active and passive members. Passive members were significantly more motivated by the financial aspect of joining a cooperative (42% stating it as important reason in contrast to 27% of the active members) and named the altruistic motivations as often being less important than active members. This is especially true concerning the support of the community, where 75% of the active members gave it a high importance compared to only 54% of the passive members.

Change in Awareness

Building on the motivations and outlined above, the respondents were asked whether the involvement in the energy cooperatives changed their awareness concerning energy supply and potentially other environmental issues. In total 59% of all respondents noted a change in their awareness. The drivers behind it partly corresponded with the further reasons mentioned about the motivations. In addition, among the main reasons mentioned are more access to and more interest in information and discussion with other supporters and interested or critical people, the perception of a general need for green energy at the local level and a sense of community and

eagerness to play a personal part in communal actions. Deviations regarding the change in awareness between age, sex or level of active involvement were not significant.

Behavioural Change

In the following, the respondents were asked whether their environmental behaviour changed as a result of their engagement in an energy cooperative and, possibly, of their increased awareness concerning environmental issues. The respondents were confronted with five indicated areas and asked whether their behaviour has changed or not. In a second step, the respondents were asked to explain the way their behaviour changed if they answered with yes in a particular area. The most behavioural changes resulting from the engagement in energy cooperatives could be observed in energy consumption (34% of the respondents answered yes) and financial investments (29%).

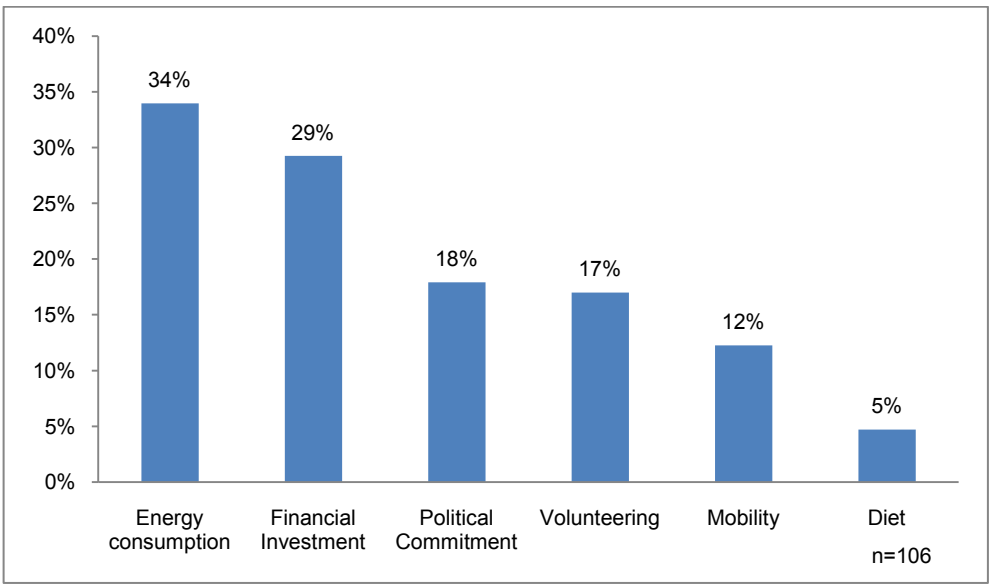

Figure 12: Fields of behaviour change

Furthermore, almost every fifth respondent said that his or her behaviour changed in the area of political commitment and volunteering. The respondents' behaviour change in the area of mobility (12%) and diet (5%) were rather minor.

Like in the other categories, also behavioural change also varies according to age, gender and level of activeness of the respondent. Except for the investment behaviour, the age group from 61-77 (pensioners) reveals the most significant change in all indicated categories, especially in energy consumption with at least 15% more than any other age group. In the area of diet, although rather insignificant as a whole, the pensioners are virtually the only age group where a change in behaviour took place.

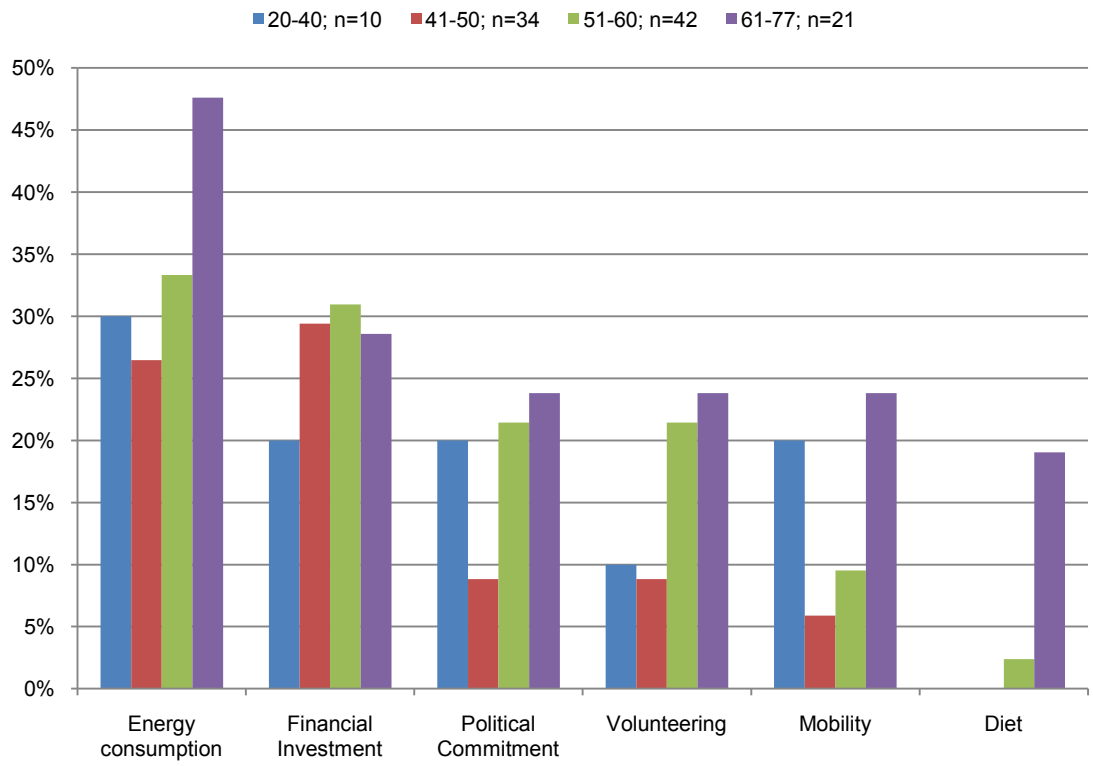

Figure 13: Behaviour change and age

Obviously, besides the perception bias, this raises the question of the reference level, which could not be distinguished by the questionnaire. The maybe surprising dominance of older people recognizing a change in their environmental behaviour can have a simple explanation: It might be quite likely that they have, compared to other age groups, not (or very little) contemplated about their own behaviour before they entered into an energy cooperative. In turn, younger people might have not seen a major effect on their behaviour only because of the engagement in an energy cooperative but might have considered other factors. These potential distortions in the results have to be taken into account before coming to premature conclusions. The same is true for the observed differences in behaviour change between gender. While female respondents scored higher in terms of the altruistic motivations to join a cooperative and in the perceived awareness change, they assigned a slightly lower behavioural change compared to men. This is especially true in energy consumption, financial investment and mobility, where 11-17% fewer female respondents noted a behavioural change. In the area of political commitment and volunteering, the value differs by only 5 and 4%, respectively.

In terms of energy consumption, most respondents recognized a higher awareness for energy, heating and water saving possibilities, which often led to increasing investments in energy saving devices such as for appliances and energy saving lamps. Others explained that they had changed their heating system and now used for example pellet heating or long distance heating instead of oil heating, which can be seen as a direct consequence of the establishment of

energy cooperatives, which dealt with district heating systems. Some respondents stated that they had consumed energy already very consciously and already tried to save energy before joining the energy cooperative.

Regarding changes in investment behaviour, respondents stated that their involvement in energy cooperatives generally raised their interest in investing in green projects and especially in the energy sector. Conducting more investments in local or communal projects was also named as a behavioural change in this area. More generally, respondents commented that their perception towards alternatives to traditional banks had changed favouring rather regional banks. Apart from these rather positive replies, two respondents answered that they had become more cautious and more risk adverse in their investment behaviour.

In the field of political commitment, respondents became more active and more interested in politics as well as more critical towards parties. Many mentioned for example that they started to judge parties according to their actions instead of their words, or according to their political commitment towards the *Energiewende*. Furthermore, respondents became more interested in and knowledgeable about energy politics, the *Energiewende* and Renewable Energy Act and regard this as an important factor in their political activities. Respondents mentioned that this led for example to a change in voting behaviour or participation in demonstrations. Some respondents also became more actively involved in politics, for example as a candidate in local elections or in general as participants in local decision-making processes concerning energy production.

Respondents answering positively about volunteering highlighted a stronger commitment, especially within the energy cooperative. Some respondents also volunteered in other 'green' projects. As already seen in other parts of behavioural change, some respondents stated that they had already volunteered for many years, which again raises the question of the reference level.

Only 12% of the respondents stated a changed in their mobility behaviour, mainly by using more often bicycles and public transport. A number of respondents also stated that they replaced their car with a smaller, more energy efficient car such as diesel or LPG. E-mobility was also mentioned as a new area of interest. Again, some respondents stated that they had already tried to cut CO2 emissions from their mobility before joining the cooperative.

5% of the respondents noticed a change in their diet, mainly due to buying more locally and organically produced food. Only one respondent stated that he or she eats more vegetarian food due to the high energy consumption of meat production.

4.4 Energy transition in Denmark and Spain

4.4.1 The case of the Island of Samsø

Off the eastern coast of Denmark the island of Samsø has set an example by achieving a zero carbon footprint in less than ten years after winning a competition initiated by the government in 1997. The island previously depended largely on oil and electricity imports but the island residents successfully replaced them with a combination of wind, solar, geothermal and biomass. Today, Samsø produces enough energy to cover 100% of its own consumption needs, which includes the personal consumptive needs of 4,300 residents as well as other sectors including for instance transport. In addition, the island produces surplus energy, which is sold to the mainland at a profit. Thus, the Samonians reduced their carbon footprint from 11 tons of CO_2 per year to minus 4.4 tons of CO_2 per person, marking a 140% drop from 1997 levels. In addition, collective structures own all renewable energy installations so that it is the citizens of Samsø that benefit also financially from the replacement of conventional energy sources with renewable ones.

The competition and initialising of the Renewable Energy Island (REI) project

The Danish Government subsidises research, development and deployment of renewable energies, in particular wind energy since the late 1970's. In 1996, the government published the "Energy 21" strategy aiming at an increase share of renewable energies in total energy consumption from 12% at that time to 35% in 2013. One year later, the Danish government initialised a competition in order to test if communities can change from conventional to renewable energy sources in a short period of time making use of existing technologies (Jakobsen, 2008). The island of Samsø won the competition and started its Renewable Energy Island (REI) project. They took stock of the current annual energy consumption and calculated that Samsø required 29,000 MWh that could in theory be covered by the installation of fifteen wind turbines. At that point, the majority of the island's electricity was imported from the mainland with some 5% provided by a few wind turbines already set-up on the island.

Early on in the planning process, private companies showed great interest in developing wind projects on the island. However, strong local interest and organizational authority rooted in local institutions helped secure citizen involvement and future ownership in the development of renewable energies. The national organization of the Danish Wind Turbine Owners' association partnered with the Samsø Wind Energy Association, Samsø Municipality and Arhus County. Working together these local institutions developed a plan that determined the location of the wind turbines and the necessary capacity. Arhus County developed a course of action, which included 11 turbines producing 1 MW each to cover basic household consumption needs. These were installed in 2000. In order to offset the energy consumption needs of other sectors, particularly transport, Samsø also installed ten 2.3 MW offshore wind turbines in 2005 (Jakobsen, 2008).

While wind energy on land and off-shore is the cornerstone of production, the community had to set other complimentary goals to achieve 100% renewable energy including the use of renewable heating and more efficient heat, electricity and fuel use by adjusting people's consumption habits and behaviour.

The REI project turned out to be beneficial to the community in diverse ways. From 1998 onwards it created an average of twenty jobs per year until 2007, in positions related to craftsmanship, engineering, planning and other sectors. Perhaps, the most unexpected development was the spurt in tourism as visitors interested in renewable energies and this kind of lighthouse projects were attracted (Jorgensen et al., 2007). However, an increase in tourism leads to an increase in energy consumption, especially as up to 250 new vacation, retirement and summer houses are planned to be build (Saastamoinen, 2009).

Factors for successful implementation

The project implementation can be seen as successful in terms of the implementation of renewable energies. Within 8 years, the island shifted to renewables for energy generation. For this, the following success factors could be identified:

1) The shift to renewable energies has come from the grassroots and initiatives have been rooted in local people through a user-driven innovation process rather than being pushed from the top, Open dialogue between local government, scientists, citizens and local actors has also been key. Most importantly, collective ownership of the installations rather than by private companies has brought the required acceptance of local citizens and also provided a compensation for the impacts associated with wind energy (e.g. aesthetic burden) (Jorgensen et al., 2007). In addition, in the 1970s the islands main source of income was agriculture, which was experiencing a significant lull. As a result, it was farmers that initially expressed interest and supported the REI project. Not only did they have the land on which to build the turbines, they had the business skills and the foresight to plan and implement renewable energy installations.

2) The shift to renewables was taking place in a financially secure environment. This was in particular made possible by the government: as part of the competition it set a guaranteed fixed price for the energy generated in Samsø, thus ensuring that all wind turbines are paid off in six to seven years (Jorgensen et al., 2007). Hard and Jamison (2005) call this "cultural appropriation" whereby "new things and new ideas are made to fit into established ways of life."

"By making it possible for people to invest in and thereby share the ownership of local wind energy plants and by making arrangements so that the power that was generated could be easily connected to the already established energy distribution networks, Danish policy makers created an exemplary story of cultural appropriation."

3) The shift to renewables was supported by key actors – which is Soren Hermansen who has been heavily involved in the REI project from the beginning. He (and his team) initialised and pushed the process by explaining, organizing and bringing together citizens behind the idea which was crucial to engendering change (Jakobsen, 2008). New ideas and changes in conventional behaviour are more easily to overcome when there are a few "true believers" and a high level of trust among neighbours and community members. Wüstenhagen et al. (2007), for

example, identify trust as an important factor when trying to gain acceptance of unfamiliar things. They explain that “trust” which exists most commonly through personal relationships, is crucial in helping people understand the risks in regard to environmental, economic and social aspects, as well as, the aims, motives and competence of decisions.

4) The shift to renewables was connected to positive expectations with respect to local development. Oil use and the respective costs for imports were regarded as an enemy on the island. Denmark did not subsidize Samsø’s oil consumption, as many governments do with islands that incur extra costs in transportation. Instead, the citizens of Samsø had to bore the burden of transport costs in addition to that of rising oil prices and high energy taxes on oil. Thus, Samsø citizens were acutely aware that they could save money by shifting away from oil while at the same time. Furthermore, there was a distinct awareness among Samsø citizens of the need to create more jobs, attract young people to stay on the island and make the local economy self-sufficient through new means. The renewable island project offered these opportunities and finally meet the expectations (Saastamoinen, 2009).

However, the project did not meet the expectations with respect to behavioural change. In particular, the goals of saving heat, electricity and fuels for transport by using new technologies but mainly by changing behaviour were not met, although a number of campaigns aimed at reducing energy consumption were launched. These included information, certification and education campaigns on consumption habits and household appliances as well as house visits from energy advisors and campaigns for renewable energies installations and insulation (Jorgensen et al., 2007; Saastamoinen, 2009). Over the project life time, heat consumption finally increased by 10% despite a target of a 25% reduction, electricity consumption decreased by 3-4% while the target was set towards 15% reduction, and energy consumption from the transport sector increased by 5% despite a target of minus 5-10% (Jorgensen et al., 2007). The reasons for these failures were not further analysed as the evaluation of the project did not address behaviour change in detail (Jorgensen et al., 2007). Saastamoinen (2009, p. 17) reflects on energy savings by highlighting rebound effects and that probably “positive social dynamics that worked in favour of building renewable production units did not work in the field of energy savings”.

4.4.2 The case of “Som Energia” in Spain

Som Energia means “We are Energy”. It is a non-profit renewable energy cooperative started in October 2011 in Catalonia, Spain. Inspired by the success of renewable energy cooperatives in other European countries, a group of University students and professors from the University of Girona started the first renewable energy cooperative in Spain. Their objective was to provide Spanish citizens with the opportunity to invest in renewable energy generation capacities and switch their consumption to renewable electricity.

The cooperative started with selling green electricity brought from existing generation capacities (by using green certificates as proof of origin) but the aim of the cooperative was from the

beginning to invest into own renewable installations to be able to supply all of its members with own generated electricity coming from small-scale projects situated near the home of members.

Regional circumstances

Som Energia was founded during the economic crisis but there were still financial support available for the build-up of renewable energies through renewable feed-in tariffs. However, at the beginning of 2012, the Spanish government stopped accepting applications for projects beginning operation after January 2013 and introduced a retroactive tax on all kinds of electricity produced (Velten et al., 2013). Som Energia "survived" these changes as its business model combines the direct investment into own electricity but also heat generation and the selling of electricity to its members. In addition, the cooperative was and still is very cost efficient: during its first year, the cooperative has been organised by volunteers. Then, low operational costs of the cooperative could be realised through low expenses in salaries and by depending on a high number of part-time volunteers as well as some unemployed full-time volunteers. In addition, office rent and supplies as well as substituting advertisement with frequent appearance in social media networks such as facebook or twitter are also means to cut costs.

The REScoop project (2013, p. 39) therefore argues that Som Energia is a best-practice example "in the area of financial sustainability" in unsecure policy environment and times of the financial crisis. The financial crisis might even increased interest in other, more transparent and participatory investment opportunities besides a general distrust in the banking sector.

The main barrier to produce and/or sell energy constituted the Spanish energy regulations and the related administrative processes. It took the cooperation quite some time to get the respective licences as there is not only one responsible competency but several ministries and organisations that are involved.

Design of the cooperative

The founders of Som Energia sought to create a cooperative that operates at a national scale, with a large and diverse membership that simultaneously provided the financial resources for affordable electricity from local renewable sources that are set up nearby where members live. The first project was thus realised near the University of Girona followed by projects near Barcelona and in the rest of Catalonia.

Members pay a refundable initial membership investment of EUR 100 as to facilitate and open the participation to all parts of society. Members are then able to buy renewable electricity which is sold at the same price as conventional electricity. In addition, members can participate in the building of renewable energy installations. For this, members of the cooperative have two tiers of financial contributions: there are "voluntary capital contributions" that range from EUR 100 to EUR 25,000 and have an interest rate of 3.5% (regularly revised by the Assembly); or there are "participations" with a contribution ranging from EUR 1,000 to EUR 100,000 for at least 5 years and an interest rate between 4% to 7% (Som Energia, 2013). The member's contributions are not related to a specific project but to the mix of all energy projects owned by the cooperative.

Within just two years, Som Energia generated a membership of over 6,000 individuals. Most of them are coming from the area surrounding Catalonia but now also people from other parts of Spain are getting involved. Despite the difficult economic conditions, membership in the cooperative continues to grow (+800 people per month) and in 2013 Som Energia's membership surpassed 8,000 individuals (REScoop, 2013). From its founding in 2011 to 2013, Som Energia invested over EUR 3 million in the development of own renewable energy projects including eight photovoltaic systems, a 500 kW biogas plan and a 80 kW biomass heater. The cooperative is now also investing in wind energy (Mayo, 2012; Som Energia, 2013). As of 2013, Som Energia was producing renewable electricity for 1,400 of its 8,000 cooperative members. Decisions regarding the technology, location, design and size of projects involve as many of the members and local citizens as possible; Som Energia finally decides then based on local circumstances and needs of their members.

Today, the cooperative is the owner of three companies, which in turn are the exclusive investors in Som Energia's energy projects. In most cases, Som Energia purchases renewable energy plants that already exist or that are in the final stages of development and hires a local company to maintain and operate it. In its first project, Som Energia bought a PV plant that had solar panels on an industrial building. The construction, paperwork and licenses were already taken care of by the previous owner. There are currently eight more solar projects in various stages of development totalling 700 kW. In addition, a 500 kW biogas plant was purchased in 2013 totalling some EUR 2.2 million. The biogas power plant was bought from another company who had already constructed it and is now paid by Som Energia for maintenance work. The biogas plant is the first in Spain to be owned and operated by a cooperative.

Som Energia also disseminates information about renewable energy use and the cooperative's work. Due to limited financial resources and its widespread membership, Som Energia relies heavily on volunteers in different districts. They have 17 local support groups that are run by volunteers. They organise town meetings to explain the business model and objectives of Som Energia to the public, eventually to recruit more members and to involve itself as a central component in the public discussion about renewable energy and cooperative ownership of green energy in Spain.

5. Discussion

5.1 What drives transition towards renewable energies in rural areas?

Energy transitions are complex processes with of a broad range of actors involved. For the Netherlands, Verbong and Geels (2007) observed several changes in rules, networks guiding principles and in technology, which drove energy transition in different co-evolutionary steps. These also include developments which do not occur within the regime but at a wider level, such as general changes in consumption patterns or Europe-wide economic development (Verbong and Geels, 2007). Thus, energy transition can only partly be shaped by policies, other factors can be unpredictable, yet of equal importance.

The three case studies presented here show that in fact directed developments that do not happen by coincidence, but are instead strongly triggered by frontrunners at the local level and political pre-conditions could foster energy transitions. Transitions from fossil energy to renewable energies are widespread in the EU and they follow different patterns and directions. The case studies unveiled some characteristics for the promotion of renewable energies in rural areas. Based on the results presented in chapter 4, factors beneficial for an expansion of renewable energies in rural communities are as follows. Some of them are discussed in more detail below.

- **Legal framework** favouring renewable energies over fossil energies, enabling for a secure investment environment
- **Funding** to support initial activities that do not yet generate income
- **Frontrunners** deeply rooted in the region and of high reputation among population
- Established **networks** of actors and stakeholders
- General **attitude and willingness towards change** among at least some parts of the population
- A **simple, convincing and highly inclusive concept**
- **Spaces and capacities** for open dialogues

Many substantial changes in the energy regime have their origin in the more distant past when specific changes were not yet recognisable. Many transitions have in common that crises of the previous system, either evoked by external factors or rooted in internal structural failures or both, urged stakeholders and institutions to become creative and to think about adaptations to new circumstances. This was not only true in Rhön-Grabfeld, Samsø and in Spain but also takes place at an even broader level, when global economics change.

A shift of the **legal framework**, giving renewable energies a favourable position over fossil fuels, be it through direct support via feed-in-tariffs (FITs), quota systems, premiums or tenders or by disadvantaging fossil fuels via emission trading or environmental taxes, is a significant step to unfold dynamics towards a transition to renewable energies, though not the only one. In the case of Rhön-Grabfeld, the feed-in tariff as part of the Renewable Energy Act adopted in 2000 provided for a new level-playing field for renewable energies in Germany. It only took two

years for the first larger scale PV utilities to be established in the district. Besides a guarantee price for renewable energies, the development of renewable energies in Samsø was initialised by a competition launched by the government, which the island community won. Unlike the feed-in tariff in Rhön-Grabfeld, which solely established secure investment conditions, the competition in Denmark provided in addition grants for initial investments and capacity building. Som Energia in Spain also benefitted from a feed-in tariff, which, although abolished during the economic crisis, provided a solid fundament for renewable energy operators to invest and to build up capacities. Energy transitions are therefore good examples to demonstrate that adjustments in regulations and rules at regime level open up a window for flourishing niche development, which can potentially challenge incumbents in the regime.

In addition, as the case study of Rhön-Grabfeld showed, **funding and sponsoring** from wealthy entrepreneurs ensured that funding gaps could be bridged in times when sufficient income could not be generated. Without the benefit of supportive funds, Som Energia had (and still has) to rely on volunteering to increase their reputation and gain additional supporters for their cooperative. This raises the question if transition experiments in a cooperative way are only possible through the unconventional support of frontrunners by sponsors or other kinds of funding organisations. While this question is quite new and hardly discussed, the need for funding in transitions has been raised in other contexts. For example, Jäger and von Raggamby (2013) point towards the role of research and researchers in transition experiments and recommend longer and more flexible funding from EU institutions in these projects, taking needs for skill enhancement and the time-consuming initialisation of such processes into consideration. However, since only few transition experiments are integrated in research projects, other sources for supportive funding might be needed if local transition experiments should be promoted. In addition, there is a need for more conducive conditions and more flexible sources of funding through social finance initiatives as well as broad awareness through social marketing to support system change (Antadze and Westley, 2010). However, in general, we see a gap in general and systematic knowledge on the role and possible origins of funding to foster transition experiments and frontrunners and their activities in particular. Future research would need to address which role governments could play in financing open result processes (see remarks about the limitations in Antadze and Westley, 2010) and should develop innovative funding models to involve entrepreneurs, foundations and other private actors. We briefly touch upon this issue in the discussion about “enabling policy” (see chapter 6).

In Transition Management, **frontrunners and first movers** are integral for niche developments, but it seems that their role in transitions of rural areas are particularly important. Processes contributing to transitions – as shown by the case studies – have a higher chance being realised if launched or at least strongly backed by local actors. These local frontrunners should be open to innovative ideas, well connected to local and regional stakeholders, should already have a good reputation within the population and should be able to create strategic alliances. In Rhön-Grabfeld, the interviewees often referred to Mr. Diestel and Mr. Klöffel and their commitments as the key success factor for the transition. Not only are they as individuals strongly rooted and well known in the region, the institutions with which they have worked and held representative

positions (farmers' association and sharing organisation for agricultural machines) also have a long tradition in the region. It needs to be highlighted that they neither belong to a particular political affiliation, which could have raised distrust among some parts of the population. Their commitment was mainly driven by the intention to contribute to stable wealth within the district and to pursue environmental thinking rather than by any political reasons.

Besides the key role of frontrunners, it can be assumed from the case study in Rhön-Grabfeld and in Samsø that **local identity** plays a key role in initialising transition experiments in the energy sector, especially in rural regions (see also the example of Texel in Frantzeskaki et al. (2013). In contrast to surrounding districts, Rhön-Grabfeld has pursued cooperative structures to produce renewable energies. The cooperatives do not only deliver income to a limited amount of people but also consider the needs of the community as a whole. At the same time, they can significantly improve the economic return and social acceptance of renewable energy facilities (see mainly chapter 4.2). In Samsø, cooperative structures were established in the first place also in order to prevent investors to take over the energy projects, which would have resulted in low acceptance by the population. However, in contrast, the case study in Spain, where Som Energia involves people at a supra-regional level and aims to diffuse renewable energies across the state, shows that a particular locality of energy production is not necessarily needed.

Judging from this limited set of examples , it appears that a group of people who feel strongly connected to a certain region and share the same local identity is not necessarily a requirement for forming energy cooperatives. A shared idea, providing for the right structures for investment and a good diffusion strategy seem to be important factors to launch energy transitions beyond the regional scale. A local base can nonetheless increase the acceptance for renewable energy projects among inhabitants and clarify the benefits for the local economy. Cooperatives provide favourable structures to ensure this local embedding of renewable energies, but can also be applied more flexibly as a business and diffusion model at a supra-regional level.

Are co-operatives investing in renewable energies still in a niche? Reflections on the applicability of the MLP and Transition Management

In chapter 2 we pointed out that we consider energy cooperatives investing in renewable energies as a part of niche activities within the electricity system at a regional level. The processes and dynamics mainly described in our empirical case study in Northern Bavaria can be well explained by referring to the concepts developed in TM. The founders of Agrokraft followed more or less precisely the circular process of TM (see Figure 3).

However, there is a key difference to what is usually presumed to be an open problem structuring process in a transition arena (see Loorbach and Rotmans, 2006). Instead of providing an open space for ideas on future community development, the energy transition in Rhön-Grabfeld was designed conceptually by two frontrunners who clearly paved the way and conceptually determined the direction the development should go. In other words, they were the ones who initialised a transition experiment. They thereby responded directly to societal

challenge, namely a need for a sustainable model of renewable energy development in the region to both respond to the environmental drawback of fossil energies and to deal with the external pressures from project developers, who searched for community land for their own renewable energy business.

Once the idea was shared with a critical amount of supporters and relevant stakeholders, the process followed the same pattern as described by the TM circle (developing coalitions, mobilising actors and executing projects, evaluating/monitoring/learning). The learning and promoting processes of the energy cooperative also led to a scaling up of activities across the district and even beyond (see "spreading the concept" in chapter 4.1). In contrast to one of the main principles of Transition Management, this process can hardly be described as a "goal-seeking process where the transition visions and images, as well as the underlying goals, change over time" (Loorbach and Rotmans, 2006). By implementing the cooperatives as a more inclusive model of renewable energy expansion, the frontrunners rather provided for participation in decision-making at a later stage.

It can be argued that the cooperatives investing in renewable energies in Rhön-Grabfeld have already left the niche level, entering the regime level by substantially affecting regime configurations and actor constellations. But this interpretation depends on the scale of observation. At district level, the energy cooperatives have a substantial effect on the energy production, especially on the share of energy derived from renewable sources, but also on the reorganisation of actors involved in energy production and even beyond, since the cooperatives also envisage extending their activities towards other fields of application. Hence, if the delineation of the system refers to the regional (district) electricity system, including supply and market structures (i.e. technology used, patterns of ownership and type of market interactions) the energy cooperatives can no longer be seen as mere niche activity. The question, however, is how these regional initiatives should be regarded in the national context. Rhön-Grabfeld might form a best-practice example of how transition from fossil fuel-based power generation to renewable energies could be organised in a strongly inclusive and sustainable manner. But which role does this example have in changing the entire German energy system? Answering this question would require a long-term and comprehensive analysis of the numerous bottom-up initiatives in renewable energy development in Germany and how they are cumulatively responsible for the ongoing dynamics and interrelations between actors, legislation and vested interests.

5.2 Energy cooperatives – a model to foster sustainability transition in rural areas?

The case studies have shown that, in addition to being a pure investment opportunity, energy cooperatives offer the opportunity for participation and engagement of local citizens and can therefore be seen as a useful driver of transition experiments. They increase acceptance for renewable energy installations by being open to all citizens in the affected region and generating profit for the community as well as for each individual.

Energy cooperatives are also a platform for organisation and motivation, as the business model is very open and democratic when compared to other legal forms such as limited liability companies or a partnership. Participation is provided through the right of cooperative members to vote for positions in the cooperative and decide about the cooperative statement, the related projects and the profit distribution and use. People can join the cooperative at any time, and several activities can be conducted under the same roof as long as they are compatible with the company's mission statement. A lot of work is done on a voluntary unpaid basis including the work in the supervisory and executive board.

Transitions of rural areas are often hampered by the fact that these regions are less attractive for business and investments mainly because of a lower density of a skilled workforce compared to urban areas as well as limitations in infrastructure and transport routes. At the same time, due to more traditional habits among people and less influence from other cultural backgrounds, a certain level of distrust against newcomers and outside investments often occurs in rural areas. Hence, outside players potentially driving innovation and thereby transition of rural areas often times are neither attracted by rural areas or encounter low acceptance for their activities. As a result, socially accepted transitions are more likely to happen endogenously or, in other words, through the community and inhabitants themselves building strongly on the trust as a significant enabling factor.

Especially in areas with low incomes, high unemployment rates and a continuous demographic change, the communities' ability to substantially improve the situation of the population mostly by building on their own resources and capacities is significantly constrained. Against this backdrop, cooperatives in general and energy cooperatives in particular offer a promising model (see above) for using resources and capabilities of local actors and residents, which together could pave the way for a successful energy project. Cooperatives offer comparably low entry costs for becoming a member and to contributing to the overall investment.

Furthermore, cooperatives often make use of other cost saving potentials. In a similar study, Viardot (2013) found that community cooperatives often develop partnerships, for example with local vendors in the form of preferential rates and service exchanges to decrease overall costs of energy projects. Through partnerships with local SMEs energy cooperatives generally ensure that private money spent or invested by residents is used to invigorate the local economy rather than leaking out of the region when buying from a large-scale company at national level or investing in the financial market. The question however remains if community-based energy cooperatives should solely cooperate with local companies and providers. In the case study of Rhön-Grabfeld, we discussed the ambiguous role of energy project developers as competitors with energy cooperatives for the same resources (mostly land) in the district. However in principle, new constellations of actors could also benefit from cooperation between a cooperative and a professional project developer, as long as trust can be generated among the partners and synergies can be found. Agrokraft can also be seen in this context as a project developer, although rooted in the region. Energy cooperatives could potentially benefit from external professional project developers as well, which could bring in additional expertise, experience and networks.

Raising awareness and increasing acceptance for energy transitions

Renewable energy cooperatives are playing a central role in educating the public about energy production, management and use. In doing so, they are increasing acceptance of change (Morris and Pehnt, 2012). Individuals often have an indirect or distant relationship to the energy that they depend on and use daily. Since energy is often received and used by individuals via intransparent mechanisms, many individuals are cut off from the discussion of what type of energy generation to use. Through learning about energy cooperatives and participating in them, consumers can take part in energy production, management and use. In this regard, Schweizer-Ries, (2008) makes a distinction between *passive* and *active* acceptance. Oftentimes, the construction of, in particular, large-scale technology projects (e.g. central power plants) requires passive consent by citizens and the public. When citizens participate as owners, contributors, and designers of energy projects, the type of acceptance is more active and thereby more stable.

Cooperatives as focal points of community activities?

Another important aspect shown by the Rhön-Grabfeld case study that has not yet been discussed in depth is the potential to engage in additional activities. Cooperatives originally dealing with the adoption of renewable energies can serve as a platform for further activities that can benefit a community or a region as a whole. The integrative power of a successfully conducted renewable energy project in a cooperative can provide a solid foundation on which other visions can be jointly realised. Cooperatives could thereby be regarded as consolidation of regional capacities, which were previously unconnected and therefore unleveraged.

Based on the tradition of Raiffeisen (see Braumann, 1970) the frontrunners of the cooperatives in Rhön-Grabfeld therefore want to use the same structure to carry out other kinds of projects for example in order to open up new production and market opportunities for agriculture. In principle - and this also differentiates cooperatives from other business forms – any kind of project could be realised by a cooperative when it is in line with its cooperative statement and approved by its general assembly. It is therefore open for social innovations and potentially even responsive to acute communal shortages or unforeseen disasters. In this context, one could argue, that a community with a web of active cooperatives is more resilient to external destabilising factors than others mainly consisting of singly acting individuals. As they are local networks that serve to pool capacities, active cooperatives could function as a focal point for communities to discuss and develop new or – in case of disasters – restoring initiatives.

However, it must be noted that energy cooperatives do not necessarily cultivate community-focused projects. In fact, in some cases in Rhön-Grabfeld, the members of cooperatives decided to stop the affiliation of new members to the cooperative, especially in times when the renewable energy plant has been installed and investment costs were amortised. In such situations, the revenues from an energy cooperative primarily benefit the members but not necessarily the community as a whole, especially when the return is not reinvested in additional projects. This should not diminish the fact that a much larger group of (local) people does benefit from the profits compared to a limited liability company, but it also shows that

cooperatives do not automatically consider the community as a beneficiary of their activities in every case.

In fact, cooperative activities strongly depend on the dynamics among their members. Depending on the composition of the members, conflicts and disagreements among the group could be a risk in operating the business. We see a certain gap in transition research on group dynamics within such cooperative structures, mainly dealing with the question if and how processes could be hampered or even fail through the continuous need for agreement among a large number of participants. More generally spoken, there seems to be a gap in investigation of failed transition experiments[11] in general and of cooperatives in particular. Most case studies (as well as ours) build on good or best-practice examples, which might disregard issues like risks, gaps, reasons for failure and other factors from which lessons could be learned for future transition initiatives.

Mainly building on the insights gained from the case study in Rhön-Grabfeld but also what was shown by the cooperative structures formed in Samsø, energy cooperatives can contribute to basically every element within the transformative potential of a community (Wittmayer et al., 2013). In short, (energy) cooperatives designed in a way as in Rhön-Grabfeld are inclusive, foster participation and learning processes, focus on community needs and provide access to resources. They are also in principle open for different future scenarios, however with some limitations as discussed in chapter 5.1.

Cooperatives – a model for energy transition beyond community borders?

The literature often emphasizes the importance of “community identity” and “participation” in the design and planning of cooperatives, which are factors that seem to increase peoples’ sense of self-ownership, energy independence and sustainability. The case study in Spain “Som Energia” illustrates that these elements are more flexible than potentially perceived, and a cooperative can also operate at a supra-regional level and offer its members some of the same benefits of smaller more local cooperative energy projects.

Another interesting aspect illustrated in the Som Energia case study is the fact that cooperatives can be resilient in environments of economic difficulty. With Spain being one of the countries most intensely hit by the economic crisis, it is interesting that the cooperative has been able to

[11] If stressed at all, transition failures are usually discussed at a general level (like in Hess (2013)) rather than at regional or local level.

maintain rapid membership growth and significant investments by its members in selected projects. Even with the removal of the feed-in-tariff in 2012, the number of projects pursued by Som Energia continues to increase.

Moreover, Som Energia's cooperative structure actually has the potential to kick-start a nation-wide movement supporting the energy transition. With the 17 local chapters holding regular awareness raising meetings, the outreach of the organisation is significant and plays a distinct educating role by bringing information to the public about renewable energy and the opportunity for participation. Som Energia's wide reach can be attributed to its administrative model that relies on the work of volunteer members and on internet-based communication. Since all administrative responsibilities are managed through phone and online networks and communication, Som Energia can manage rapid growth without jeopardizing their financial capabilities, which are limited.

5.3 Do energy cooperatives foster behavioural change towards more sustainable consumption?

The case studies in Spain and Denmark did not contain any information on potential behavioural changes through the participation in energy cooperatives, nor did we find any comparable study or research on this particular topic. Thus, this chapter discusses the main results we gained out of the case study we conducted in Rhön-Grabfeld, addressing the following issues.

- We critically assess the outcomes of our investigation, mainly to uncover potential bias and gaps, which also leave room for further research.
- With regard to the Practice Theory (see chapter 2.2.1) one of the key questions is whether energy cooperatives could be seen as a newly established network of actors out of which new behaviours could emerge.
- Further, it is necessary to discuss whether energy cooperatives do increase the availability of infrastructures, skills and social norms needed to reshape collective practices and to potentially foster sustainable behaviour.
- In the context of empowerment and social learning, we elaborate whether energy cooperatives could be a place for second order learning, not only expanding their members' knowledge but potentially also reshaping their values, norms and attitudes.

What do the results tell us?

First and foremost, the results of the interviews conducted with frontrunners in Rhön-Grabfeld and the online questionnaire with members of energy cooperatives throughout the district show that the commitment and participation had an effect on the awareness and behaviour of the people involved.

The results can be summarised as follows:

- It is mainly altruistic motives rather than profit-driven motivations that drive people to become a member of an energy cooperative.

- The gender balance of respondents is also in line with the results on frontrunners, and the level of activity in energy cooperatives clearly shows that there is a notable male dominance in the case assessed.
- While the engagement in energy cooperatives had an effect on the environmental behaviour of the members, for every field of behaviour at least two thirds of the respondents did not perceive an effect or were unsure.
- The most relevant behavioural change occurred in energy consumption and financial investments.

We already stated in chapter 4.3.2 that these results should be handled with caution. Most importantly, although we asked people to assess their behaviour in relation to their participation in an energy cooperative, we cannot exclude the possibility that behavioural changes might be influenced by other factors or other people. Human behaviour is a complex issue (see review in Antal et al., 2012) and usually cannot be traced back to a well-defined and closed set of influences and surroundings. However, the high level of participation in our questionnaire and the impressive enthusiasm towards the energy cooperatives and the subsequent change in the district among those people we interviewed already show that the implementation of energy cooperatives do result in different kinds of positive psychological effects. We already highlighted the community-strengthening power of energy cooperatives and their potential to educate people with regard to energy consumption and production. All these effects can potentially contribute to an enhancement of sustainable behaviour as this was shown for energy consumption and financial investments by our questionnaire.

Since other fields included in the survey such as changes in political commitment, diet or mobility behaviour scored far less than energy consumption and financial investments, it seems that a certain “proximity” to the issues tackled by energy cooperatives is crucial in order to have an effect on the respective behaviour. In other words, the results unveil, that the participation in an energy cooperative does not reshape environmental behaviour in general but rather more specifically in the areas which play a clear role in the operations of the cooperatives. More research needs to be done on what aspects of cooperative activities and structures make people rethink their behaviour. Our results can only link the behaviour changes to a rising awareness and knowledge about renewable energy production in general as well as its relation to fossil energy and the policy behind it.

We also found that older people and men tend to experience a higher level of behaviour change compared to younger people and women, respectively. As already discussed in chapter 4.3.2, the reference situation as well as the self-evaluation need to be considered in this aspect. Elder people may be more likely to have thought about their environmental behaviour for the first time since being associated with an energy cooperative compared to younger people for whom sustainability issues might be more generally relevant. Furthermore, men tend to overestimate their abilities relative to objective achievements, whereas women's estimates of their abilities tend to be closer to reality or even modest (see e.g. Cross and Madson, 1997). At the same time, women generally report a higher concern for the environment and more pro-environmental

behavior than men (Eisler et al., 2003; Tanner, 1999; Zelezny et al., 2000). These aspects have to be taken into account when designing investigations on behavioural changes.

What elements do energy cooperatives provide to change practices?

Practice Theory identified three key elements that constitute changes in practices and thereby also in behaviour: materials, competences and meaning (Shove et al., 2012; Southerton et al., 2011). Having a closer look at the three elements (see also chapter 2.2.1), further explanation could be found why energy cooperatives, though potentially having a strong effect on awareness for environmental issues, can only evoke limited changes in behaviour. Taking changes towards more sustainable diet as an example, it is quite obvious that energy cooperatives neither provide for the materials (e.g. local markets for more regional food), competences (e.g. knowledge about the impacts of meat production or of vegetarian recipes) or meaning (e.g. a shared perception that changing diets is an easy and obvious way of improving the environment) for a change in practices. The effect on their diet behaviour that respondents associated with their membership in energy cooperatives is therefore extremely minor.

In the fields of energy consumption and financial investment, the situation is different. Energy cooperatives can indeed provide for some competences needed to change the energy consumption of a member, for example through the knowledge about sources of energies and the effort involved in producing energy. Moreover, the environmental motivations that prevail among members for joining an energy cooperative also underpin the fact that "meaning" in terms of shared values and visions concerning energy production and potentially also consumption can be found in cooperatives. In terms of "materials", the linkage between energy consumption and energy cooperatives is not so easy to draw because renewable energy facilities established by a cooperative do not directly provide for the right infrastructure, which enables energy savings at household level. An exception might be investments in local energy grids when these are associated with a well-communicated analysis of the energy sources used and the development of consumption rates within the community.

Especially in the context of "meaning" and "competences" within the Practice Theory the issue of empowerment and social learning needs further investigation. The main question is if participation in an energy cooperative fosters empowerment in the sense described in Avelino (2011) and leads to second order learning, which has the biggest potential to also reshape environmental behaviour. The design of the questionnaire did not allow for an in-depth analysis of social processes in energy cooperatives and the different interactions between their members. However, the interviews with frontrunners unveiled that for some people, energy cooperatives offered an opportunity to discover skills and knowledge they might not have recognised in the past, most importantly the ability to motivate and encourage people, to speak in public or to thoroughly plan a building process. The potential cooperative structures have to enable people to practice skills they were not automatically aware of should not be underestimated, as it also lifts a somewhat hidden potential for innovation and sustainability transitions. In summary, we found that Practice Theory provides for a sound theoretical framework to analyse the potential cooperatives have to foster changes in environmental

behaviour. However, we also found that more detailed questions and probably also passive participation in cooperative actions and assemblies are needed to shed more light on the effect cooperative activities have on their members.

6. Conclusions and policy recommendations

In this chapter, we firstly give a brief summary of the main findings of our study. Secondly, we will discuss these findings with regard to their implications for regions in the EU and for EU policy, and thirdly, we identify some gaps in policy making with regard to transition and social innovation, which can be filled by conceptualising what we call an “enabling policy”.

Main findings and research needs

Our study demonstrates the high value of cooperatives in the economic and societal development of rural areas. While energy transition is the focus in this study, the strengths of cooperatives in transition experiments, namely their high potential for social inclusion, participation, capacity building as well as their contribution to foster local economies and to support community activities, can also be transferred to other transition processes.

Transition theory particularly looks at long-term changes of economies and the society rather than rapid emergence of markets and profit-oriented businesses. Compared to limited liability companies or investments from the financial sector, cooperative actions are usually embedded in the local environment and do not (only) serve profit interests. Altogether, this makes them an attractive vehicle for movements towards transition and should gain additional attention in future research on transition at regional scale.

However, the study also shows that energy cooperatives can only be established and function, if the legal framework decreases their economic risks and ensures a long-term security in investments. In the rural context, cooperatives also benefit from a dense network of actors and stakeholders, which share the same or at least a similar vision about the future. More research is needed how such networks evolve and which role frontrunners have in this process. We sketched out some characteristics how trust as a crucial factor can be built in a transition process (see Chapter 4.3.1), but we feel that these factors might differ between regional contexts, which need further investigation.

It has to be noted that in the dynamic field of energy transition, cooperatives are not the only business models, which can support a more inclusive and participatory development towards renewable energies. The rapidly changing energy market, more importantly in Germany but also in other regions of Europe, create new opportunities for cooperation between producers and consumers, governments and stakeholders, civil society etc. Research on new networks and emerging business models including ‘prosumers’ concepts and Energy Service Companies (ESCos) (Marino et al., 2011) is still in its infancies. For example, more insights on which business models could be best applied to which regional and legal conditions could encourage more regional planners and entrepreneurs to get engaged in the energy market and also in energy transition.

By linking transition experiments in rural areas to energy cooperatives and to behavioural change this study is apparently the first of its kind. While the study revealed that cooperative structures could to some extent foster changes in behaviour towards more sustainable

practices, these results are not yet consolidated and requires more evidence from other contexts. However, we feel, that especially the (social) learning aspect in cooperatives bears a potential for awareness raising towards certain topics of sustainable development and consequently also for changes in behaviour. As we acknowledge the complexity of behavioural change, we only conclude that cooperatives provide for some beneficial conditions rather than inducing sustainable behaviour themselves.

The European policy context

We are also aware of the fact that Germany as the country of our main study site Rhön-Grabfeld is a unique example for energy transition in the EU.[12] However, some similarities between the energy cooperatives operating in Germany and those in Spain and Denmark have shown that the results can to some extent be transferred to other contexts. It rather seems a question of culture and historical factors, why cooperatives in general have developed stronger in some regions than in others (see Chapter 1.1.2). With regard to energy transition it is obviously the legal framework, which determines how widespread and successful renewable energies in general and energy cooperatives in particular are established. However, the current energy market design in most Member States does not allow intermittent energy technologies with a high capital-to-running-cost ratio to be financially viable without state support.

For EU policy this means that adapting the Renewable Energy Directive will not be enough. For the power sector, the challenges ahead are not only to adjust support schemes or to harmonise them but also to transform the entire energy system – regulation, infrastructure, and market design – so that renewable energies can become its central element. The perfect regulatory solution does not exist yet. In this learning process, a method of trial-and-error therefore is vital to collect experiences and diffuse the best-performing instruments. The evolution of the support schemes over the last decade clearly shows that this type of diffusion is taking place between Member States. In a fully harmonised system, the risks associated with picking a low-performing instrument are much higher. The EU's role could be to work swiftly towards a physically integrated grid by extending interconnections between national electricity grids and by extending market coupling. In addition, cooperatives could be promoted by national governments, especially where they are not playing a major role.

[12] Maybe even what has happened in Rhön-Grabfeld is a unique example for energy transition in Germany.

Towards an "enabling policy"?

Furthermore, policy should also consider that it is not only about diffusing the right technology but that a sustainable transformation of the energy system needs to take place at local level with local conditions and requirements. Therefore, measures and programmes should also support regional and local actors to build capacities through funding, to enhance skills through education and trainings and to disentangle unnecessary regulations or obscure responsibilities.

Taking into account the human factors, which, according to our study, play a significant role in processes towards transition, we propose a paradigm shift in policies towards what we call an "enabling policy". The key question of an enabling policy is:

Which policy measures can directly support transition experiments?

Such a policy would build on the "transition potential" of individuals, frontrunners, actors groups and communities in order to unleash social innovation and societal change from the bottom. It is thereby assumed that ideas and creativity as well as possible formats to get organised are already existent in EU communities, but are often impeded by financial constraints, lacking structures or simply by a missing starting point.

Such 'radical decentralisation' would abolish the assumption that policy has to steer processes from the top. Instead, it would assign more trust and responsibility to communal actors and networks. More than that, enabling policy would empower those frontrunners or change agents by additional support. Such support could be multifaceted and might include the following measures:

- Diminish unnecessary administrative hurdles
- Provide flexible and less result-based funding opportunities; also enable "process funding"
- Provide space/forums for exchanging ideas and knowledge between citizens and stakeholders at local level. Makes these forums a go-to-point in every community of the EU.
- Value outcomes of these forums in decision-making and strengthen the interplay between policy levels (local, regional, national and EU)

This does not mean that policy making should move back from interventions towards more sustainability, but it should leave more freedom and capacities to people who are already active and have more knowledge about local needs and opportunities. This idea is not entirely new

and has already been implemented, e.g. by the Agenda 21 process or by EU policies especially in rural areas, for example by the LEADER+ programme.

However, we feel that the time is ripe to retry and strengthen such processes under nowadays conditions. Lessons learnt could be drawn from previous processes and weaknesses could be encountered for example by further improved communication technologies, which vastly facilitate exchange of ideas and concepts compared to initiatives in the 1990ies. Moreover, phenomenon like increased awareness of social innovations in public policy, upcoming movements like transition towns[13] as well as diminishing believe in the political elites strongly driven by continuous financial and economic crises in many parts of Europe could be the right basis to redirect policy towards where people work and live. We acknowledge at this point that our approach is far from being elaborated but it emerged from our work on energy cooperatives undertaken for this study and we consider it worthwhile to be further investigated.

[13] For further information see: http://www.transitionnetwork.org/

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Annex

Online questionnaire

1. **How old are you?**

2. **What is your gender?**

3. **A. What is your professional occupation?**

   B. Please state the postcode of your residence.

4. **How much money did you invest in the energy cooperative (including deposit)?**

   Possible Answers:
   ≤ 100 €, ≤ 1000 €, ≤ 10.000 €, ≤100.000 €, >100.000€

5. **What made you join the energy cooperative?**
   1. Lucrative investment
   2. Support the community
   3. Support of environmental protection / sustainable energy supply
   4. Interest in community projects
   5. Others
      a. **Which other motives made you join the energy cooperative?**

   Possible answers for 5.1 – 5.5: important, less important, unimportant

6. **Which position do you hold in the energy cooperative?**
   Possible Answers: (rather) passive member, (rather) active member, supervisory board, chair, spokesperson, other

7. **Has your commitment in the energy cooperative extended your awareness of energy supply in general or other topics?**
   Possible answers: yes or no
   If yes:
   a. **In which way has your awareness of energy supply or other topics extended?**

8. **Has your commitment in the energy cooperative changed your behaviour in the following areas?**
   1. Energy consumption
   2. Mobility
   3. Investment
   4. Nutrition
   5. Volunteering

6. Political Commitment

Possible Answers: Yes, No

If yes:

a. In what way has your behavior in area XY changed?

9. Have you noticed other effects in your daily life or your personal perspectives, since you got involved with the energy cooperative? If so, what effects?

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Project Information

Welfare, Wealth and Work for Europe

A European research consortium is working on the analytical foundations for a socio-ecological transition

Abstract

Europe needs change. The financial crisis has exposed long-neglected deficiencies in the present growth path, most visibly in the areas of unemployment and public debt. At the same time, Europe has to cope with new challenges, ranging from globalisation and demographic shifts to new technologies and ecological challenges. Under the title of Welfare, Wealth and Work for Europe – WWWforEurope – a European research consortium is laying the analytical foundation for a new development strategy that will enable a socio-ecological transition to high levels of employment, social inclusion, gender equity and environmental sustainability. The four-year research project within the 7th Framework Programme funded by the European Commission was launched in April 2012. The consortium brings together researchers from 34 scientific institutions in 12 European countries and is coordinated by the Austrian Institute of Economic Research (WIFO). The project coordinator is Karl Aiginger, director of WIFO.

For details on WWWforEurope see: www.foreurope.eu

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	Universitat Autònoma de Barcelona	UAB	Spain
	Humboldt-Universität zu Berlin	UBER	Germany
	University of Economics in Bratislava	UEB	Slovakia
	Hasselt University	UHASSELT	Belgium
	Alpen-Adria-Universität Klagenfurt	UNI-KLU	Austria
	University of Dundee	UNIVDUN	United Kingdom
	Università Politecnica delle Marche	UNIVPM	Italy
	University of Birmingham	UOB	United Kingdom
	University of Pannonia	UP	Hungary
	Utrecht University	UU	Netherlands
	Vienna University of Economics and Business	WU	Austria
	Centre for European Economic Research	ZEW	Germany
	Coventry University	COVUNI	United Kingdom
	Ivory Tower	IVO	Sweden
	Aston University	ASTON	United Kingdom