

# EMPOWERING THE NEXT GENERATION

A German wind & solar energy cooperatives business model research

## **MASTER THESIS**

Philip S. Boontje

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### Author

BSc Philip S. Boontje Student number: 1310003

#### Education

Delft University of Technology Faculty of Technology, Policy and Management Management of Technology Graduation section: Technology, Strategy & Entrepreneurship

### Thesis supervisory committee

Chair professor: First supervisor: Second supervisor: External supervisor: External supervisor:

prof.dr. E. ten Heuvelhof dr.ing. V. Scholten prof.dr. H. Bouwman drs. D. Dijk drs. A.M. Schwencke Delft University of Technology Delft University of Technology Delft University of Technology Rabobank Nederland ASI Search

#### Title page image

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### Interviewed energy cooperatives













Energiegenossenschaft







**Bürger**Energiegenossenschaft

Voralb eG

Deutsche Bürger**Energie** 



STARKENBURG

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Philip Boontje.

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## Abstract

During the last years the Netherlands has seen an expansion of civilian-led energy cooperatives which focus on investments into local renewable energy production, energy efficiency services and electricity sales. Although the Dutch renewable energy cooperative boom continues, many are struggling to find the right earnings model and long-term added value for their city or region. To broaden the knowledge of the cooperative sector, this Thesis aims to reveal what elements determine the business models of the German renewable energy cooperatives and which business model typologies can be distinguished. 15 interviews were held with German wind & solar energy cooperatives founded by cooperative banks, municipalities, project developers, utility companies and civilian initiatives. The Thesis found that the business model typologies of German energy cooperatives represent the stabilized cooperatives, developer dependent cooperatives, developer independent cooperatives and developer integrated cooperatives. The faster growing energy cooperatives all effectively applied the following elements: value proposition, network and trust, which have been labeled the expansion triangle. The integration of the four business model types with the expansion triangle revealed that the value proposition represents the vital element for an energy cooperative, with network and trust representing supportive elements. The findings of this Thesis provide interesting insights for actors involved with civilian participation into renewable energy sources. This research allows these actors to understand which business models can be selected and which requirements have to be met to build faster growing energy cooperatives.

Keywords: Business models, Renewable energy cooperatives, Expansion triangle, Value proposition

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## Acronyms

AG

DGRV	Deutscher Genossenschafts-und Raiffeisenverband
DBE	Deutsche Bürger Energie eG
EEG	Erneuerbare Energien Gesetz
FTE	Full-Time Equivalent
FWR	Friedrich-Wilhelm Raiffeisen ENERGIE eG
GmbH	Gesellschaft mit beschränkter Haftung
GmbH & Co. KG	Gesellschaft mit beschränkter Haftung & Compagnie Kommanditgesellschaft
HG	Heating-grid
KG	Kommanditgesellschaft
REC	Renewable Energy Cooperative
ROE	Return on Equity
ROI	Return on Investment
SPV	Special Purpose Vehicle
STOF model	Service-Technology-Organization-Finance model
VR-bank	Volks-Raiffeisenbank

Aktiengeselschaft

VR-bank

## **Translations**

- Aktiengesellschaft Aufstichtsrat Beteiligungs-eG Betreibers-eG Deutscher Genossenschafts-und Raiffeisenverband
- Energiegenossenschaft Energiewende Erneuerbare Energien Gesetz General Versamlung Genossenschaft Gesellschaft mit beschränkter Haftung Kommanditgesellschaft Sparkasse Volks-Raiffeisenbank Vorstand
- Limited Company Supervisory Board Participation Cooperative **Operations** Cooperative German Cooperative and Raiffeisen Association **Energy Cooperative Energy Transition** Renewable Energy Law General Assembly Cooperative Private Limited Liability Company Limited Partnership Savings Bank Cooperative People's-Raiffeisen bank Managerial Board

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## Chapter 1

## Introduction

This chapter and its subsequent sections will introduce the energy cooperative movement, the problems that it faces, the objectives of this research, its added value for the energy sector, the applied methodology, followed by the research questions and the scope of the research.

## 1.1 Background

Following from the meltdown of the Chernobyl nuclear reactor, awareness for alternative sources of energy increased in the Dutch late 80's (Schwencke, 2012), with civilians starting to join forces providing an alternative to nuclear power generation. These Dutch grassroot initiatives founded 12 wind energy cooperatives between 1989 and 1994, installing their own windmills, allowing for the production of local and renewable energy. A similar development can be seen among the transition town movement starting in 2005, resulting into hundreds of initiatives worldwide, which focus on reinforcing their local economy and make a shift towards a more sustainable living environment (Connors & McDonald, 2010). A second Dutch cooperative wave emerged during the economic crisis of 2008. These renewable energy cooperatives (RECs) focus on buying green electricity for their members, collectively buy solar panels and provide energy efficiency consulting services. These RECs argue that civilians become members because the cooperative appeals to their desire to keep the local community vital, to create more social cohesion, become more independent of large energy companies, keep the energy costs in check and allow more money to stay within the region. Since 2008, also the German cooperative movement started expanding, with 754 RECs active in 2012, representing overall investments of €800 million (DGRV, 2012). These energy cooperatives have invested strongly in roof and field PV and are currently switching their developments and investments towards wind power.

## 1.2 Problem statement

Although a strong expansion of civilian led energy initiatives has been seen for the last years in the Netherlands, only several of them were able to make significant steps towards an effective and professional organization. Apart from the successful exceptions, most of the Dutch energy cooperatives are encountering low margins when re-selling electricity of utility companies, collectively buying solar panels and when providing energy efficiency services. Due to the limited expansion in member size and revenues, Dutch cooperatives are starting to realize the financial and time-intensive efforts related to running a professional organization. To overcome their challenges, the cooperatives are starting to look for partners to support them, representing other RECs, municipalities, cooperative banks and utility companies. To allow for a larger civilian participation in the Dutch energy transition and an effective integration of RECs into the energy sector, it is necessary to expand the knowledge regarding these new cooperatives.

Since the German cooperative developments have been growing faster than the Dutch, new insights and possibilities may emerge when researching the German RECs. To get a better understanding of their developments, German scholars have started introducing typologies. They distinguished cooperatives based on their technologies, organizational ownership structures, and their regional and social focus. The scholars argue that great opportunities lie in an analysis of German RECs based on the interconnectivity between their financing structures, their organization forms and the different project types they apply (Holstenkamp, 2012). When looking for an effective tool for describing the German energy cooperatives, the business model framework stands out, because of its ability to describe the heuristic logic and architecture of companies (Chesbrough & Rosenbloom, 2002). The scholars (Johnson & Suskewicz, 2009) argue that the business model framework can provide a useful tool for analyzing sectors that experience strong market shifts. Based of the previous argumentation, developments within the renewable energy sectors have been repeatedly analyzed by business model frameworks and their related elements, but explicit business model research into the German energy cooperative sector is absent.

## 1.3 Research objective

It is the aim of this Thesis to use a business model framework for analyzing and comparing the German energy cooperatives, thereby providing an expansion of the knowledge related to their financial and organizational structures. With the insights of this research, utility companies, cooperative banks, governments and citizens should be enabled to better understand their role in the energy transition, inspiring them to act whenever necessary, with the right approach and with the right message.

## 1.4 Research methodology

This Thesis will be performing an analytical research, because of its effectiveness in unveiling the indepth context dependent factors that shape the performance of energy cooperatives. The research data will be gathered through semi-structured interviews with 15 cooperative representatives from both the managerial board and the supervisory board. Both quantitative and qualitative data will be gathered, with the quantitative data complementing the qualitative data allowing the research to provide the motives behind business decisions. Each interview took between 1.5 and 2.5 hours and they were conducted at the offices of cooperative banks, project developers and at the homes of board members.

The RECs selected for the sample have been chosen based on several variables: geographic position, size of production facilities (200 kWp vs. 5 000 kWp), type of renewable energy production facilities (solar, wind) and initiating actors (local bank, local civilians, project developers), Contact with these energy cooperatives was made through four channels. First, contact was sought with the national cooperative union, the DGRV, which in turn introduced the Thesis to several regional cooperative societies (Genossenschaftverbände), which on their turn introduced the research to multiple RECs within their organization. The second channel represented the REC website of the cooperatives in the state of Baden-Württemberg. Third, a REC database constructed by Holstenkamp was searched for appropriate wind energy cooperatives, which already installed one or more windmills. Fourth, advice by Lars Holstenkamp introduced several other energy cooperatives, which distinguished themselves from the majority based on their initiators and used organizational structures. Originating from the above four channels, 20 energy cooperatives were selected. During the REC selection, a strong emphasis was placed on the professionalism of their webpage and most importantly their recent activities. It was argued that when cooperatives where interviewed that showed strong activity, its board members would also be able to provide specialist, challenging, intelligent, and inspiring input. Eventually 15 out of 20 cooperatives were willing to provide a personal interview.

## 1.5 Research questions

The main research question is described as follows:

*M.O. "What are the elements that determine the business models of German RECs and which business model typologies can be distinguished?"* 

The main research question is subdivided into the following five sub-questions, individually overlapping with most chapters within this Thesis.

*S.O.1. "What is the institutional and economic context affecting the energy cooperatives in Germany?* 

Before diving into the energy cooperatives and their organizational details, the economic and regulatory landscape has to be described.

*S.O.2. "What are the typologies, characteristics and financial structures described in German and Dutch literature regarding energy cooperatives?* 

When preparing for the interviews and the interview questions, it is necessary to describe cooperative related research from both Germany and the Netherlands. These findings will guide the development of the interview questions later on.

S.O.3. "What are business model theories described by literature, which models have been applied in renewable energy business model research, and which business model framework should be selected for the Thesis?"

By exploring what definitions exist of business models, the use of business models in literature, and by creating an overview on which elements and interrelations are frequently used, the theoretical foundation for this Thesis will be created.

## *S.O.4. "What performance indicators are available in academic literature that can be integrated into the chosen business model?"*

Now the business model literature, the cooperative business models and their institutional and economic contexts are known. This research will provide a set of performance indicators which will provide tools, which enable us to quantify energy cooperative performance.

## *S.Q.5. "How can the interview outcomes be explained by applying the elements of the selected business model framework?"*

After completing the interviews, its results are going to be described per subject, using the business model framework elements selected in sub-question 3. With these five sub-questions, input will be generated for the main research question to be answered.

Figure 2 describes the entire research flow described above, allowing the Thesis to analyze the interview outcomes, allowing to provide new sets of typologies, accompanied by the categorization of organizational and financial structures.

## 1.6 Research scope

The German RECs are investing in different types of renewable energy technologies, and to allow the Thesis to keep its focus, it is decided only to focus on the wind and solar cooperatives. Solar cooperatives represent investment vehicles, allowing local civilians to invest and become dividends through the German Feed-In-Tariff for solar energy. The wind cooperatives use the same approach, feeding their wind energy into the grid, and being provided with financial compensation from the German national government. The solar cooperatives have shown a strong boom in recent years and represent the largest group among German RECs. Wind cooperatives represent a smaller group within Germany, but are steadily expanding their numbers and investment volumes due to new wind development opportunities. The focus on solar and wind cooperatives was supported by Holstenkamp of the Lüneberg University, who argued that German biomass heating and combined-heat & power cooperatives are a somewhat different group of cooperatives and show less similarities with wind and solar, than do wind and solar with respect to each other.



Figure 1: Research scope in the energy value chain



Figure 2: Research flow diagram & structure of the Thesis

## 1.7 Structure of thesis

Chapter one introduced the overarching context of the research, its objective and scope. Chapter two provides the institutional and economic context of the German energy market. The third chapter provides insights into the German renewable energy cooperatives, followed by an overview of the Dutch cooperative developments. Chapter four describes the business model literature, the renewable energy business model literature and the selection criteria that led to the selection of the STOF model as the business model framework for this Thesis. The fifth chapter elaborates on the performance management literature and the selection of financial performance indicators. Chapter six provides case by case descriptions of each energy cooperative interviewed. In chapter seven, the interview outcomes are described with the STOF model elements of the service domain, organization domain and the finance domain. The eighth chapter analyzes the research results of chapter eight, selecting business model elements and categorizes different cooperative business models. Chapter nine states the conclusion on the research question as mentioned in Chapter one, accompanied by the recommendations for the Rabobank and new research opportunities.

## Chapter 2

## **German Context**

This chapter will describe the institutional context in Germany of renewable energies and their related laws and the organizational forms applying the laws in Section 3.1. Section 3.2 will introduce the economic context, describing the market expansion of renewables in Germany and the Netherlands.

## 2.1 Institutional context

The German Erneuerbare Energien Gesetz (renewable energy law) was introduced in 2000 and replaced the Stromeinspeisegesetz (Electricity feed in law) from 1991. The EEG allows electricity producers to feed in renewable energy at a fixed price per kWh for a period of 20 years. The EEG provides guaranteed prices for solar, biomass, geothermal, hydropower, and wind power. The EEG has set targets for the future expansion of renewables in Germany, targeting 35% in 2020, 50% in 2030, 65% in 2040 and 80% in 2050.

For solar power the EEG of 2012 provides a guaranteed price of 19,50 cent per kWh for a system up to 10 kWp. A system of over 10.000 kWp is provided with 13,50 cent per kWh. Every month the FIT for solar is lowered by 1% when the annual expansion occurs within the preset corridor of 2.500 MWp up to 3.500 MWp. When the PV capacity growth turns out lower, this 1% is being decreased based on a set of multiple thresholds from 500 MWp up to 1.500 MWp below the corridor. When the PV capacity growth ends up higher, the 1% monthly FIT decrease grows based on a similar set of thresholds reaching up to 4.000 MWp above the preset corridor (EEG, 2012). The German EEG for solar will keep providing new payments up until the month in which the total installed capacity surpasses 52.000 MWp. After this event, the EEG will provide no more payments for new installed PV capacity.

A wind power source is provided with a FIT of 8,93 cent per kWh for its first five years of commission. After the five years, this payment will be prolonged based on the performance of the windmill compared to a preset reference wind mill. Starting at a 150% of the reference 2 months are added to the five years per 0,75% difference between the 150% reference and the actual performance of the windmill. A windmill in the south of Germany built in an area with lower wind speeds might reach 90% of the reference production. The owners of the windmill will therefore be provided with a FIT for 5,0 + (((150-80)/0,75)\*2)/12) = 5,0 + 13,3 = 18,3 years. After this period, the basic payment for wind energy is provided, representing 4,87 cent per kWh.

The final price the owner of the renewable energy source is provided depends on the month in which the source provides its first energy to the electricity grid. From that moment, the length of payment and its related requirements are linked to the EEG active during its first electricity generation. Future changes to the EEG therefore only impact the owners of planned and under construction sources.

The EEG budget originates primarily from the EEG-levy that is inserted into the electricity bill of all German electricity consumers. Hereby the costs for the expansion of renewable energy are gathered throughout the country. Currently in 2013, for every kWh consumed a levy of 5,3 cent per kWh is enacted. Figure 3 describes the expansion of both the EEG budget and its related levy.



Figure 3: EEG in € billion/year & EEG levy on electricity use (Wynn, 2013)

Multiple business types are active in the German renewable energy market. Ranging from the AG (Joint-Stock company) to the eingetragene Genossenschaft (Cooperative). German hybrids exist, with a Genossenschaft owning multiple GmbH's that in their turn own several wind or solar parks.

### Table 1: Organizational types

Germany	United States of America	The Netherlands
Aktiengeselschaft (AG)	Joint-Stock company	Naamloos Vennootschap (N.V.)
Kommanditgeselschaft (KG)	Limited partnership	Besloten Vennootschap (B.V.)
Eingetragene Genossenschaft (eG)	Cooperative	Coöperatieve Vereniging
Gesellschaft mit beschränkter Haftung (GmbH)	(non-existent)	(non-existent)

## 2.2 Economic context

Following the stable and long-term investment horizon related to the EEG, the German expansion of renewable energies has been growing steadily. In 2000 Germany produced 576 TWh, of which 9,5 TWh from wind power and 0,064 TWh from solar, representing 1,7% and 0,01% of total production. In 2011, Germany produced 609 TWh, with 48,9 TWh through wind power and 19,3 TWh through solar, representing 8,1% and 3,2% of total production (AGEE-Stat, 2012; BSW Solar, 2013). Figure 4 illustrates the expansion of wind and solar energy in both Germany and the Netherlands.



Figure 4: Evolution of global annual installations (EPIA, 2012)

When comparing the PV market of the Netherlands and Germany, there are multiple differences. The current installed capacity in Germany accounts for an energy production of 28,060 GWh, representing 4,7% of Germany's gross power consumption in 2012 (Feldman, 2012). Looking at the Netherlands, PV generated 100 GWh in 2011, representing 0,08% of domestic energy use (CBS, 2011). Figure 5 displays the annual installed capacity both in Germany and the Netherlands over the last ten years (CBS, 2013; Feldman, 2012; HollandSolar, 2013).



Figure 5: Annual installed capacity (CBS, 2013; Feldman, 2012; HollandSolar, 2013)

Due to the strong growth of photovoltaic in Germany, global demand for solar panels surged, resulting in an investment boom in the United States, Germany and China. Due to the expanding production capacity volume, prices have started dropping significantly. In the first quarter of 2007 the cost of a 10 kWp PV system averaged around €4.500/kWp. By the fourth quarter of 2012 prices had dropped between €1.500 and €2.000/kWh, representing a 65% price drop.





Figure 7 and Figure 8 unveil an interesting trend by describing the ownership distribution among solar and wind power. Both PV and wind tend to be primarily funded by private people, farmers, project developers and local SMEs. With the four largest utilities representing funding for 3.0% and 2.1% among solar and wind of total installed capacity.



### Figure 7: Ownership of 16.917 MWp PV in 2010 (trend:research, 2011)

Ownership of the PV systems is strongly correlated to the ownership of the roof upon which these are installed. Since the German EEG provides a higher FIT for smaller systems (€ct 19,50/kWh) than for large ground mounted PV plants (€ct 13,50/kWh) private households dominate PV ownership. Farmers and all types of companies benefit from the FIT, since it allows them to fill the roofs of their barns, offices and factories. Project developers sign lease contracts with land owners, allowing them to construct large ground based PV fields. The utility companies, both regional Stadtwerke and the larger utility companies combined only represent 3,0% of the total energy production, thereby playing a marginal role of the solar energy transition in Germany.



### Figure 8: Ownership of 27.214 MW on-shore wind in 2010 (trend:research, 2011)

The strong civilian participation in the wind power of Germany originates from the many BürgerWind parks owned by GmbH & Co KG's. This business type has developed itself as the standard model since the 90s, with project developers creating professional investment models for civilians from the region, allowing them to invest through shares and loans. Expert interviews by (Holstenkamp & Degenhart, 2013) among Stadtwerke revealed that the development of new wind parks can only be realized with the inclusion of civilians participation, without it, projects will become unfeasible.



Figure 9: German PV Feed-In-Tariff for 10-40 kWp (Wynn, 2013)

Developments in the German renewable energy market push the market into new directions. Due to global decreasing prices for solar panels, new market for electricity storage are opening up (Staab, 2013). Due to relatively high electricity prices in Germany and a decreasing FIT, a growing percentage of residential home owners opt for the installation of a PV-system together with storage facilities. The original situation of feeding the roof-PV electricity into the grid changes towards self-consumption, which is gaining market share among newly installed PV-systems in contemporary Germany. Figure 9 visualizes this growing gap between the household electricity prices and the decreasing FIT.

## Chapter 3

# German & Dutch RECs

This chapter will introduce the renewable energy cooperative business models found in Germany and the Netherlands. Section 3.1 describes the German renewable energy cooperatives, followed by Section 3.2 describing the Dutch renewable energy cooperatives.

## 3.1 German renewable energy cooperatives

### 3.1.1 Historic developments

The cooperative organizational model was introduced by the German mayor Friedrich Wilhelm Raiffeisen in 1864. He wanted to provide an alternative to the loan sharks in rural areas that were demanding high interest rates among farmers. Farmers banded together to set up a credit union, providing each other loans, thereby building on Raiffeisen's philosophy of self-help, self-governance, and self-responsibility. By becoming active credit takers or providers, farmers became members and coowners of the cooperative bank.

After the boom of cooperative banks in the second halve of the 19<sup>th</sup> century, energy cooperatives started emerging during the electrification of the German rural areas in the 20's (Herlinghaus, 2008). At its height in 1927, around 6.000 electricity cooperatives existed throughout Germany. Currently, the amount of active electricity cooperatives in Germany has sunk below 50, caused by absence of economies of scale, financing issues, nationalization during the DDR, and forced closures (Holstenkamp & Müller, 2013). Following the stability of the renewable energy law, the expansion of renewable energies started to take off in 2006 as seen in Figure 10.



Figure 10: New registrations of RECs (Holstenkamp & Müller, 2013)

Due to the expanding numbers of RECs the total count of cooperatives turned out 754 at the end of 2012 of which 431 PV cooperatives (Holstenkamp & Müller, 2013). Explaining this rapid expansion, (Stappel, 2011) argues it was primarily caused by the changes to the Genossenschaftsgesetz (Cooperative law) in 2006. Another explanation is given by (Holstenkamp & Degenhart, 2013) who argue that the strong boom of PV cooperatives originates from the fact that PV projects can be developed in shorter time compared to windmill projects, because of the relative simplicity related to installing PV systems.

## 3.1.2 Categorizations

As introduced in the previous paragraph, the cooperative organizational form has been applied in a wide range of sub-sectors within the renewable energy sector. For providing systematization for the energy cooperatives active in Germany, scholars have provided categorizations distinguishing the RECs based on the fields of activity (Theurl, 2008; Flieger, 2011), and the renewable energy used (Holstenkamp & Müller, 2013; Volz, 2012).

The typology provided by (Theurl, 2008) are based on theoretical considerations, distinguishing 11 fields of activity.

- Craft based cooperatives: a cross-trade organization of energy-saving measures and consulting efforts (value creation networks)
- Innovation cooperatives: research and development of technologies for improving energy efficiencies related to renewable energy
- Purchase cooperatives: bundled purchase of electricity
- Procurement cooperative: bundled purchase of resources and energy saving components
- Precursor cooperative: production of bio-gas, bio-fuels and wood

- Power plant cooperative: production, use, and sale of electricity from wind, water, solar, and biomass
- Virtual network of combined heat-and-power: organization of feed-in and service provider of many smaller decentralized power plants
- Consulting cooperative: bundling and documentation of know-how regarding energy savings, energy efficiency, renewable energy, and promotional measures.
- All-round cooperative: Consulting, design and implementation of all energy measures based on their own power stations and supply agreements
- Meta-cooperatives: Associations of cooperatives enabling the exploitation of economies of scale and expertise benefits;
- Cooperatives and cooperative networks for interest representation: pooling of information, communication and lobbying activities

In the above list of cooperatives not all cooperatives are existent yet, and overlap can occur between the different types. The virtual network cooperative represents a future theme, and cooperative networks are primarily organized through foundations instead of cooperatives. A less extensive list of activity fields has been presented by (Flieger, 2011), introducing four basic cooperative types, divided into several ub categories.

- Energy services cooperative
- Energy consumption cooperative
- Energy production cooperative
- Energy production-consumption cooperative

When providing examples of the different types of cooperatives, (Flieger, 2011) describes the German bio-energy villages as production-consumption cooperatives, which own and operate heating grids. The production cooperatives can represent the PV cooperatives and the consumption cooperatives represent the older electricity cooperatives which provide electricity and gas to private households. The energy services cooperative provides extensive consulting services to its members with regard to energy related challenges. Both typologies are represented in Table 2.

(Theurl, 2008)	(Flieger, 2011)
Innovation cooperative	
Precursor cooperative	
	Energy services cooperative
Craft based cooperative	- Contract procurement and sales agreements
Procurement cooperative	<ul> <li>Purchase and procurement cooperative</li> </ul>
	<ul> <li>Cooperatives to secure a sustainable energy</li> </ul>
All-round cooperative	Energy production-consumption cooperative
Consulting cooperative	- Consulting cooperative
Power plant cooperative	Energy production cooperative
Purchase cooperative	Energy consumption cooperative
Virtual network of combined CHP	
Meta-cooperatives	
Cooperatives and cooperative	
networks for interest representation	

### Table 2: Comparison of typologies (Holstenkamp & Müller, 2013)

A survey by (Volz, 2012) stratified the German RECs into different categories, distinguishing the PV cooperatives, heating grid cooperatives, and hybrid energy cooperatives. PV cooperatives develop and operate solar systems and sell the electricity to the grid following a compensation through the EEG. The heating grid cooperatives provides heat to its members through a central heating unit fired by wood or biogas. The hybrid cooperatives both operate PV and heating grids and may operate wind and/or hydro power sources. Volz mentions that this categorization does not represent all German RECs, but comes close to it. Several other RECs exist that provide a specific trade or service. For example the Greenpeace Energy eG provides electricity to its members, and the Netzkauf EWS eG owns an electricity grid in the German Schwarzwald.

The working paper by (Holstenkamp & Müller, 2013) segments the German RECs based on the technologies applied. In Germany the scholars reveal the dominant role of the photovoltaic

technology representing 431 cooperatives applying it for their energy production. 177 cooperatives use bio-based technologies, and 49 are focusing on wind energy production, as seen in Figure 11.



### Figure 11: REC technologies (non-mutual exclusive) (Holstenkamp & Müller, 2013)

For the research by (Holstenkamp & Müller, 2013), sources by (Herlinghaus, 2008; Froschmeir & Haffmanns, 2009; GVB, 2011) have provided input for their energy carrier categorization research. The three sources categorized the cooperatives based on their use of electricity and their type of energy carrier. Cooperatives described either own photovoltaics, heating grids, electricity grids, biogas, windmills, or heating furnaces, as seen in Table 3.

(Herlinghaus, 2008)	(Froschmeir & Haffmanns, 2009)	(GVB, 2011)
Photovoltaic cooperative	Solar cooperative	Photovoltaic cooperative
Cooperative wood heated plants	Bio energy cooperative	Heating grid cooperative
Cooperative bio-energy villages		Bio gas cooperative
Service- and marketing		
cooperative for forest owners		
		Cooperative wind parks
Electricity cooperative	Electricity cooperative	
	Purchase cooperative	
	Heating plant cooperative	
Purchasing and marketing		
cooperatives		
for technical components of		
renewable energy		
	Other cooperatives	

#### Table 3: Comparison of typologies based on energy use and carrier (Holstenkamp & Müller, 2013)

The installation size of PV systems among the PV cooperatives shows a wide spread. A survey by (Volz, 2012) found that 56% of cooperatives own 200 kWp or less, compared to 10% of the PV cooperatives owning more than 1,000 kWp. A survey by the (DGRV, 2012) provides similar data, with 8% of the 180 surveyed PV cooperatives installed a PV capacity of over 1,000 kWp as visualized in Figure 12. According to Volz the average PV cooperative operates 435 kWp, the DGRV found 440 kWp. 67% of German RECs are primarily located in rural areas. Rural and urban areas represent around 24%, and 9% of all RECs are located around urban areas. The REC database of (Holstenkamp & Müller, 2013) shows that are strong concentrations of RECs in the Bundesländern (States) of Bayern and Baden-Württemberg in the south, respectively 16,35 and 12,33 per million inhabitants. In the north, Niedersachsen and Schleswig-Holstein represent respectively14,61 and 11,63 per million.





Since 2009, a significant growth of interest towards cooperative wind energy has taken place throughout Germany, with the free-state of Bavaria representing almost 50% of all energy cooperatives involved with wind energy (Holstenkamp & Degenhart, 2013). These energy cooperatives own or develop wind energy projects, as can be seen in Table 4.

Table 4: Status of windmill projects among energy cooperatives (Holstenkamp & Degenhart, 2013)

Project status	Amount	Share in %
Under development	21	47,7%
Under construction	5	11,1%
Operating	11	24,4%
Insolvent/dissolved	2	4,4%
Service/off-shore participation	6	13,3%
Sum	45	100,0%

From the categorizations discussed in this paragraph, it follows that German RECs are active with a wide range of energy sources and energy carriers. Although many typologies are given, definitions tend to overlap in their effort to describe a sector which portraits a diverse patchwork of organizations involved among one or more value chains.

### 3.1.3 Organizing the REC

When preparing to the analysis of the way in which the German RECs are organized, the question arises which actors are active within the RECs. A survey by the (DGRV, 2012) revealed that when looking at the type of members among the 290 energy cooperatives, 91,0% of them represented private people holding membership shares, as seen in Figure 13.



Figure 13: Membership type among German RECs (DGRV, 2012)

Apart from the civilians active, the founders and initiators of the German RECS originate from a wide range of people and actors, especially from the cooperative banking scene. The Volks-Raiffeisenbanken (VR-banken) have been an active initiator of PV cooperatives and started using pre-developed start-up packages among its local banks (Volz, 2012). Next to the cooperative banks, civilians, municipalities, utility companies among others, have been present during the genesis of most German RECs. The actors introduced in Figure 14 are the Volks-Raiffeisenbank (VR-bank), civilian initiatives, environment initiatives, local municipalities working together with the Volks-Raiffeisenbanken, the utility company EnBW of the state of Baden-Württemberg working together with multiple other actors, the Genossenschaftsverband (Cooperative Union), local utilites (Stadtwerke), Majors, and the Volks-Raiffeisenbanken together with the Stadtwerke.



Figure 14: Initiators of the foundation of German RECs (Volz, 2012)

Volz argues that the use of promoters represent a success factor among German RECs. When specific personalities are asked to act as a forerunner, these promoters can then motivate and convince other civilians to join the cooperative. The research by (Holstenkamp & Müller, 2013) concludes that within several regions a network emerges of initiators and promoters, that push for the start of new RECs. The survey by Volz resulted into the data of Figure 14 showing the degree of participation of local actors.



■ No relationhship ■ Member ■ Supervisory board ■ Managerial board ■ Supervisory & Managerial board

### Figure 15: Involvement of regional individuals and institutions. (Volz, 2012)

The internal organization of every German cooperative constitutes out of three elements, the managerial board (Vorstand), the Supervisory board (Aufsichtsrat), and the General assembly (Generalversammlung). The cooperative law (Genossenschaftsgesetz) requires at least two managerial board members and three supervisory board members. Each member of the cooperative has one vote within the general assembly, with the weight of the vote being independent on the amount of cooperative shares. Among 94% of all German RECs the managerial board work is performed voluntarily, requiring 13,7 hours per week among local heat-grid cooperatives and 7,5 hours per week among PV cooperatives. Volz argues that the heating-grid RECs require more time investments, since these represent higher degrees of complexity and organization.

In an effort to describe the different organizational structures applied among German wind energy cooperatives, (Holstenkamp & Degenhart, 2013) categorize two types of energy cooperatives. The first has been labeled the *Participation cooperative* (Beteiligungs-eG), and the second has been labeled the *Operating cooperative* (Betreiber-eG). The participation cooperative collects capital among its members, which can be civilians, SMEs, and municipalities. Then it invest its equity into a cooperative or company operating the wind park, representing one or more KG's (Kommanditgeselschaft). When reflecting on the participation cooperative, (Holstenkamp & Degenhart, 2013) argue that this type of cooperatives provide advantages due to their wider risk distribution compared to operating cooperatives.

Apart from the participation/operation cooperative categorization, (Holstenkamp & Degenhart, 2013) introduce a second categorization, namely civilian participation in a *Narrow sense* and in a *Wide sense*. In the narrow sense, civilians invest their equity into a regional renewable energy project. This project aims to get as much people motivated to invest as possible and to provide local community benefit. The local public has decision power through its ownership and more than 50% of the shares are owned by civilians. The civilian participation in the wide sense represents financial investments through subordinated loans or other types of non-equity participations. The participation is not regional and therefore becomes an investment vehicle with members owning no more than 50% of the shares of the operating company.

In their working paper, (Holstenkamp & Degenhart, 2013) visualized the narrow/wide sense categorization of RECs, by describing the ownership structure that cooperatives use to build their organization. For building their organizations, RECs apply different combinations of cooperative and company forms, creating a spectrum of ownership structures. The least complex example is displayed in Figure 16, with the cooperative owning all the investment objects. The simplicity of the organizational structure is the major benefit of this cooperative structure, when communicating its concept to potential new cooperative members.



Figure 16: Project & participation cooperative (Holstenkamp & Degenhart, 2013)

A variation on the above organization structure emerges when not only civilians become participants of the final project cooperative, but also municipalities or local businesses. In this case, the structure does not represent a cooperative in the narrow sense anymore, since the civilians do not have a voting majority in the project cooperative.

A more elaborate structure emerges with the introduction of multiple cooperatives owning a single project cooperative, as seen in Figure 17. In this case, multiple local RECs may become shareholders of a single project cooperative, which operates a renewable energy source located in the region home to the local RECs.



Figure 17: Multiple cooperatives owning one project cooperative (Holstenkamp & Degenhart, 2013)

When the project assets are not owned by a cooperative, but by a company, a structure emerges in which the energy cooperative acts as a holding, possibly owning two or more project specific companies, as seen in Figure 18. These companies are required to operate either a wind park, a PV-plant, a heating-grid etc. Inserting the assets of projects into these Special Purpose Vehicles (SPVs) result into lower risk for the participants. When one project fails, and the invested capital is (partially) lost, the other projects can continue operating.



Figure 18: Cooperative as a holding (Holstenkamp & Degenhart, 2013)

When the above organization structures are being combined into more complex models, umbrella organizational structures can be formed, as visualized in Figure 19. These umbrella organizations structures allows civilians to become members of local energy cooperatives, which on their turn set up their umbrella cooperative. These central umbrella cooperatives can be able to invest into a separate energy cooperative, using equity provided by the local energy cooperatives. If required, the project cooperative can receive investments from other actors apart from the umbrella cooperatives, such as local businesses or municipalities.



### Figure 19: Umbrella cooperative structure (Holstenkamp & Degenhart, 2013)

Benefits from the umbrella cooperative structure can result in economies of scale which cannot be realized by the smaller member cooperatives. For example a wind park can be owned by multiple local RECs through this umbrella cooperative. A drawback of the umbrella cooperative structures is represented by the higher foundation and administrative costs. Business structures with an extra layer of local cooperatives can diminish the degree of participation and voting influence of individual civilians. Problems can arise from the higher degree of structure complexity, resulting into issues such as a decreased degree of transparency. Lower degrees of transparency caused by the complex structure may result into larger difficulty and effort to explain the cooperative structure which in turn
may hamper the accumulation of equity among potential members (Holstenkamp & Degenhart, 2013).

# 3.1.3 Financial characteristics

When discussing the financial aspects of the German RECs, the (DGRV, 2012) uses its nationwide projections mentioning investments of €800 million into renewable energy, originating from a total of 80,000 members, generating an average dividend of 4% (DGRV, 2012). From Figure 20 it follows that REC investments differ significantly. 9% of the RECs have invested over €4 million around 50% have invested €500,000 or less.



Figure 20: Total investment volume German RECs (Volz, 2012)

The use of bank loans to finance renewable energy projects differs among the RECs, which is described in Figure 21. A large group of has an equity ratio of 100%, accompanied by another large group of RECs that have equity ratios between 10% and 30%. In his research paper (Volz, 2012) suggests that two different philosophies exist between these two groups. The first group tends to be more focused on the cooperative idea of exclusive membership investment. The second group tends to be more commercial, allowing bank loans to create an interesting financial leverage.



Figure 21: Equity ratio distribution among German RECs (Volz, 2012)

The loans that RECs use to increase their financial leverage and thereby lower their equity ratio, originate from several credit sources as can be seen in Figure 22.



Figure 22: Sources of debt capital (DGRV, 2012)

From the financial characteristics of the German RECs it follows that they represent a wide spectrum of organizations, applying different financial and organizational strategies resulting into the wide spectrum of investment volumes and equity ratios.

# 3.1.4 Goals & Motives

In an effort to describe the goals and motives set by the RECs for their organization, both (Volz, 2012) and the (DGRV, 2012) have generated overviews of these among 73 German PV cooperatives (Volz, 2012) and 290 German RECs of which 180 represent PV cooperatives.



Figure 23: Goals of RECs, 1 = less important / 6 = more important (Volz, 2012)

Promotion of renewable energies Promotion of regional value creation Dividend payment for members Securing the regional energy supply Energy supply in "own" hands Independence from big energy companies Cost-efficient energy supply



Figure 24: Foundation motives PV REC, 0 = no motivation / 3 = very high motivation (DGRV, 2012)

When comparing the surveys, the (DGRV, 2012) use 7 motives relative to 18 in the survey by (Volz, 2012). The *promotion of renewable energies* has been labeled as the largest motivation for the RECs to start their cooperative. These outcomes are similar to the goals of *renewable energy production* and *public awareness in the region* used by the (DGRV, 2012). Both surveys show a strong desire among RECs to promote the use of renewable energies in their region and realize a higher degree of energy awareness. The second largest goal and motivation among RECs is represented by the *value creation* 

*in the region* (Volz, 2012), similar to the *promotion of regional value creation* (DGRV, 2012). These RECs state their desire to have a positive effect on the financial and economic situation of the region within which they are located. The least important motivation or goal among cooperatives is represented by the *cost-efficient energy supply* (Volz, 2012) and the *cost effective energy supply*.

Next to the goals and motives of the German RECs, the survey by (Volz, 2012) has provided a set of performance indicators that are used among the German PV cooperatives. These cooperatives have indicated that the indicators are useful when describing their performance.



## Figure 25: Indicators that measure performance, according to PV cooperatives (Volz, 2012)

The performance indicators mentioned by the German PV cooperatives predominantly describe financial performance and metrics related to natural performance, such as the member size or the annual kWh production. When comparing the performance indicators used among the PV cooperatives with their motives to start the REC, several discrepancies emerge. The height of the dividend represents the most prominent indicator, but among the motives, the dividend payements turn out on the 15<sup>th</sup> place.

# 3.1.5 Future developments

The challenges that are experienced by the German RECs originate from multiple sources. An external cause for concern originates from the possible future changes to the EEG. The new elections and strong debates in the German public domain pushes to the direction of an EEG make-over. Other challenges for the PV cooperatives originate from the difficulty of finding roofs for new PV-systems (Volz, 2012). These limited amounts of rooftops are partially responsible for the decision of a third of the RECs to no longer accept any new members. These new members are unnecessary since no need for extra capital is required, no new projects are being developed/built, and/or all projects under development are reaching their final construction phase.



# Figure 26: Future challenges 1 = do not agree / 6 = strongly agree (Volz, 2012)

In their cooperative wind park research, (Holstenkamp & Degenhart, 2013) state that the biggest challenge for wind energy cooperative originates from finding early access to new construction sites, since wind cooperatives are in direct competition with strongly capitalized project developers. Figure 26 provides an overview of the range of challenges that German RECs are facing according to (Volz, 2012).

# 3.2 Dutch renewable energy cooperatives

A Dutch essay by (Schwencke, 2012) provided a categorization of the RECs active in the Netherlands. The essay separates two distinct cooperative types which are labeled the *wind cooperatives* and the *new utilities*.

Wind cooperatives solely invest in either single windmills or wind parks. These cooperatives have been mainly founded around the start of the 90's as a response to the Chernobyl nuclear meltdown. These cooperatives either build windmills locally (e.g. DeltaWind, KennemerWind, Zeeuwind) or nationwide (e.g. Windvogel). Some of these wind cooperatives represent professionally led companies with multiple full-time employees, offices and so called 'millers' for maintenance. The two largest, DeltaWind (1450 members) and Zeeuwind (1650 members) each generate respectively 53 GWh and 83 GWh annually. Wind cooperatives in the Netherlands are actively looking to build more wind parks since the Dutch government is pushing for a higher percentage of wind power in the total energy mix. The wind cooperative DeltaWind started the Windgroup Goeree-Overflakkee together with energy companies Eneco and Nuon, the National forest administration, a project developer and several dozen farmers. Together they plan to add 200 MW to the 60 MW currently located on the island. DeltaWind also cooperates with the wind cooperative ZeeuWind to build another wind park containing 20 to 40 wind mills located between the regions within which they are active. Together they founded the Wind Krammer B.V. which will be responsible for the development of the wind park.

The second categorization by (Schwencke, 2012) introduces the new utility cooperatives which represent newly emerging renewable energy cooperatives which are locally oriented (e.g. municipality, province). The segmentation by (Schwencke, 2012) has been expanded by (Heynen, 2013), a former board member of the NHEC cooperative. Heynen argues in his blog that the new utility cooperatives can be segmented into three sub-categories. The first represents cooperative that set up projects with volume discount opportunities for their members. These cooperatives typically organize collective acquisition and installation of solar panels providing their members and region with cheaper panels or insulation material due to volume advantages. The second cooperatives are represented by energy suppliers, who provide electricity to their members through established energy companies such as GreenChoice or Eneco. Margins on the above activities and services are slim and strong involvement of volunteers is needed to allow the cooperative to function and create a large customer base. The third cooperative tends to develop single projects based on incidental subsidies, thereby not providing a long-term durable earnings model.

One of the energy cooperatives active in the Netherlands is TexelEnergie, which was started in 2007 on the island of Texel. The choice for the cooperative model originated from the desire of the initiators to allow the civilians to become maximally involved. The second reason lies in the fact that cooperatives are hard targets for takeovers, referring to the absorption of the Texel utility company into the provincial utility company (TexelEnergie, 2013). The research paper by (Schwencke, 2012) mentions that TexelEnergie had 4.000 customers and 3.000 members in June 2012. Primarily, TexelEnergie sells electricity and natural gas to its customers. Apart from this service it sells solar panels and it currently develops a biogas combined heat & power plant, which will insert its heat into a local heat distribution grid and provide electricity to the island. During its last general assembly a large majority of the cooperative members voted in favor of wind power on their island. Wind power expansion is currently being blocked by the province of Northern-Holland due to protests on its mainland. Apart from the above example of TexelEnergie, many more and smaller new utility cooperatives have emerged in the Netherlands.

Apart from the local renewable energy cooperatives, multiple supplementary cooperatives have emerged which aim to provide services to its members. Coöperatie WindUnie (Wind Union) is the eldest, representing 250 members of which most are farmers, who own one or more windmills. This wind cooperative provides a trading and service office for its members and their production capacity of 415 MW.

# Empowering the next generation – Thesis P.S. Boontje

# Chapter 4

# Business Model Literature

This chapter is devoted to the business model concept, its use and its application in the Thesis. Section 4.1 will explain why the business model concept emerged and how the concept found its way into the vocabulary of present-day managers and entrepreneurs. Section 4.2 provides a business model literature review, followed by Section 4.3 describing the application of the business model concept among renewable energy research. Section 4.4 provides the set of criteria and the selection of the business model framework for this Thesis. Section 4.5 describes the STOF model and its domains.

# 4.1 Need for the business model concept

The business model concept is relatively young to academic standards. Its application within academic literature increased in the mid 1990's, trying to explain the rise of internet based company structures, and their unique property of network effects (Zott, Amit, & Massa, 2011). Due to the Dot-com bubble the fascination for the concept was short lived (Magretta, 2002; Osterwalder & Pigneur, 2005), but deregulation, technological change, globalization and sustainability have rekindled interest into the concept (Perkmann & Spicer, 2010; Casadesus-Masanell & Ricart, 2011). In parallel to the re-valuation of the business model concept, 20<sup>st</sup> century economic theory has not been able to explain the rise of the e-commerce companies, since its theory builds on the assumption that value is being created around tangible objects (Teece, 2010). Intangible value, is at best, an afterthought. Teece states:

# *"Equilibrium and perfect competition are a caricature of the real world... customers don't just want products; they want solutions to their perceived needs"*

With the emergence of intangible value propositions, not the market but its business model brings the value to the customer. Economic theory assumes that new technological inventions create value by itself and firms capture this value by simply selling output. Economic theory assumes developed markets, instead of developing markets. It assumes strong property rights, instead of ineffective property rights due to fast technological improvements. It assumes costless transfer of information and perfect arbitrage, instead of information transfer costs and information asymmetry. It assumes no innovation, instead of incremental or radical improvement to products and services. Because of all the previous assumptions, economic theory deems it unnecessary to figure out the value creation architecture, which is challenged by business model theory.



Figure 27: Business model articles in the business/management field (Zott, Amit, & Massa, 2011)

A research by (Osterwalder & Pigneur, 2005) revealed that the business model term was first mentioned by (Bellman & Clark, 1957) and was introduced in an academic title and abstract by (Jones, 1960). At the end of the 20<sup>st</sup> century going into the 21<sup>st</sup> century, the popularity of the term has risen steeply both among academic and non-academic journals, showing a small decrease after the Dotcom bubble in the year 2000, as can be seen in Figure 27.

The first elements of the business model concept were introduced by (Schumpeter, 1934), by mentioning that value creation is related to innovation. He described five different types of innovation that allow for wealth creation: new products, new methods of production, new sources of supply, exploration of new markets and new ways to organize business. Reflecting on Schumpeter, (Zott, Amit, & Massa, 2011) argue that value creation mechanisms often go beyond the value that can be created through the Schumpeterian innovation or value chain reconfiguration (Porter, 1985). Value creation, spans firms' and industries' boundaries, therefore frameworks used in isolation cannot sufficiently address questions about total value creation (Zott, Amit, & Massa, 2011). Companies can both create and capture value with their value network, representing suppliers, partners, distribution channels, and coalitions that extend the company's resources. Through new value propositions, revolutionary business models allow businesses to thrive in the 'age of revolution' (Hamel, 2000).

Different new forms of value creation have been realized throughout the 20<sup>st</sup> and 21<sup>st</sup> century. In line with Schumpeter, Porter and Zott, some businesses found new ways to organize their business. where other decided to reconfigure their value chain, with 21<sup>st</sup> century companies providing value propositions through new value networks. The grocery hypermarkets emerged after the second world war and integrated a wide range of value chains by creating economies of scale among their stores. McDonalds was the first company to effectively introduce the 'franchise model', creating new value propositions to the mobile consumer (Baden-Fuller & Morgan, 2010). Both Xerox and Hilti have introduced the leasing model into their business model by providing printing and power tool services to their customers for a monthly fee (Chesbrough & Rosenbloom, 2002; Johnson M., 2008). Value chain reconfigurations have been realized by Dell and Tesla Motors, by applying a direct-to-consumers sales approach designed to eliminate intermediaries (Morris, Schindehutt, & Allen, 2005; Tesla Motors, 2013). AirBnB and Zipcar have built their internet platform into value networks which allowed both companies to become the largest worldwide peer 2 peer networks for bed and breakfast and car sharing (AirBnB, 2013; AVIS Budget Group, 2013). Similar to the peer 2 peer networks, crowd funding platforms like Kickstarter, Mosaic and the Windcentrale, have been connecting investors with designers, artists and entrepreneurs, allowing for new value creation through group purchases and investments.

The above examples provide a spectrum of economic and social opportunities which emerge when technologic innovations and new forms of social collaboration create synergies. These new value propositions can be supported by business model frameworks and their ability to describe the 'business logic' of a firm or service (Bouwman, de Vos, & Haaker, 2008).

# 4.2 Business model theory

The expanded use of the business model concept among entrepreneurs, managers and scholars has resulted into a broad range of definitions when it comes to describing the business model. Therefore a literature study has been provided, which reflects on the business model definition evolution after the Dot-com bubble.

Answering the question: What is a business model?, (Magretta, 2002) states that they are, at heart, stories- stories that explain how enterprises work. It answers the fundamental questions: Who is the customer? And what does the customer value? And how do we make money in this business? According to Magretta, creating a business model is a lot like writing a new story, allowing to use elements of old ones and applying variations of new ones. While discussing the use of the concept, (Chesbrough & Rosenbloom, 2002) quotes a course syllabus of the North Carolina State University, stating:

"Business models are perhaps the most discussed and least understood aspect of the web. There is so much talk about how the web changes traditional business models. But there is little clear-cut evidence of exactly what it means."

Where Magretta describes the business model as a story, other scholars have synthesized likewise abstract definitions based on their own research or reflection of existing theory. In their book for sustainable energy business models, (Wüstenhagen & Boehnke, 2008) argue that business models are considered to be vehicles for bringing new technologies to market. This definition overlaps with (Chesbrough & Rosenbloom, 2002) who state that a successful business model creates a heuristic logic that connects technical potential with the realization of economic value. Complementing the business

model definition as a logic, the scholar (Teece, 2010) suggests that a business model articulates both the logic, the data and other evidence that support a value proposition for the customer and a viable structure of revenues and costs for the enterprise delivering that value.

Multiple scholars have described the business model as an architecture, structure, or infrastructure combining multiple business concepts in its definition. For describing the e-business, (Amit & Zott, 2001) describe business models as the content, structure, and governance of transactions designed so as to create value through the exploitation of business opportunities. A similar e-business research by (Dubosson-Torbay, Osterwalder, & Pigneur, 2002) describes business models as the architecture of a firm and its network of partners for creating, marketing and delivering value and relationship capital to one or several segments of customers in order to generate profitable and sustainable revenue streams. The architectural theme has been integrated into the business model definition by (Osterwalder, 2004), stating that it is a description of the value a company offers to one or several segments of customers of the firm and its network of partners for creating, marketing and delivering this value and relationship capital, in order to generate profitable and sustainable revenue streams. Business models have been defined by (Morris, Schindehutt, & Allen, 2005) as a concise representation of how an interrelated set of decision variables in the areas of venture strategy, architecture, and economics are addressed to create sustainable competitive advantage in defined markets.

When discussing the diverse definitions of business models, scholars have provided reflections on the research progress. Through time, definitions have consolidated to several key elements, but criticism has not ceased after one decennium of research on the topic. To provide arguments for their standard business model framework, (Morris, Schindehutt, & Allen, 2005) argue that there has been no attempt to prioritize critical research questions or establish research streams relating to models. With a similar reflective notion to support the introduction of their business model building blocks, (Osterwalder & Pigneur, 2005) mention that business model are still relatively poorly understood, particularly as a research area. Through their business model development research, (Zott & Amit, 2010) observe that researchers frequently adopt idiosyncratic definitions that fit the purposes of their studies but that are difficult to reconcile with each other. As a result, (George & Bock, 2011) describe academic business model literature as being fragmented and confounded by inconsistent definitions and construct boundaries.

To structure the wide spectrum of definitions and applications of the business model concept, authors have created business model categories. An integrative framework by (Morris, Schindehutt, & Allen, 2005) split up the business model into three increasingly specific levels of decision making, with the levels reflecting on the different managerial purposes of a model. These levels represent the foundation level, proprietary level, and rules level. The categorization by (Zott, Amit, & Massa, 2011) did not segment business models vertically in line with decision making, but horizontally, arguing that business models are used within three silos respective to research interest: 1) e-business and the use of information technology in organizations, 2) strategic issues, such as value creation, competitive advantage and firm performance, and 3) innovation and technology management. A second horizontal categorization by (Wirtz, 2011) provides three streams inside the business model literature: the technology stream based on the internet boom, the organizational stream using the business model as a strategic management tool, and the third stream adding the element of market competition to the efficiency focus of the second stream.

Despite its ambiguities, (Zott, Amit, & Massa, 2011) argue that several acknowledgements emerged around the business model concept. The scholars argue that:

"(1) The business model is a new unit of analysis that is distinct from the product, firm, industry, or network; it is centered on a focal firm, but its boundaries are wider than those of the firm; (2) business models emphasize a system-level, holistic approach to explaining how firms 'do business'; (3) the activities of a focal firm and its partners play an important role in the various conceptualizations of business models that have been proposed; and (4) business models seek to explain both value creation and value capture."

The above business model literature review illustrates that despite the wide spread use of the business model concept, consensus continues to be absent. The first and third acknowledgement by (Zott, Amit, & Massa, 2011) overlap with the REC literature findings of section 3.1, describing the networked partnership environment found among German RECs. The second and fourth acknowledgements

overlap with the main research question which aims to better understand business model typologies and its elements. Due to this overlap, the above four acknowledgements will reflect the core essence behind the business model concept throughout this Thesis.

# 4.3 Renewable energy business model research

The business model concept has been used repeatedly for describing renewable energy technologies and their related business models. Research on renewable energy business models have been found through article cross-referencing, allowing to find sources that did not emerge during searches among academic databases. This section will review eight research articles and papers by describing their findings, business model definitions and framework used.

The predominant researched technology among scholars is represented by photovoltaic (PV). A US research by (Frantzis, Graham, Katofsky, & Sawyer, 2008) has been performed to inform utilities on the evolution of PV business models and their active role in the placement, operation and control of the systems. Before describing the business models, Frantzis introduces the focus of his report (blue box) with the PV product supply chain and the value network in Figure 28.



# Figure 28: PV product supply chain and value network (Frantzis, Graham, Katofsky, & Sawyer, 2008)

According to Frantzis, the evolution of business models starts with generation zero, representing the *PV System Supply*. This business model has a focus on manufacturing, supplying and installing PV systems for its end-user that own the system. Within this business model the utility is largely passive, providing net metering and interconnection. The first generation business models represent *Third-party ownership & Operation*. Within this model, third parties develop and own PV-systems, and use existing roofs to install their systems. This business model reduces the hassle and complexity of end-users and creates better access to financing. The second generation represents *full integration*, with PV-systems becoming an integral part of the electricity supply and distribution infrastructure. With this last evolutionary step, utility becomes more deeply involved as PV becomes a more dominant electricity source.

A Californian PV business model research by (Asmus, 2008) describes a single business model labeled *community solar*. This business model allows a local community, representing civilians and companies, to collectively invest in an off-site multi-MW solar plant. By collective investments, costs can be forced down due to economies of scale. The business model allows potential solar customers to participate in the solar market from which they are currently frozen out. Such customers represent domestic renters, contemplating to move.

A second US research for utilities by (Schoettl & Lehman-Ortega, 2011) argues that due to new PV business models, threats and opportunities emerge for utility companies. Six major strategic groups have been identified, which the scholars label *generic business models*, visualized in Figure 29.



Figure 29: The six generic PV business models (Schoettl & Lehman-Ortega, 2011)

The models represent: 1) *the Turnkey project provider*. complete PV systems for residential and commercial rooftop owners, 2) *Build-own-operate rooftop PV*: renting rooftop space of building owners, providing them with complementary revenue, 3) *Value-added service provider*. project development and consulting, 4) *Construction and installation service provider*. construction and installation service through project management, 5) *Utility scale power producer*. Player owns large scale PV-facilities selling the electricity, 6) *Virtual power plant*. Player controls supply and demand so as to deal with peaks.

A second Californian research by (Drury. E, 2012) analyzed the PV production capacity growth in the state. The research found that third-party PV companies were able to reduce or eliminate up-front adoption costs, reduce technology risk and complexity by monitoring system performance. As a result, these companies have seen a strong growth since they repackaged the PV value proposition by showing cost savings in the first month of ownership rather than payback times on the order of a decade. The researchers found that third-party PV products are likely increasing total PV demand rather than gaining market share entirely at the expense of existing customer owned PV demand.

Dutch initiatives that started experimenting with PV since 2008 were cause for (Huijben & Verbong, 2013) to contribute to the understanding of its developments. The most dominant business model was labeled the *customer-owned PV*, which showed strong growth due to decreasing PV prices and increasing household electricity prices. Second, the *community solar* business model was occasionally observed around experimental projects involving virtual net metering (De Vrieze, 2012). Third, several examples of *Third party PV* business models were described, with housing associations implementing PV-systems on the roofs of their apartments (Corpeleijn, Pijffers, Jansen, Stoof, & Versprille, 2012). Huijben selected the business model framework of Osterwalder after an extensive analysis of business model theory, its related definitions and applications in the growing PV sector. No explicit arguments for the selection of this specific business model were provided. Huijben uses the business model mapping methodology of (Osterwalder & Pigneur, 2009) providing a tool for mapping out the new business model developments among the Dutch PV sector during the interviews.

A German research by (Richter, 2013) challenges utilities to see distributed PV as an attractive business opportunity instead of seeing it as a threat. Through business model innovation, utilities can take up positions in growth markets such as energy efficiency and distributed storage. The research introduces four pillars: value proposition, customer interface, infrastructure, and revenue model. The selection of

these pillars is based on a literature review, where Richter argues that many authors favor a conceptualization based on these four elements.

Apart from the PV business model research, (Boehnke, 2007) introduced a paper that described micro combined heat & power (CHP) systems for operation on a small scale, located close the point of consumption. Following the business model literature review, Boehnke synthesized two types of business model components: the market components and the configuration components. Before introducing the business model components, Boehnke argues that although most definitions differ from each other to some extent at first glance, there seems to be a common underlying intention, namely to depict a business's core logic for value creation.

A wood heating entrepreneurship research by (Okkonen & Suhonen, 2010) analyzed different models among SMEs in Finland. The scholars argue that ready-made examples of applicable technologies and business models of renewable energy are needed because both technological and organizational developments in the wood heating sector are time and resource consuming. The research provides a set of six heating business models: 1) public companies/utilities, 2) public–private partnerships, 3) private companies and cooperatives, 4) the network model of large enterprises, and 5) ESCOs (Energy Saving Companies). The research has been built on the business model ontology of (Osterwalder, 2004). Its business model framework was not applied in the research, but multiple elements were integrated into a hybrid of different business model elements of multiple scholars (Timmers, 1998; Selz, 1999; Amit & Zott, 2001; Osterwalder, 2004).

Specific wind power business model research could not be found, although multiple research sources close to the subject provided a range of findings overlapping with the business model concept. A Berkely Lab research by (Bolinger, 2001) compared European and US community wind ownership, not mentioning the business model concept, although performing similar segmentations as found among the PV business model research. The economic development impacts of community wind park performance, comparing profitability and job creation. A Scottish research by (Aitken, 2010) revealed the complexity related to community benefits when a large external company plans to build a wind park. The research concludes that institutionalized guidance could creater greater confidence when discussing community benefit packages and would reduce the likelihood that benefits are perceived as bribes.

	Frantzis, 2008	Asmus, 2008	Schoettl, 2011	Drury, 2012	Huijben, 2013	Richter, 2013	Boehnke, 2007	Okkonen, 2010
Technology subject	PV	PV	PV	PV	PV	PV	CHP	WOOD
'Business model' in title	Х	-	Х	-	-	Х	Х	Х
Definition of a business model	-	-	Х	-	-	Х	-	Х
Business model literature review	-	-	Х	-	Х	Х	Х	Х
Use of a business model framework	-	-	-	-	Х	Х	Х	-

Table 5: Renewable energy business model review

The above literature review on business model research provided several interesting findings. Research into articles, papers and reports have provided multiple sources which describe business models or 'new models' for solar energy development as well as micro CHP and wood based heating, as seen in Table 5. The term business model was not always used in the title of the sources, but was mentioned throughout the rest of the texts. Although the term business model has been used among all sources, not all provide a definition of the concept. Those sources that have provided a definition also performed a business model literature review, comparing business model elements of different scholars. Of the five sources that performed a literature review, three applied an existing or a new business model framework.

The renewable energy business model literature review has revealed that the concept has found limited application among scholars. Elements of the business model concept (e.g. earnings model, ownership model, value networks) have been discussed by several sources, primarily relating to PV. Most business model research provided categorizations of different models, with the business model framework providing a supportive tool for the segmentation.

# 4.4 Business model framework selection

For selecting the business model framework that will be used in this Thesis, multiple requirements have been set which describe the selection criteria. The selection criteria have been set up in line with the overall research objective (applying a business model framework), complemented with the experience from previous renewable energy business model research.

The following criteria have been used for the framework selection:

- Amount of elements: the research discussed in Section 4.3 illustrates different degrees of details integrated into the business model research among renewable energy. The research objective of this Thesis requires a broad description of both financial and organizational subjects, which demands a sufficient amount of elements. When the financial segment of a business model is solely described by elements labeled revenue model, or cost structure, there will be insufficient guidance for the integration of detailed metrics such as performance indicators. Neglecting the above requirement can lead to results similar to the PV business model research by (Richter, 2013), which introduced the revenue model element, but did not provide further details on how this element had been internally structured.
- Explanation of elements: for getting a thorough understanding of a business model framework, it is essential to have an understanding of which elements it does and does not represent. Since elements do not necessarily have to be mutually exclusive, they can have somewhat overlapping meanings. Clear explanations of elements can decrease ambiguities when the research data is going to be analyzed.
- Element interrelations: the business model framework should provide clear constructs explaining how individual business elements relate to each other. When applying a framework, questions can arise such as: How does the value proposition relate to the customer segment? How are competencies related to strategy? How does the value network impact pricing? Therefore the framework should have sufficient explanatory capacity to answer questions like the ones above, providing insights into the interconnectivity between its elements. The micro-CHP research by (Boehnke, 2007) provided a new business model framework from existing elements, but the framework did not describe the types of interrelations between these individual concepts.
- Integration of network features: the German REC research (DGRV, 2012; Volz, 2012) has
  revealed that many cooperatives have been started, and are working together with a spectrum
  of local initiators and organizations. Because of the strong local interconnectivity of local
  actors, its network features should be covered by the business model framework.

To provide a set of business models frameworks which will have to be compared based on the above set of criteria, the business model literature review of five articles and books have been compared. These sources represent the three business model articles by (Boehnke, 2007; Richter, 2013; Huijben & Verbong, 2013), complemented by the literature review of two IT business model frameworks. These two frameworks represent the STOF model (Service, Technology, Organization, Financial) and the VISOR model (Vision, Importance, Supporting resources, Obstacles, Readiness). Each of the five business model frameworks use multiple secondary research sources to provide input for their business model, as visualized in Table 6.

## Table 6: Secondary BM literature reviews

	Application of a Business Model Framework				
5 Secondary Business Model articles,	3oehnke, 2007)	3ouwman, de Vos, & laaker, 2008)	Richter, 2013)	Huijben & Verbong, 013)	El Sawy & Francis, 013)
STOF model & VISOR model	E.	ШТ	R)	よる	ほん
(Alt & Zimmermann, 2001)	Х	Х	-	-	Х
(Hedman & Kalling, 2003)	Х	Х	-	-	Х
(Morris, Schindehutt, & Allen, 2005)	Х	Х	-	-	-
(Shafer, Smith, & Linder, 2005)	Х	Х	-	-	-
(Bouwman, de Vos, & Haaker, 2008)			-	-	-
(Osterwalder & Pigneur, 2005; Osterwalder & Pigneur, 2009)	Х	-	Х	Х	Х
(El Sawy & Francis, 2013)					

The literature review comparison reveals that the nine building block framework by (Osterwalder & Pigneur, 2009) has been mentioned by almost all sources. Moreover, both (Richter, 2013) and (Huijben & Verbong, 2013) have shown less extensive literature research, mentioning fewer secondary business model sources, compared to (Boehnke, 2007) and (Bouwman, de Vos, & Haaker, 2008). The literature reviews of the above five sources have provided many more business model frameworks and elements, but these were either explicitly focused on internet business models or represented frameworks representing primary business model elements.

The set of seven business model frameworks of Table 6 will be compared according to the four criteria. The compliance of the business model framework with each of the four criteria will be represented by the pie-charts of Table 7.

#### Table 7: Representation of criteria pie-charts

Absent	Insufficient	Sufficient	Affluent

# Table 8: Business model framework comparison

Business model frameworks	Elements	Amount of elements	Explanation of elements	Element interrelations	Integration of network features
(Alt & Zimmermann, 2001)	<ol> <li>Mission: vision, strategic goals, value proposition</li> <li>Structure: actors and governance, strategic focus</li> <li>Process: value creating activities</li> <li>Revenues</li> </ol>			$\bigcirc$	
(Hedman & Kalling, 2003)	<ol> <li>Customers</li> <li>Competitors</li> <li>Offering: products &amp; services, marketing strategy</li> <li>Activities and Organization</li> <li>Resources: human, physical, organizational</li> <li>Supply of factors and production inputs</li> <li>Longitudinal process component: dynamics over time, scope of management</li> </ol>				
(Morris, Schindehutt, & Allen, 2005)	<ol> <li>Offering related factors: products or services</li> <li>Market factors: customer target groups</li> <li>Internal capability factors: sources of competence</li> <li>Competitive strategy factors</li> <li>Economic factors: pricing, volume, margins</li> <li>Personal/investor factors: time, scope, ambition</li> </ol>			$\bigcirc$	$\bigcirc$
(Shafer, Smith, & Linder, 2005)	<ol> <li>Strategic choices: customer, value proposition, competencies, revenue, competitors, output, strategy, branding, differentiation, mission</li> <li>Create value: resources, processes</li> <li>Value network: suppliers, customer information, customer relationship, information flows, product/service flows</li> <li>Capture value: cost, financial aspects, profit</li> </ol>		$\bigcirc$	$\bigcirc$	
(Bouwman, de Vos, & Haaker, 2008)	<ol> <li>Service domain: Intended value, delivered value, expected value, perceived value, customer, context, tariff and effort, bundling</li> <li>Technology domain: technical architecture, backbone infrastructure, access networks, service platforms, devices, applications, data, technical functionality</li> <li>Organization domain: actors, value network, interactions, relations, strategies and goals, organizational arrangements, value activities, resources and capabilities, roles</li> <li>Finance domain: Investment sources, cost sources, performance indicators, revenue sources, risk sources, pricing, financial arrangements</li> </ol>	J		J	•
(Osterwalder & Pigneur, 2009)	<ol> <li>Product: value proposition</li> <li>Customer interface: target customer, distribution channel, relationship</li> <li>Infrastructure management: value configuration, core competency, partner network</li> <li>Financial aspects: cost structure, revenue model</li> </ol>		•		
(El Sawy & Francis, 2013)	<ol> <li>Value proposition: customers, customer value, customer understanding, customer relationship</li> <li>Interface : customer interface, value interface, services and linkages</li> <li>Service platforms: core technology investments, technology, logistical streams, IT infrastructure, key resources</li> <li>Organizational model: key partnerships, organizational characteristics, channels, value network, connected activities, stakeholder network</li> <li>Revenue model: financial flows, financial model, revenue stream, financial aspects</li> </ol>				

Based on the comparison of the four selection criteria with the seven business model frameworks in Table 8, the STOF model by (Bouwman, de Vos, & Haaker, 2008) has been selected as the business model framework for this Thesis. On all criteria the STOF model scores higher than the other six frameworks, but for the criterion *explanation of elements*, the CANVAS model by Osterwalder occasionally provides more supplementary information. Although the CANVAS scores higher with respect to its supplementary information, it is argued that the STOF model still scores sufficiently high enough on the other three criteria to be applied in this Thesis.

# 4.5 STOF model

The STOF model finds it origin in the need for a theoretical underpinning of designing viable business models for electronic services, including mobile services. In 2003 (Faber, Ballon, Bouwman, & Haaker, 2003) developed the STOF business model framework. Since its genesis, it has been applied among insurance intermediaries (Bouwman, Faber, & Van Der Spek, 2005), used for designing business models of mobile services (Haaker, Faber, & Bouwman, 2006), applied for analyzing e-commerce business models (Bouwman, MacInnes, & de Reuver, 2006) and has been used for describing critical design issues and success factors (de Reuver, Bouwman, & Haaker, 2006). In the book Mobile Service Innovation and Business Models, (Bouwman, de Vos, & Haaker, 2008) present their conceptual framework, complemented with a business model design method. The framework applies a holistic view on business models. In the introduction, Bouwman states that due to rapid changing needs and demand of customers, service providers have to be able to respond almost instantaneous and change their service offering. To allow for the creation of successful service innovation strategies, Bouwman argues that service innovation is directly related to business models supporting these services. Within the business model context, the concept of value is central in the definition of the business model concept. When describing and designing a business model, the framework takes a network-view, since mobile services typically require cooperation in a complex value network. As a result the STOF model uses the multi-actor approach instead of focusing on the single firm.

For the synthesis of the business model definitions, (Bouwman, de Vos, & Haaker, 2008) compare the business model definitions introduced by (Timmers, 1998; Chesbrough & Rosenbloom, 2002; Bouwman & Van Den Ham, 2003; Osterwalder & Pigneur, 2002; Haaker, Faber, & Bouwman, 2006). Reflecting on these various definitions, the following definition has been proposed:

"A business model is a blueprint for a service to be delivered, describing the service definition and the intended value for the target group, the sources of revenue, and providing an architecture for the service delivery, including a description of the resources required, and the organizational and financial arrangements between the involved business actors, including a description of their roles and the division of costs and revenues over the business actors"

Following the above discussion regarding the definition of a business model, the book by [] introduces several sources discussing sets of basic business model elements and components. Based on this reflection, the STOF model focuses on the customer value, and organizational, technical and financial arrangements as illustrated in Figure 30.

The mobile IT services in the technology domain predominantly describe the IT-functionalities, digital service platforms and technical architecture necessary for e-business models. Because the focus of this Thesis does not require an extensive use of digital platforms it has been decided that the technology domain will remain out of scope. Following from the previous exclusion, three of the four domains of the STOF model will be further used in this Thesis.



Figure 30: STOF business model domains (Bouwman, de Vos, & Haaker, 2008)

# 4.5.1 Service domain

During the introduction of the service domain, (Bouwman, de Vos, & Haaker, 2008) state that the central issue of designing a service concentrates around its value, since each service organization aims to provide a certain *value proposition* to its *end-users*. Four interrelated concepts are integrated into the service domain of the STOF model, as seen in Figure 31. These are represented by the *intended* and *delivered value* by the provider and complemented with the *expected* and *perceived value* by the *customer or end-user*. The *intended value* puts requirements on the *technical functionalities* (out of scope) and requirements on the *value network*. The final *delivered value* to the *customer or end-user* can contain a mismatch with the *intended value*. Furthermore, the *delivered value* is also co-determined by the *previous experience* of customers with previous services. Moreover, the *expected value* is co-determined by the *previous experience* of customers with previous service provider, just as it is dependent on the provider' reputation, trust, and its *financial arrangements*. The *perceived value* represents the actual perception related to the consumption or use of the service. This concept represents 'the bottom line', since it evaluates the value of the innovation provided. The higher the *delivered value* will be.

Several variables have strong impact on the *perceived value*, these represent the variables: *Customer or end-user, Context, Effort, Tariff,* and *Bundling.* The variable *customer* represents the different market segments, with different needs, wishes and preferences, each determining the *perceived* and *expected value*. Quantities related to the *market segment* are the installed base, the size of the target group, and the size of maximum potential market. Other descriptive measures are the percentage of ownership, adoption of the service, access to the service. Understanding and knowing the final customers or endusers is crucial for successful innovations. The *Context* represents multiple levels of abstraction, such as the physical context of the customer or its social-cultural context. The frame of reference provided by the *Context* will shape the *perceived value* related to all non-financial factors that impact the willingness of a customer to use a service. The same holds for the *Tariffs* used by the service. The bundling services variable allows service providers to propose an increased value to its customer or end-user.

Several variables are mentioned from outside the service domain, originating from the technical domain, representing the *previous versions, technological functionalities,* and the *technical architecture.* These variables have limited overlap with the REC business context and find their origin within the IT platform context which represented the starting point of the STOF model. Because of their limited overlap, these variables will be out of scope for this Thesis, as visualized in Figure 31.



Figure 31: Descriptive model for the service domain (Bouwman, de Vos, & Haaker, 2008)

# 4.5.2 Organization domain

During the introduction of the organization domain, (Bouwman, de Vos, & Haaker, 2008) states it is based on the value network concept and the elements related to it. The scholars argue that the value network concept originates from the deficiency of the value chain concept (Porter, 1985) to describe co-operative behavior and horizontal aspects of a company's processes (Allee, 2000; Tapscott, Lowi, & Ticoll, 2000). For supporting the use of the value network as a broadening of the value chain, (Bouwman, de Vos, & Haaker, 2008) mention a general trend among strategic management literature, by describing plural organizations. Inter-organizational networks are described by (Granovetter, 1994), illustrating organizational forms such as business groups. Moreover, cooperative and governance networks are mentioned by (Wigand & Picot, 1997), network enterprises by (Castells, 1996) and strategic networks by (Gulati, Nohria, & Zaheer, 2000).

Following from the above literature reflection, the organization domain has been given nine elements, of which the first, the *value network*, has been introduced above. The *actors* within a network, made out of businesses, government and NGOs, can have more or less power depending on the *capabilities and resources* that they have access to. Three types of actors (partners) can be identified within a *value network* (Hawkins, 2002). First, the structural partner provides non-substitutable tangible and essential (in)tangible assets, playing a key or direct role in determining the intended customer value and business model. Second, the contributing partner provides goods and services which are specific for the *value network*, but they play no direct role when determining the intended customer value. Third, the support partners provide generic goods and services which could be used in a wide array of other business models and intended customer value. The more structural a partnership becomes, the more influence an actor can have over a network. Among the actors in the network that build on *interactions, relationships* can emerge when *interactions* become reciprocal. The trust and commitment within a network is bolstered by an increased intensity of the inter-actor relationships. Actors can decide to participate within the *value network* depending on their *strategies and goals*. The collaboration that follows may require mutual information sharing and providing insights into the

'kitchen' of the involved companies. Since strategies of actors within a network not necessarily have to coincide, trust is important for an open and constructive collaboration. For the *value network* to keep providing its proposed service, *value activities* have to be performed by its individual *actors*. The *resources and capabilities* (e.g. financial, social, organizational, technical) present among the networked *actors* allow them to perform their contributive *value activities*, as seen in Figure 32.



Figure 32: Descriptive model for the organization domain (Bouwman, de Vos, & Haaker, 2008)

## 4.5.3 Finance domain

When introducing the finance domain in Figure 33. (Bouwman, de Vos. & Haaker, 2008) elaborate on four finance related subjects: Costs. Revenues. Risks and Pricing. The book states that in general a company's cost side is reasonably well charted. A high degree of fixed costs can typically lead to economies of scale, lowering production costs when its production volumes are increased. Higher degrees of cost-sharing can lead to economies of scope, allowing the bundling of complementary services, to reduce overall costs. Complementarity can stimulate demand and thereby a company's revenue. The book is brief when describing the revenue model, it indicates what methods of payment are used, what is being paid for and thus in what way income is generated. When describing general revenue models, (Weill & Vitale, 2001) are introduced when distinguishing 1) payments for transactions, 2) payments for information and advice, 3) payments for services and commissions, and 4) advertisement-generated income and payments for referrals. Other revenue models have been proposed, but these focus on e-businesses and related Internet Services. The subject Risks are discussed when describing the challenges faced when investments are necessary into new technologies. When choosing a technology, it can have significant irreversible characteristics, since the technology runs the risk of becoming outdated. Therefore (Bouwman, de Vos, & Haaker, 2008) states that dealing with risks is a balancing act, addressing both positive and negative aspects. The last subject relates to *Pricing* and the sacrifice a customer has to make to obtain or use a service. *Pricing* can be used for short term profits on high-end markets, or for the creation of market share, focusing on long-term profits. Pricing builds on pricing discrimination, and exists in different forms: 1) personalized pricing, 2) group pricing, 3) versioning, 4) bundling, 5) price discrimination on sales volume (Shapiro & Varian, 1999; Klein & Loebbecke, 2003). Dependent on the place in the life cycle of a service (e.g. start-up, mature), Pricing can differ. Within complex value networks, the Pricing is moderated by the investment decisions reflecting the interest of the actors involved. Through intended relationships and interdependencies, organizations can consider sharing risks and investments for solving common problems.



Figure 33: Descriptive model for the finance domain (Bouwman, de Vos, & Haaker, 2008)

Within the context description of the financial domain (Bouwman, de Vos, & Haaker, 2008) introduce the financial variables which shape the *financial arrangements*. The *Investments sources* variable asks the questions who will supply the *Capital*, representing an important design variable for the finance domain. The *Cost sources* influence the coordination costs within the *value network*. *Performance Indicators* allow for evaluation and management of the *financial arrangement*, representing indicators like market adoption, usage, or return on investment (ROI). The *Risk sources* originate from other domains, since negative impact can result from decreasing *perceived customer value*. As mentioned above, *Pricing* of the service will be the most visible part for the end-user. The *financial arrangements* within the value network describe how profits, investments, costs, risks and eventually revenues are shared among the involved actors.

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# Chapter 5

# Financial Performance Indicators

This chapter introduces the performance management literature in Section 5.1 by describing its different perspectives and applications, concluded by a focus on financial performance indicators. Section 5.2 will provide a financial performance literature review, selecting a set of four financial performance indicators, taking into account the German REC context.

# 5.1 Performance Management Literature

Many organizations, both in the past as in the present, are facing challenges on how to keep their organization in good shape. Organizations require short cycles when manufacturing goods, need consistent quality among their products or want to maximize effectiveness when new products have to be developed (Kaplan & Norton, 1996). For tracking the performance of both the workforce and the assets of organizations, a wide spectrum of measurements concepts has emerged. Each of these concepts are either related to performance, performance measurements or performance, (Verweire & Van Den Berghe, 2004) argue that many definitions capture the notion of the multidimensionality of the performance concept. Performance can be defined in financial terms (e.g. market value, profitability), operational terms (e.g. efficiency, number of outputs, service quality) or marketing terms (e.g. customer satisfaction, customer growth). An organizational definition of performance is provided by (Verweire & Van Den Berghe, 2004) when describing the conceptualization of the subject by (Barney, 1997). The scholars state that organizational performance is defined in terms of:

*"The value that an organization creates using its productive assets in comparison with the value that the owners of these assets expect to obtain."* 

When discussing performance management, the scholars argue that too much effort has gone to focusing on performance measurement instead of performance management. Since today's managers having more trouble managing their business than finding optimal performance measures. The evolution of performance measurement to performance management can be illustrated with the evolution of the Balanced Scorecard (BSC) by (Kaplan & Norton, 1996). The framework was first developed to measure organizational performance, allowing to overcome the limitations caused by only managing with financial measures. In time, its authors adapted the framework to become an organizing framework for strategic management systems. When applying a performance management framework, its effectiveness will be dependent on the management style of individual companies, either requiring an informal or formal approach (Verweire & Van Den Berghe, 2004).

Many authors of new performance management frameworks, its authors claim them to be comprehensive and unique, yet each author offers a different perspective on performance (Neely & Adams, 2000). Four academic management disciplines have tackled the performance challenge, describing performance management from either the finance perspective, the management control perspective, the operations perspective, or the risk perspective (Verweire & Van Den Berghe, 2004). Apart from the different perspective, performance management has also be applied on different organizational levels, namely on the corporate level, the business level, and the functional level. The corporate level will primarily focus on financial data, where at the functional level, employees will primarily focus on non-financial data due to the operations perspective.

For both larges and smaller organizations, the Balanced Scorecard has proven to be one of the most popular frameworks used within the accounting and control world. The Harvard Business Review mentioned the Balanced Scorecard to be one of the most important management ideas of the last 75 years (HBR, 2013). The BSC splits its framework up into four perspectives: the financial perspective, the customer perspective, the internal process perspective and the learn and growth perspective. Each perspective is made out of a range of measures allowing top managers a fast but comprehensive view onf the business (Kaplan & Norton, 1996).

Although the BSC has supported the performance measurement revolution in the 90's and thereby promoting its acceptance, critics have pinpointed several weaknesses related to the framework. One of its critics argues that a focus on costs by the use of financial performance measures encourages short-termism, and gives little indications for future performance (Bruns, 1998). Moreover, the traditional performance measures (like the BSC) fail to reflect changes in the competitive circumstances and strategies of modern organizations (Kennerley & Neely, 2002). Targeting financial performance, (Verweire & Van Den Berghe, 2004) argue that a strong focus on financial measures will lead to an unbalanced performance measurement system. Furthermore, things and processes that will not be

measured, will be sacrificed to improve the yield of those that are measured (Meyer, 2002). Challenging the usefulness of measures in general, Meyer argues that using one measure will not provide the entire picture, where using multiple will, but will then provide difficulty when combining them to reflect on overall organizational performance. The scholar continues by stating that the different measures used will not always be correlated. Increasing customer satisfaction, for example, will not one on one increase customer loyalty, thereby increasing sales.

From the above reflection on the performance management literature, interesting organizational opportunities emerge to align operations with the goals and strategy of organizations. Nonetheless, will this Thesis not use all types of performance measures, due to its focus to provide a holistic business model research. Out of all performance measures discussed, only the financial performance measures will be applied in this research. It is expected that most financial data will be readily available for the RECs and will require limited effort to gather. The use of financial measures will imply the use of the financial measures described by the BSC. Although the criticism towards the deliberate use of financial measures has be repeatedly mentioned above, it can be parried due the integration of the measures into the STOF model, allowing for an integral analysis of the German RECs. Although the customer measures can provide detailed information on organizational performance, they will not be used, since gathering the detailed information related to the measures will require significant effort for the volunteers of the RECs. The arguments used against customer measures also hold against the operations measures used in the Balanced Scorecard framework. Collecting the operations measures requires data of multiple sources, collected by the volunteer REC board members. Applying the operations measures on the STOF model will therefore be impractical and out of scope. The last segment of measures of the Balanced Scorecard, originating from the learn and grow perspective, will not be applied because these need to be developed dependent on the strategic objectives of the firm. Since these objectives and measures are not provided in German REC literature, they will not be incorporated into the REC interview questions.

# 5.2 STOF model & Financial Domain

Based on the selection in the previous section, it has been decided to focus on the financial performance indicators. From the financial domain of the STOF model, it follows that its financial performance indicators are used for monitoring the costs and revenues of a business, which allow for the evaluation and management of the financial arrangements.

The financial performance measures and indicators have been applied among multiple research fields, describing the correlations between CSR, HRM or customer satisfaction with financial performance. A research by (Dess & Robinson, 1984) analyzed the usefulness of performance measures for measuring organizational performances such as *Return on Assets* and *Sales growth*. A research by (McGuire, 1988) addresses the relation between CSR and the financial performance of firms, using the performance indicators *Total Assets, Sales growth, Asset growth, Operating Income growth*, the *Debtto-assets* ratio and the *Operating leverage*. A similar CSR correlation research by (Preston & Bannon, 1997) used the financial performance indicators *Return on Assets, Return on Equity* and *Return on Investment*. A research by (Huselid, 1995) analyzed the impact of HRM practices on financial performance thereby using a single indicator, the *Gross Rate of Return on Capital*. When addressing the effect of customer satisfaction on firm performance, (Anderson, Fornell, & Rust, 1997) used the performance measure of *Return on Investment*. A research by (Berman, Wicks, Kotha, & Jones, 1999) analyzed the relation between stakeholder management models and firm financial performance, thereby using the *Return on Assets* as their primary and single financial performance indicator.

As mentioned in Section 5.1, performance management literature categorizes financial performance measures into one of multiple perspectives within the research field. Many scholars have described the financial performance indicators, arguing that it represents the traditional mainstay of quantitative approaches to organizational performance measurement (Neely, 2002). When discussing accounting-based performance measures, (Verweire & Van Den Berghe, 2004) mention its focus on profitability measures such as *Return on Investments* (ROI) and *Return on Sales* (ROS). Although these profitability measures have received criticism from economists and management theorists, they continue to play a central role within corporations. The most frequently used accounting based measures are the *Return on Equity* (ROE), *Earnings per Share, Pay-out ratio* and *Cash flow.* Account measures tend to reflect a firm's past performance, whereas market-based performance measures reflect the present value of future streams of income. The most common measures are the *Price-to-Book* ratio, the *Price-to-Earnings* ratio and the *Dividend Yield* (Verweire & Van Den Berghe, 2004). The scholars argue that

these market-based performance measures are best used when comparing with an industry average or when comparing organizations within a particular industry.

Next to the accounting-based and market-based performance measures, the Financial Performance Scorecard by (Needles, Frigo, & Powers, 2002) provides a useful integrated financial ratio analysis. The scholars make a separation between performance drivers and performance measures. The performance drivers are financial drivers and are stated to be critical to provide the performance measures. Performance drivers will not be uniform among companies, since these are more a function of the various strategies companies may employ (Epstein & Manzoni, 2004). The drivers and measures introduced are summed up in Table 9.

Performance Drivers	Performance Measures		
Asset turnover	Growth in revenues		
Profit margin	Return on assets		
Debt to equity	Return on equity		
Cash flow yield	Free cash flow		
Turnover ratios	Cash cycle		

Table 9: Financial Performance Scorecard	(FPS)	(Needles,	Frigo,	& Powers,	2002)
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Apart from performance measurement literature, the German REC literature provides similar financial and accounting measures for describing and categorizing the REC sector. Following from an empirical research, (Volz, 2012) describes the investment volumes of RECs, complemented by their equity ratios. A similar survey by the (DGRV, 2012) also describes the investment volumes and equity ratios, but among both surveys, no other financial measures or indicators are provided.

Following from the above description and the German REC literature, the segmentation provided by (Needles, Frigo, & Powers, 2002) has been applied on four selected financial performance indicators, dividing them among performance drivers and performance measures. This set of four financial performance indicators will be coupled to the central element of the Finance domain of the STOF model of Figure 34.





# Table 10: Financial performance indicators

Performance Drivers	Performance Measures		
Asset turnover	Growth in revenues		
Profit margin	Return on assets		
Equity ratio/Debt to equity	Return on equity		
Cash flow yield	Free cash flow		
Turnover ratios	Cash cycle		
	Return on investment		
	Asset growth		

- *Equity ratio*: the cooperative research by (Volz, 2012; DGRV, 2012) illustrate the diversity of RECs in choosing their financial leverage. Different arguments might be applied by cooperatives when deciding on the amount of debt they want to acquire and the related risk they are willing to take. The equity ratios and debt to equity ratios are interchangeable.
- *Return on Equity (ROE)*: following from its popular use among accounting measures, the returns that can be generated from the cooperative membership equity may show larger or smaller discrepancies relative to the ROI provided to the cooperative members. Differences between these ratios might relate to different goals and strategies used by RECs.
- *Return on Investments (ROI)*: Since the German RECs represent investment cooperatives that allow their members to invest in local solar and wind power, the ROI provides insights on the dividend yield provided to the local population.
- Asset growth: since many cooperatives have emerged since 2008, it is interesting to analyze their speed of growth. Since renewable energy investments are capital intensive, the asset growth of cooperatives might be a good indicator of their performance.

The financial measures used as input for the ratios represent the REC revenues, their investments, member equity and their financial liabilities.

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# Chapter 6

# Case by Case REC description

This chapter will present a tabular overview of the interview data collected during the research, followed by 15 case description of the energy cooperatives that have been visited during the research. The cases will describe a subset of the answers provided to the interview questions of Appendix A.

The 15 cases discuss when the cooperative was started, where it is located, how many members it has, which actors were involved with the cooperative at the start and during the interview, followed by the reasons to start their REC. From the financial data, the total investment volumes are mentioned, complemented by the membership equity size, the equity ratio and the height of the dividends. Each case will be concluded by its long term development plans.

The decision to only mention a subset originates from the following four reasons: 1) Answers that were qualitative or were quantitative and have strong differences among each other, require supportive explanation, 2) Some answers during the interview were perceived to be incomplete and did not enable a proper portrayal of the specific subject. 3) Several interview questions were consistently provided with the similar answers, due to sector wide laws, market and legislative developments. 4) In several instances, some subjects could not be discussed with all RECs, and therefore cannot be used in this case by case description. Exceptions to the above subset originate from interesting outlying topics, since they provide novel perspectives on concepts applied by RECs. Figure 35 illustrates the above segmentation of the research data, illustrating a more detailed segment of the research flow diagram of Figure 2.



Figure 35: Description of the subset used for the cases

## Energie für Saerbeck eG

This REC has been founded in 2009 in the village of Saerbeck, in the state North Rhine-Westphalia. The cooperative has 390 members and was started because the municipality of Saerbeck aimed to achieve climate autarchy. The major wanted to allow civilian participation when developing the plans. As a result, the local cooperative bank proposed the municipality to start an energy cooperative, aided by an engineering cooperative that was to develop the smaller scale PV-systems. For the municipality to realize its ambitions, an ammunition depot had been bought allowing it to create a bio-energy park. The cooperative has invested in a total of 6.120 kWp of PV-systems on roofs of two schools, a gym and on the property of the former ammunition depot. Apart from solar energy, the REC invested into a windmill located on the same depot with a production capacity of 3 MW. The roof PV-systems are located within the village of Saerbeck, with the ammunition depot being located 5 kilometers northwest of the village. The cooperative promised its members dividends of around 4% for a period of 20 years, but during its first year it made a loss, followed by growing returns which are expected to eventually reach the promised 4% level. The total investment by the REC members represents €4.851.000 equity, using an equity ratio of 73%. Bank loans were provided by the local Volksbank Saerbeck eG and the central cooperative WGZ bank, providing the loans to both the REC and its subsidiary operating companies, applying equity ratios of 30%. The average cooperative member invested approximately €3.700 and originates from the Saerbeck village. During the last project with the bio-energy park, also people from neighboring cities were allowed to invest. The president of the Volksbank stated that in the end they had completely drained their municipality civilians of funds and therefore needed outside investors. After the bio-energy park projects, the REC stated that it did not want to plan any new projects. Due to its fast growth, it wanted to stabilize first.

#### Paderborner Land eG

This REC has been founded in 2009, in the city of Paderborn, located in the state of North-Rhine-Westphalia. It currently has 260 members, who invested in a total of 3.606 kWp, both on public roofs as well as on open fields. Its systems are located both in Paderborn and in the surrounding cities and villages. Many people asked the cooperative bank for opportunities to invest into new PV systems, allowing them to participate in the Energiewende (energy transition). The bank did not want to do the investments themselves, so it started a separate energy cooperative, allowing locals to join, arguing that: "What a single person cannot realize, realize many". The investments done by the REC provided their members with a dividend of 4%. When looking for new members to invest into new projects, local media was used to spread the news and investments could be done at each of the 60 local Volksbank buildings. The cooperative invested around €7.000.000, with €970.000 in membership equity, representing an equity ratio of 14%. The REC is planning to participate into new windmill parks and therefore is negotiating with multiple project developers. The cooperative does not want to develop the wind mills themselves and desires to leave this to the project developers. To provide the extra investments necessary for the wind parks, it aims to grow toward 2.000 or 3.000 members. Eventually the REC desires to provide its electricity directly to its members, either by itself or in cooperation with the RECs located in their region.

#### BürgerWind Westfalen eG

This cooperative was founded in 2011 in the village of Lichtenau, in the state of North Rhine-Westphalia, representing 620 members. The cooperative provides loans to several wind park operating companies in the region. The cooperative has been founded by the WestfalenWIND GmbH, because of the local resistance to further expansion of the wind power capacity. The project developer aims to lower the resistance among the population by allowing them to invest into the cooperative. Members are given an annual dividend of 5.0%. The cooperative has gathered around €8 million among its members, providing subordinated loans with 6.5% interest to the operating companies. These subordinated loans represent 10% of their total investment volume, with 20% of total investment originating from equity providing investors, complemented by 70% bank loans. When looking for new investors, the local population near a wind park will be asked to invest first, after which civilians living further away are allowed to invest. The REC does not plan on changing its business model, since it mentioned that it did not want to become an operating cooperative like the Paderborner Land eG, stating that they have different business model philosophies. The REC wants to continue providing its investment opportunities to its members and local participation opportunities to wind mill owners in the region. The cooperative mentioned that it faces the risk of losing its label 'eingetragene Genossenschaft' (registered cooperative) when it continues to operate similar to a bank. Therefore the cooperative desires to operate a single windmill parallel to its current activities, allowing it to keep its organizational cooperative form.

# Bürgerenergiegenossenschaft eG

This REC was founded in 2010, in the city Hagen, located within North Rhein-Westphalen, currently representing 200 members. The cooperative owns 1.011 kWp of PV-systems distributed among 38 roofs. Each of the PV systems are located within the Ennepur-Ruhr-Kreis and the city of Hagen. There are no opportunities for windmills, since the Ruhr area is heavily populated. The cooperative was started by a group of enthusiastic civilians who wanted to make a difference with respect to environmental subjects. PV systems have for example been installed on roofs of a housing cooperative, the local Sparkasse (Savings bank) and municipality roofs. Contact to the roof owners comes from the network of members who propose the cooperative PV investment and connect the roof owner to the president of the cooperative. In parallel, the president himself also looks for new opportunities and seeks contact with new actors. The cooperative uses two different installers for its projects, selecting them based on trust in their abilities. Although the cooperative board desired to work with 'sustainable' and 'green' solar panels, the members decided to continue investments with cheaper Chinese panels, allowing more investment opportunities. Investment volumes were not provided during the interview. The bank loans were provided by the Sparkasse, allowing the REC to use an equity ratio of 30%. The REC argues that they prefer to work with local partners, like the Sparkasse and the Volksbank, although it might cost the REC several .1% in dividends. The cooperative wants to expand, mentioning large and small scale wind, hydropower and energy efficiency, but none of these has become concrete yet.

#### Energiegenossenschaft Odenwald eG

This cooperative was founded in 2009, in Erbach, located in the state Hessen and currently represents over 2.000 members. It invested into over 5.000 kWp of PV systems, spread over 70 buildings in its Kreis and surrounding municipalities. The REC has co-invested into two windmills. The first has a capacity of 2 MW and is owned together with the energy cooperative Starkenburg eG. The other windmill of 3 MW is co-owned with the local Kreis Odenwald and the municipality. Both windmills are located on hill tops within the Odenwald region. The cooperative was started by the Volksbank Odenwald eG, because it saw the potential for local economic development with the help of renewable energies. Due to cooperation with municipalities many public roofs could be rented for the installation of PV-systems. The Volksbank paid the salary for the REC board until the cooperative was able to pay its board themselves. The cooperative has grown to such a size, that it was able to become independent of its initiator, but still operates in close cooperation with both the Volksbank, the municipalities and the Kreis. The REC provided its members with a steady dividend of 3,5% over the last two years. The cooperative has accumulated around €8 million in member equity, complemented with Volksbank loans up to €35 million, representing an equity ratio of 23%. Investments into the cooperative can only be done by civilians living in the Kreis Odenwald, but also inhabitants of municipalities next to the Kreis Odenwald are able to become member of the REC. The cooperative is building the 'Haus der Energie' (House of Energy), allowing working spots for over 300 people from companies within the energy sector. Government employees relating to energy sector regulations will also shift their offices to the building. The cooperative aims to develop over 80 windmills in the coming 8 years and is discussing the possibilities to participate at a pellet production facility. It currently sells its own EGON-electricity through an external electricity cooperative, but aims to start selling its own electricity directly to its members. The cooperative is developing its expertise in energy contracting, gaining experience with low risk public buildings, expecting to grow this sector after the wind development boom.

#### Starkenburg eG

The Starkenburg eG has been founded in 2011, in the city Heppenheim, located in the state Hessen, with around 500 members, owning 500 kWp of PV systems and co-invested in a windmill together with Energiegenossenschaft Odenwald eG. The cooperative was founded because a project developer wanted his windmill to become a community windmill, allowing it to become owned through civilian participation. The initiators of the cooperative knew each other from an environmental network, Metropol Solar, which aimed to make the region 100% energized through renewables. During its start the REC was supported by the project developer Agrokraft GmbH. The municipality Heppenheim does not work together with the cooperative, but only ideological reasons for this decision by the municipality were mentioned by the REC. Members provide the REC with capital through membership shares (two times €100) and a subordinated loan of €1.800, bundled in so called 'investment packages'. The REC only used member investments to fund its energy projects, requiring €2,3 million without using bank loans, providing dividends ranging between 3% to 4%. When developing new projects, the REC applies 'church tower thinking', demanding those people

living closest to the project site investment priority over those further away from the 'church'. The cooperative is making plans to invest into new windmills and is looking into biomass and hydropower opportunities.

# Friedrich Wilhelm Raiffeisen Energie eG

The cooperative was founded in 2008, located in the city of Bad-Neustadt in the free-state Bavaria, representing 230 members who have invested in a total of 2.088 kWp spread among 22 PV systems. The PV systems are spread in the region near Bad-Neustadt, located on the roofs of child daycares, businesses and apartment buildings, but the cooperative is currently not developing any new PV systems. Members are provided with a dividend of around 6%, with members investing €100 into shares and provide a €1.900 subordinated loan to the cooperative. The administrative tasks of the REC are outsourced to the project developer Agrokraft GmbH, also located in Bad-Neustadt. Developments among energy technologies are followed by the project developer, and they will provide interesting opportunities during inter-cooperative meetings. Based on this cooperative concept, the project developer has been starting 20 other RECs throughout the region, supporting the local civilians with the experience of the development company. The largest and newest project of the Agrokraft GmbH is labeled the Friedrich Wilhelm Raiffeisen Windpark eG, Streu & Saale, representing 18 windmills. The six villages surrounding the wind park will each get their own REC, which collectively own the wind park cooperative. The development costs have been financed with civilian risk capital from these RECs, representing over 450 members who have provided over €1 million to support the development. The Agrokraft GmbH desires to have a REC in every village or town, with every region having their own regional development cooperative. Local people will use the financial overflow of their projects to reinforce themselves, the local child care, or local social projects.

## Energiegenossenschaft Untermain eG

This REC has been founded in 2008 in the village of Mönchberg, in the free-state of Bavaria. The cooperative has 130 members, owns 327 kWp of PV systems and has co-investment into a wind operating company. The cooperative was founded to put a stop to the financial imbalance between the hill regions and the river valley. Local taxes would flow to the municipalities located near the economic activities, away from the hills where the people working in the valleys would live. The cooperative wants to make a difference for its region which is losing inhabitants, by building windmills. The project developer Agrokraft GmbH supported the cooperative during its start, introducing an investment packages, each representing  $\in 100$  shares and  $\in 1.900$  subordinated loans. The cooperative mentioned that they wanted to shift their financial model towards the model of Odenwald, allowing a shift from a loan-model towards the membership share model. They argued that the loan-model does not function properly. The cooperative mentioned that they were waiting with respect to energy storage technologies, but mentioned to be looking more into energy contracting and heat distribution grid development.

#### Bürgerenergiegenossenschaft Ostfildern eG

This cooperative has been founded in 2011, located in the city of Ostfildern in the state Baden-Württemberg. It holds 250 members who collectively have invested into 373 kWp of PV systems. The initiative for the cooperative came from the local municipality and the Stadtwerke which wanted to start an energy cooperative, since other cities in the region were doing the same. The Stadtwerke and two local Volksbanken started looking for initiators for the cooperative, eventually finding a Volksbank employee and a former municipality employee willing to become board members. Members of the cooperative were provided with a 1% dividend in 2012, but mentioned that the dividend should be inserted into the dividend of 2013. The REC suggested that due to several €100,000's in cash, the cooperative came into problems and was happy to be able to invest its funds into 3 new PV systems and a wind park, allowing the cooperative to generate dividends for 2014. The cooperative has invested €937.000, using no bank loans. The cooperative is looking for investment opportunities, but is unable to build windmills in their own region due to air restrictions. To allow for new investments, the REC cooperates with other RECs in the region to look for joint investment opportunities. One of the four largest utility companies of Germany, the EnBW, allows RECs to provide loans to finance existing utility owned windmills, receiving interest rates between 3,2% and 4,7%, depending on wind conditions. The REC states that the EnBW is providing these propositions in an effort to reposition itself. The cooperative is not actively developing new projects and waits for interesting investment opportunities to emerge.

## Bürgerenergiegenossenschaft Voralb eG

The energy cooperative Voralb is located in the village of Heiningen, in the state Baden-Württemberg. It represents 250 members, who jointly invested into 118 kWp of PVs. The cooperative was founded by the utility company EnBW, together with nine municipalities, each providing the amount of their inhabitants in euros, with each municipality becoming a member. The members were given a dividend of around 5%, up from 3,8% in the year before. Due to the high dividends, the cooperative receives affluent investment requests. The cooperative has invested €387.000, with new investment opportunities only open for investors from inside the Kreis or surrounding Kreise. The cooperative mentioned the support they have received from the Genossenschaftsverband Baden-Württemberg, providing benefits to all cooperatives in the state. In parallel, the RECs started by the EnBW have banded together after the EnBW stepped into the background. This organization, the Verband der Bürgerenergiegenossenschaften Baden-Württemberg, acts as an information platform for the 60-70 RECs who have joined together. Looking in the future, the REC is looking for windmill opportunities, discussing participation opportunities with project developers.

## Bürgerenergiegenossenschaft E-werk Mittelbaden eG

This cooperative was started in 2012 and is located in the city of Lahr in the state of Baden-Württemberg. Its 850 members jointly invested into a 286 kWp single PV-system, complemented by an investment into a wind park of 4 windmills, totaling 8 MW. The cooperative was initiated by the local Stadtwerke, the E-werk Mittelbaden, because it wanted to facilitate civilian participation for the Energiewende. This local utility company announced the start of a local REC, allowing it to acquire one of its PV-systems, with the utility company requiring €500.000. During the first meeting €1,6 million was gathered among 400 civilians, followed by €1,9 million during the second meeting among 450 civilians. The REC links the fast member growth to the solid name and solid financial performance of the local utility company. Return on the investments were promised between 4% and 6%. The utility company desired the REC to become an independent organization and did not want to be directly involved in its strategy or operations. The E-werk is developing 3 to 7 windmills in its region and promised the REC participation opportunities when the windmill developments would be finished. The cooperative has invested €1 million of the promised €3,5 million, requiring no bank loans due the sufficient amount of membership equity. The REC desires to expand their portfolio with more PV, wind, hydropower and biomass, but no projects are currently being developed by the REC.

#### Windkraft Dillinger Land eG

This renewable energy cooperative was founded in 2012 and is located in the city of Dillingen in the free-state of Bavaria. The cooperative has 455 members who own 3 out of 8 windmills in the wind park Zöschingen, located several kilometers north-west of the city. The cooperative was started because several civilians wanted to invest into one of the windmills being developed and therefore asked the local Raiffeisen-Volksbank Dillingen eG to facilitate the investment. When choosing from investors, the project developer preferred local civilians over the Stadtwerke, eventually selling 3 of its windmills to the newly formed REC. The cooperative bank announced the participation opportunities, promising returns of 4,5% and held a meeting for 800 local civilians. As a result of the announcement, 455 civilians invested  $\in$ 5.316.000 in several weeks, using an equity ratio of 42% with a total investment volume of  $\in$ 11.075.000. The president of the Volksbank Dillingen also became president of the REC and decided to outsource the REC administration to the Volksbank. The operations of the windmill have been outsourced to the project developer Honold Windenergie GmbH. The REC does not actively plan future expansion of its wind power portfolio, but sees opportunities to become involved from the start when new projects appear.

#### BürgerEnergie Bodensee eG

The cooperative was founded in 2011, located in Stockach-Wahlwies in the state of Baden-Württemberg. The REC owns a ground based PV plant of 531 kWp, owned by 108 members. The idea of the cooperative started with the development of the solar park Mooshof, representing 4,5 MWp, since several local civilians wanted the opportunity to invest into the new solar park. The project developer Solarcomplex AG was willing to sell one 10<sup>th</sup> of the PV field when the civilians were able to form a cooperative. The project developer supported the formation of the cooperative and became a member to make sure that its formation would go according to plan. After announcements of the investment opportunities in the local media, civilians were allowed to show their interest through phone calls. The first day around one hundred people made phone calls of which 50 eventually became members. The large investment interest of the first day required the REC to lower their maximum investment height. Among the prospectors, €683.000 was gathered, providing the membership equity for the total investment of  $\in 1,2$  million, resulting into an equity ratio of 57%. The cooperative desires to expand its portfolio with wind power and therefore it is participating within an Interessen Gesellschaft (Interest Society) composed out of several Stadtwerke, municipalities and the REC, jointly developing new windmills in the region. By joining forces the society desires to keep external investors out of the region and try to get access to the highly contested windy hilltops.

#### Deutsche Bürger Energie eG

This REC has been founded in 2011 and is located in Nürnberg in the free-state of Bavaria. It has 128 members who mutually invested in 9.320 kWp of PV, representing ground based PV and rooftop PV located throughout Germany. The cooperative was started by the project developer LaVigne Capital AG and was aimed to provide the project developer with easier access to investors. The project developer argued that development times could be reduced when the project developer would start their own investment platform, thereby using a cooperative. When developing new renewable energy projects (PV, wind, biomass heating), the surrounding civilians will be asked to participate first, allowing them to become member of the REC. The cooperative promotes its civilians participation platform among other project developers who are developing wind parks, aiming to expand the used of their platform. The REC has invested over €10 million, with a 20% equity ratio consisting out of €1 million membership equity and €1 million of member subordinated loans. The cooperative promises its members returns of 6,5%, with 4% interest on their loans and 8% on their cooperative shares. The project developer is currently shifting from PV towards more wind power, heating grid projects and warmth contracting, arguing that the PV FIT has gone down significantly. On the long term the cooperative wants to become an electricity producer, selling its electricity to its members and therefore it is planning to start its electricity sales company, the DBE Strom GmbH.

#### Jurenergie eG

This REC has been founded in 2010 in the city of Neumarkt in der Oberpfalz in the free-state of Bavaria. The cooperative was initiated by the regional government of Kreis Neumarkt, who wanted to promote the use of renewable energy in their region. Government employees supported the start of the cooperative, but wanted the REC to become an independent civilian run organization. The REC has 879 members who jointly invested into 844 kWp of PV spread among 11 roofs. After the PV expansion, the cooperative co-invested into existing PV and wind operating companies. Several project developers allowed the cooperative to acquire two under development windmills, since they wanted to allow civilian participation. After finding out the high margins made by the project developers, the cooperative decided to develop their next wind park themselves. For getting access to the right locations, the Kreis supported them with maps, regional plans, proposing interesting wind locations. As a result, the REC has full-time employed one of its board members to coordinate the development of a 12 windmill park, by using its recently founded development company. The REC stressed the challenges faced by growing this rapidly, requiring preliminary investments, lowering the dividends for their members, thereby limiting asset growth. The cooperative has invested €14 million euro, using €7,4 million in membership shares, resulting into an equity ratio of 53%. The dividends of the REC were 0,5% in 2011, 1,4% in 2012 and 2,0% in 2012. The cooperative desires to provide more value to its members than just financial returnsand therefore is looking into selling its electricity to its members.

# Empowering the next generation – Thesis P.S. Boontje
# Chapter 7

# Results

# VS.

# **STOF model elements**

This chapter will describe the interview outcomes based on the three domains selected from the STOF model. Section 7.1 will describe the subject relating to value proposition, value perceptions and its related themes. Section 7.2 uses the organization elements of the organization domain to get a better understanding of the value networks of the German RECs. Section 7.3 applies the five elements of the financial domain to describe subject related to risks, revenue, costs and investment sources.

### 7.1 Service domain

When applying the service domain elements for describing the results of the research questions, several elements have been combined, where others have been neglected when describing the interview outcomes. The *Context* variable will not be used, since the service that is being provided by the cooperatives focuses primarily on financial benefits. The *Bundling* variable describes the increased value of services, when multiple value propositions are being combined. Because almost all RECs currently only provide a single value proposition, bundling of services is not yet applicable for the German RECs. Due to the financial characteristics of the REC value proposition, the *Delivered value* will be discussed with the *Performance indicators* of the finance domain in Section 7.3. The *Perceived value* are already discussed below.



#### Figure 36: Service domain element description focus

#### 7.1.1 Intended value proposition

The elements *Intended value* and *Value proposition* have been integrated into one subject, since the latter is a summarization of the first. When discussing the value propositions that RECs desire to provide to their members/customers, six different types of value proposition have been mentioned during the interviews. These represent current propositions, propositions under development and propositions which are considered by the RECs to be applied in the long term. The value propositions discussed are displayed in Table 11 representing: dividends, selling electricity, selling warmth through a heating-grid, warmth contracting and operating the municipal electricity grid.

All 15 RECs interviewed provide or provided members with the ability to invest into PV or wind related energy projects. For the electricity produced, these RECs are given a Feed-In-Tariff, which is used to pay off the loans, cover maintenance costs and provide dividends to their members. Several RECs have been providing their members dividends for years, whereas other have just started in 2012. 9 RECs have mentioned to be looking into the proposition of selling electricity to their members. The Bürgerenergiegenossenschaft Odenwald eG is the only REC in the sample that is reselling electricity from a national electricity cooperative to 600 of its members, but eventually it wants to sell its own electricity. The Deutsche Bürger Energie eG mentioned that it is planning to sell its own electricity through its subsidiary company, the DBE Strom GmbH. Seven other RECs mentioned their long-term plans to start selling electricity, both to their members as well as companies. The third value proposition represents warmth selling through heating-grids. Three RECs mentioned they were building heating grids and its related heating furnace, allowing heat generated by biogas or wood to be sold to households and buildings. Warmth contracting represents the fourth value proposition, allowing customers of the REC to get a fixed price for their in-house warmth, with the REC investing into building insulation, allowing the REC to make a long-term profit. Two other RECs also mentioned that they were looking into this proposition.

Table 11: Value propositions (black = current, blue = under development, orange = long-term)



The fifth proposition originates from the Bürgerenergiegenossenschaft Odenwald eG which states that cluster synergies can be realized by building their 'Haus der Energie' (House of Energy), providing room for 350 employees and over 30 companies, all related to energy production and efficiency. By becoming the holding company for this energy cluster building, the cooperative positions itself as the facilitating nexus around all developments regarding energy in the Odenwald region. The sixth value proposition was introduced by Jurenergie eG, who mentioned that they saw an opportunity to operate their municipality electricity grid, allowing the cooperative to save transportation costs when transporting their renewable electricity to their members.

#### 7.1.2 Customers & market segment

When discussing this element with the RECs, it has been assumed that all member represented civilians, since most cooperatives were called 'civilian energy cooperative X'. Nonetheless did three RECs mention the investment possibilities of non-civilian entities within their REC. The Energiegenossenschaft Untermain eG introduced the possibility of local companies providing risk-

capital to support the wind energy developments by the REC, promising these companies investment opportunities when the windmills would be completed. The Deutsche Bürger Energie eG mentioned that it received a request from a church fund, which wanted to invest  $\in$ 1,6 million into the cooperative. The Winkraft Dillinger Land eG allowed multiple companies to invest, apart from the utility company of Dillingen and the city of Dillingen. Apart from these three examples, there have been no mentioning's of companies or foundations becoming cooperative member. The membership of the local Volksbank, Sparkasse, or municipality is neglected in the above description, since these membership are meant as support and not as an investment opportunity. The market segment of the RECs have been described based on their regional location. Since not all interviews allowed for a specific description of the region, a partial depiction of the regional focus has been provided in Table 12.

Energie für Saerbeck eG	Municipality & surrounding cities
Paderborner Land eG	Kreis & surrounding Kreise
Bü.Wind Westfalen eG	Kreis & surrounding Kreise
Bür.En.Gen. eG	Kreis & neighboring city
En.Gen. Odenwald eG	Kreis & surrounding municipalities
Starkenburg eG	Three cities
FWR Energie eG	(n.a.)
En.Gen. Untermain eG	Two Kreise & one city
Bü.En. Ostfildern eG	(n.a.)
Bü.En. Voralb eG	Kreis & surrounding Kreise
Bü.En.Gen. E-werk eG	(n.a.)
W.kraft Dillinger Land eG	(n.a.)
Bü.En. BodenSee eG	(n.a.)
Deutsche Bü. En. eG	Germany
Jurenergie eG	Kreis

#### Table 12: Regional focus of German RECs

From Table 12 it follows that the basic region of a REC is focused on its Kreis, allowing the REC to expand its focus with either several municipalities, one or more cities, or the surrounding Kreise. Other RECs prefer it larger, focusing on Germany, where other use a smaller focus and assemble members within its municipality and surrounding cities.

#### 7.1.3 Previous experience & expected value

The element of *expected value* is linked to the *previous experience* variable, with the first influencing the latter. Within the STOF model, the *previous experience* variable is being influenced by the software package version that a customer has used before using the 'up-to-date' version. In this paragraph, the variable *previous experience* will be explained as the experience an individual had with the REC or with an actor related to the REC. Four situations were described during the interviews which can be explained with these two elements.

The first was mentioned by the Paderborner Land eG, which was allowed to use the 60 offices of the Volksbank Paderborn eG for civilians to fill in the investment paperwork. The final PV project by the REC was funded within a single day, because of the previous positive experience members had with the REC investments. Secondly, after the foundation of BürgerWind Westfalen eG by the project developer WestfalenWIND GmbH, the REC started collecting membership equity among its members, but it only used word of mouth promotion and local newspaper items to promote its investment opportunities. From summer 2011 till winter 2011, the REC gathered €1 million. In the summer of 2012 it had gathered a total of €3 million and in the summer of 2013 it had gathered €8 million. The REC argues that its name is spreading throughout the region and therefore people start investing into the cooperative with increasing larger numbers. Thirdly, the Bürgerenergiegenossenschaft E-werk Mittelbaden eG mentioned that it would not have grown to 850 members, if they local utility company had not provided its support. The REC argues that due to the strong financial policy and solid name of the local utility company, local civilians tend to trust the company and therefore were willing to listen to its proposal of founding a new REC. Fourthly, the Raiffeisen-Volksbank Dillingen eG has been involved with the foundation of a PV cooperative in 2009, representing 150 members. Due to its experience with founding cooperatives, a local project developer asked the bank to start a second REC, which would allow the local population to invest into a newly built wind park. The REC stated that

partially due to its previous experience with the PV cooperative, the new wind cooperative was able to collect €5,3 million among 455 within a limited time frame.

#### 7.1.4 Effort & Tariff

The variable *Effort* will be explained as the difficulty that potential REC members have to overcome to hurdle related to becoming a cooperative member. The *Tariff* variable will be described as the financial costs that are related to investing into the REC.

Starting with the *Tariff* variable, among the 15 interviewed cooperatives, only the Deutsche Bürger Energie eG requires entry money, representing €50. The REC argues that the first members of the cooperative are confronted with more risks than those members joining several years later. To allow the members to be treated equally, the REC uses the entry money as reserves of the cooperative. As far as could be understood from the interviews, all other 14 RECs of the research sample do not require any administrative costs or entry money.

The *effort* variable has been applied to describe two subjects that relate to the hurdles that civilians face when they wanted to become a REC member. The first subject describes the effort that members had to go through to be able to invest into the first REC projects. The second subject describes the current willingness of RECs to take up new members.

The investment efforts for new members has not been structurally explained during the interviews, but when discussing the start of the REC, several cooperatives mentioned how they marketed their investment opportunities complemented by explaining how members could invest.

	Investment context	Amount of people	Open
Energie für Saerbeck eG	Startup meeting	100-200	
Paderborner Land eG	(n.a.)	(n.a.)	
Bü.Wind Westfalen eG	(n.a.)	(n.a.)	X
Bür.En.Gen. eG	(n.a.)	(n.a.)	Х
En.Gen. Odenwald eG	(n.a.)	(n.a.)	Х
Starkenburg eG	(n.a.)	(n.a.)	
FWR Energie eG	(n.a.)	(n.a.)	
En.Gen. Untermain eG	(n.a.)	(n.a.)	Х
Bü.En. Ostfildern eG	(n.a.)	(n.a.)	
Bü.En. Voralb eG	(n.a.)	(n.a.)	
Bü.En.Gen. E-werk eG	Startup meetings	400 at first meeting	
W.kraft Dillinger Land eG	Startup meeting	800	
Bü.En. BodenSee eG	Telephone calls	100 at first day	
Deutsche Bü. En. eG	(n.a.)	(n.a.)	X
Jurenergie eG	Startup meeting	100	X

Table 13: Effort to become member of REC

Several cooperatives organized a startup meeting, which would introduce the concept of a REC, its organizational structure, concluded by a request to its attendees to become member of the new energy cooperative and with it, start investing. The Bürgerenergie BodenSee allowed locals to call the phone number of the company of one of the board members.

A second *effort* variable represents the willingness of RECs to take up new members. Six out of the 15 cooperatives mentioned that they were still willing to take up new members. 9 out of 15 RECs mentioned that they were not taking up any new members. The RECs argued that new member equity would reduce the dividends of the current members. Therefore many cooperatives introduced waiting lists, allowing new member to join either when they lived closest to a new project, or when all existing member had mentioned to which extent they wanted to expand their investment volumes.

# 7.2 Organization domain

When applying the organization domain framework from the STOF model to describe the organizational features relating to the German RECs, not all element could be applied one on one. As visualized in Figure 37, several elements will not been applied, where others have been integrated into one subject. The *Actors* element will not be discussed separately, because of the limited added value of introducing all actors, after which they will be described with relation to their goals, capabilities or roles. The *Value network* element consists of the actors and interactions within the organization domain, describing the value network would therefore result into duplicate information. The *Organizational arrangements* element will not be used to explain the interview outcomes, since it will likewise generate overlapping information when discussing the elements *Value activities, Interactions,* and *Roles.* 

The elements *Roles, Interactions* and *Relations* have been taken together, since there would be significant overlap when describing each of the elements individually. The element *Value activities* is discussed together with the element *Resources & capabilities*, because the interviews could only distinguish those resources and capabilities based on the value activities of different actors. The interviews were not able to provide an overview of all the resources & capabilities of the actors involved.



Figure 37: Organization domain element description focus

#### 7.1.4 Roles, interactions, relations

The actors involved with the German RECs have taken up certain roles throughout the existence of the RECs. Some actors played a dominant role when starting a cooperative and then did a step backwards, other actors stayed connected until the moment of the interview and again other actors became involved after several years. Table 14 describes the actors that were mentioned during the 15 interviews, labeling them into three groups. The blue actors have started the cooperatives, the black actors responded to the initiators intention, the orange actors became involved with the cooperative after its foundation.

Table 14: Actors around REC (blue = initiator, black = non-initiator, orange = follow-up)

	VR-bank	Local government	Project developers	<b>Civilian initiavie</b>	Local utility company	EnWB	Other RECs
Energie für Saerbeck eG	Х	Х	X				
Paderborner Land eG	X	Х	X				
Bü.Wind Westfalen eG			X				
Bür.En.Gen. eG		Х		X			
En.Gen. Odenwald eG	Х	X	X				X
Starkenburg eG			Х	X			X
FWR Energie eG			X				
En.Gen. Untermain eG			X	X			X
Bü.En. Ostfildern eG	Х	X			X	X	X
Bü.En. Voralb eG		Х				X	
Bü.En.Gen. E-werk eG					X		
W.kraft Dillinger Land eg	X		Х				
Bü.En. BodenSee eG			X				
Deutsche Bü. En. eG		X	X				X
Jurenergie eG		X	X				

Apart from positive interactions between actors, changing roles or negative interaction also occurred. The Bürgerenergiegenossenschaft Ostfildern eG mentioned that the municipalities that started their cooperative in 2011, providing several thousand euros subsidy, were not looking for help among the cooperative anymore to fund their city hall PV system. PV prices had dropped significantly, allowing the municipality to fund the PV-system themselves. The Starkenburg eG was started by a local network of pro-environmentalists, but the local government does not favor their proposition to the region, resulting into limited cooperation between both parties. The Bürgerwind Westfalen eG was looking for the support of their local government when developing new windmills. They proposed to launch a wind fund, allowing money to flow from the region to the region, but the government resisted their proposal because they felt bribed by the project developer.

#### 7.2.2 Strategies & goals

The interviews were able to reveal the goals that the initiators had when promoting the foundation and expansion of a renewable energy cooperative. A wide range of reasons have been provided, by many actors, with similar actors providing different goals, as can be seen in Table 15.

One set of goals is represented by the desire of actors to *reinforce the local economy*. These goals are supported by the arguments of the RECs, stating that their regions are 'structurally weak', with larger industrial regions absorbing taxes, young people and new businesses. By promoting renewable energy production in their region, the cooperatives desires to create more jobs, prevent people from leaving the region and thereby eventually boost their economy, making sure that the *money of the village stays in the village*. Another set of goals originates from the frustration of actors that external investors and companies take the benefit of renewable energy production from their region and provide it to their external shareholders (e.g. project developers, investment funds, utility companies). As a result the initiating actors argue that RECs are able to *allow civilians to participate in the Energiewende* and promote the *investment chance for people without roofs*. Furthermore, the goal of two initiating actors has been to *take action against climate change* by promoting renewable energy.

		F
	Initiator	Goal of foundation actors
Energie für Saerbeck eG	Volksbank	Taking action against climate change
W.kraft Dillinger Land eG	Volksbank	Wealth creation should stay within region
Paderborner Land eG	V.bank & Municipality	Investment chance for people without roofs
Jurenergie eG	Kreis	Allow civilians to participate in the Energiewende
En.Gen. Odenwald eG	Kreis	Reinforce the local economy
Bü.En. Ostfildern eG	City	(n.a.)
Bü.Wind Westfalen eG	Project developer	Reduce local resistance to wind energy
FWR Energie eG	Project developer	Money of the village stays in the village
Bü.En. BodenSee eG	Project developer	Allow civilians to participate in the Energiewende
Deutsche Bü. En. eG	Project developer	Faster access to investment capital
Bür.En.Gen. eG	Civ. Initiative	Taking action against climate change
Starkenburg eG	Civ. Initiative	100% renewable energy in the region
En.Gen. Untermain eG	Civ. Initiative	Reinforce the local economy
Bü.En. Voralb eG	EnBW	Allow civilians to participate in the Energiewende
Bü.En.Gen. E-werk eG	Local utility company	Allow civilians to participate in the Energiewende

#### Table 15: Goals of the REC initiators

The project developer WestfalenWIND GmbH argues that by promoting its REC it can *reduce local resistance to wind energy*. This project developer wants to keep on developing its windmills, but the region has seen an expansion of multiple wind parks and windmills, bolstering local resistance. The project developer LaVigne Capital AG mentioned its frustration when talking with investors for the development of renewable energy projects and the time it costs to come to terms and grow trust. By setting up the REC, new projects can be developed quicker due to *faster access to investment capital*, provided by civilians, companies, foundations etc.

#### 7.2.3 Value activities, resources & capabilities

The actors involved with the RECs have been performing a wide range of *value activities*, thereby allowing the value network to deliver its proposed service. From these value activities it follows which are the financial, social, organizational and technical *resources & capabilities* possessed by these actors. During the interviews, actors provided quotes and descriptions of their own resources and capabilities and those of other actors they were involved with.

#### Volksbanken

Five cooperative banks have been strongly involved with the energy cooperatives and in the interviews five types of *resources and capabilities* have been mentioned repeatedly, with the first representing their experience with cooperatives. The city of Ostfildern asked for support to the Volksbank Ostfildern eG, because of their experience with cooperative organizations and the cooperative law. The Volksbank Dillingen eG mentioned that they started their wind cooperative, because of their previous experience with starting a PV cooperative. Experience with running a cooperative bank convinced the municipality of Saerbeck to cooperate with the Volksbank Saerbeck eG, when the bank introduced to start a local REC.

During several interviews, the Volksbank representatives mentioned their experience with renewable energy projects. The interviewee of the Volksbank Paderborn-Höxter-Detmold eG mentioned that their competence center for renewable energy had been providing €350 million in bank loans to PV projects. The Volksbank Dillingen eG mentioned similar experience with financing multiple PV projects of over 4 MWp in their region.

The Volksbanken mentioned their ability to support the RECs with their financial knowledge and expertise. The Volksbank Paderborn-Höxter-Detmold eG mentioned that it provides its financial infrastructure to the cooperative, providing the administrative back office. The Volksbank Dillingen eG is being paid by the REC to handle its administrative tasks and commercial representation, putting an employee in charge to handle the annual financial statements and financial performance, requiring the bank to handle the contact with the windmill operating company Honold Windenergie GmbH. The Bürgerenergiegenossenschaft Odenwald eG described the benefits to the REC that originated from the financial expertise of their director, who was previously employed at the Volksbank

Odenwald eG. The Volksbank Saerbeck eG exemplified that their employees were taking over the financial, economic and legal subjects. Similar actions were taken by the volunteer of the Volksbank Esslingen eG who has been taking care of the commercial, accounting and tax related subjects of the Bürgerenergie Ostfildern eG.

The Volksbank Odenwald eG provided several of its employees to the Energiegenossenschaft Odenwald, paying their wages and allowing them to expand the REC. After several years, the REC had grown strong enough, allowing it to hire the Volksbank employees themselves.

To promote the investment opportunities of the REC, the cooperative banks allowed the energy cooperatives to use their communication channels. The Volksbank Dillingen eG communicated the wind park investment opportunities through the newspaper, its webpage and by putting up posters at it bank buildings. The Volksbank Saerbeck eG invited its own members to attend the first REC meeting, providing investment opportunities. The Volksbank Paderborn-Höxter-Detmold eG used flyer material throughout its 60 bank buildings, with its workforce providing extra information to potential new members.

#### Local governments

The municipalities, cities, and Kreise (group of municipalities) have been supporting the cooperative movement in different ways. The primary way this is done, is by providing the REC with the opportunity to install PV-systems on the roofs of public buildings. The municipality of Saerbeck provided the roofs of its schools and sports hall, the cities of Salzkotten and Lichtenau provided the Paderborner Land eG access to their roofs, allowing the construction of a 520 kWp PV system on the roof of community building for trash collection. All RECs that have installed PV on public roofs either paid a monthly rent, or were given free access to the roofs by the local government.

Apart from the Volksbanken, several local governments have also provided their communication channels to the REC. The Deutsche Bürger Energie eG described that when a new project is about to be financed, the project developer asks the mayor of the specific municipality to promote a meeting in the local newspaper, promoting the investment opportunities. The Kreis Neumarkt has been sending letters to its mayors, asking to provide access to the municipality roofs. In a similar fashion, the municipality of Saerbeck supported the REC by generating multiple news items and often provide project related information.

A more active role is being played by the Kreis Neumarkt, when cooperating with the Jurenergie eG. The REC is developing a new wind park in the region, with the Kreis providing support by providing maps and regional plans, allowing the cooperative to find the best windmill construction locations.

#### **Project developers**

The resources and capabilities related to the project developers cover a wide range of specialisms and technical knowledge. The predominant capability described during the interviews, represented the ability of project developers to gain access to construction sites. The first windmill bought together by Starkenburg eG and Energiegenossenschaft Odenwald eG, was provided to both cooperatives by a befriended project developer of the Starkenburg cooperative. The WestfalenWIND GmbH assures access to new wind park sites, consecutively providing the BürgerWind Westfalen eG with new investment opportunities. The project developer Honold Windenergie GmbH assured itself access to a forest of the German Staatswald in Bavaria, eventually selling three 2,4 MW windmills to the Windkraft Dillinger Land eG. The project developer Solarcomplex AG was constructing the 4,5 MWp solar park Mooshof and desired civilians participation for 1/10<sup>th</sup> of its park. Through its network, the LaVigne Capital AG receives many project opportunities and can thereby select those who are most feasible. The Jurenergie eG was given the opportunity to acquire two local 3 MW windmills from a project developer, after it got access to the construction site, developing and constructing the windmills. The same REC has started cooperating with another project developer, using the skills of the developer to successfully execute the approval process necessary for the development of a new cooperative wind park.

Next to the access to profitable development areas, the developers display a wide range of project management related capabilities. The Bürgerenergiegenossenschaft Odenwald eG mentioned the planning capabilities of the project developer of their first windmill. Similar, the Agrokraft GmbH employees described the ability of their development company to take over the planning process of local RECs. The Volksbank Dillingerland eG stated that the Honold Windenergie GmbH was able to

take care of the building permits, grid connection and the wind measurements. The project developer LaVigne Capital AG, founder of the Deutsche Bürger Energie eG, described its core competences being contracts, planning, structured processes and financing.

Two project developers were mentioned when discussing their ability to gain access to investors. The LaVigne Capital AG described its talks with asset managers of family offices and private placement, when looking for investors. The Volksbank Dillingen eG mentioned that Honold Windenergie GmbH was able to choose from several investors such as the Stadtwerke, but chose to cooperate with the wind cooperative instead.

Three project developers were actively taking over the administrative work of the RECs which they have founded, with the Agrokraft GmbH being responsible for the administration of multiple RECs. When local civilians want to invest into the BürgerWind Westfalen eG, their request are being handled by the WestfalenWIND GmbH, the same holds for the Deutsche Bürger Energie eG and it initiator LaVigne Capital AG.

Two project developers started developing their own brand, when looking to promote their cooperative. The BürgerWind Westfalen eG as well as the Deutsche Bürger Energie eG built a webpage and printed flyers for promoting its investment opportunities, with the Deutsche Bürger Energie eG sponsoring a local soccer team.

Multiple project developers applied specific capabilities which were only mentioned once. The Windkraft Dillinger Land eG outsourced operations of its three windmills to its former project developer Honold Windenergie GmbH. The Agrokfraft GmbH mentioned its goal to develop new renewable energy projects, afterwhich it would sell them to a local REC. This project developer has the capability to support REC start-ups, which allowed it to co-found 37 Friedrich Wilhelm Raiffeisen ENERGIE eG's. To finance its development effort of the wind park Streu & Saale, the Agrokraft GmbH was able to gather €1 million in risk capital among six RECs. The Solarcomplex AG got together several municipalities, local utility companies and the Bürgerenergie BodenSee eG to start an interest society to promote the introduction of wind power in their region. With the project developer becoming responsible for the development of future windmills.

#### Local & large utility companies

The interviews among the energy cooperatives that were founded by either a local utility company (Stadtwerke) or a large utility company (EnBW) provided a less affluent amount of capabilities and resources compared to previous actors.

The Bürgerenergiegenossenschaft Ostfildern eG mentioned that its local utility company provided €4.000 to cover the start-up costs. The Bürgerenergiegenossenschaft Voralb eG mentioned a similar financial supporting action by the EnBW, which became a member of the cooperative, providing €10.000. According to the interviewed Bürgerenergiegenossenschaft E-werk Mittelbaden eG, the utility company E-werk Mittelbaden was able to gather many civilians to become member of their REC because of its solid name and solid financial policy. The REC states that the trust that local people have into the utility company was vital for the successful start of the REC. Apart from the social capital, the E-Werk Mittelbaden also possesses the ability to develop new renewable energy projects. Currently it is developing several new windmills, promising the REC investment opportunities as soon as they are constructed in 2015.

#### **Civilian initiatives and RECs**

The capabilities and resources of civilian initiatives and RECs has been taken together, since the collection of individuals that are involved with the initiative integrate themselves into the REC, when it is being founded, practically becoming the same network.

Among the interviewed RECs, a wide variety of professional backgrounds were found. Apart from the initiators, multiple non-actor affiliated individuals joined the RECs to support them with their experience and expertise. Since most interviews were performed with a single spokesperson, there is a limited view on this spectrum of technical and financial capabilities.

Because of this limitation, several examples will be provided which give an indication on the type of civilians active for the REC.

The Energie für Saerbeck eG mentioned that apart from the employees of the Volksbank, also the former president of the Volksbank has been involved, together with the former head of the school, complemented with a local PV specialist. The Bürgerenergiegenossenschaft eG has a former insurance company employee as its president, who stopped working in 2009 allowing him to become full-time voluntary engaged with the cooperative. Members of this cooperative provide support with their experience in energy consulting, bio-renewable heating and energy market knowledge. The Bürgerenergiegenossenschaft Odenwald eG has multiple former Volksbank employees, but also works together with a former forester, having much knowledge with regard to spatial planning. The Starkenburg eG mentioned its entrepreneurial network of energy specialist, allowing the cooperative to harness knowledge of professionals engaged with wind project development, wind mill component manufacturing, or industrial energy efficiency consulting. The Energiegenossenschaft Untermain mentioned several members with experience in PV-system development, small scale hydro power development and operation and energy efficiency. One of the managerial board members of the Bürgerenergie Ostfildern eG has experience with the construction management, due to his former position as construction mayor of Ostfildern. The president of the Bürgerenergiegenossenschaft Voralb was formerly employed as an electrical engineer at Bosch. The Bürgerenergiegenossenschaft Ewerk Mittelbaden eG has a managerial board, containing the president of a local software development company, an employee of the E-werk and a renewable energy consultant. The Burgerenergie BodenSee eG is run by the president of a marketing bureau, with the Jurenergie eG being supported by a managerial board member, active with telecommunications supplies. Apart from his official job, the board member has been actively developing PV projects.

Apart from the capabilities of the board members, member involvement has also been discussed during the interviews. When discussing the reasons why people joined the cooperative, many board members mention the fact that most of its member have joined because of the financial benefits. The Bürgerenergiegenossenschaft E-Werk Mittelbaden eG states that an energy cooperative is less seen as a social thing and more as an economical one. The Paderborner Land eG argues that there is limited interest into CO<sub>2</sub> reduction and that its primary value creation tends to be financial. Apart from the financial motivation to join the cooperative, RECs mentioned the limited willingness of its members to participate and become active. The BürgerWind Westfalen eG stated that most members are not interested to involve themselves in the energy cooperative, its operations and take up responsibilities. The president of the Bürgerenergiegenossenschaft eG could wish himself more engagement from among the members, suggesting that it is sometimes hard to keep the motivation. During several interviews its was mentioned that RECs were having difficulties finding new board members. Energie für Saerbeck eG said that they were curious whether they could find someone willing to take on the role of board member under the same conditions as current members, since the compensation for the job was claimed to be not gigantic. The Bürgerenergie BodenSee eG described that it would be a challenge to motivate enough people to apply for a position, suggesting that this would be the theme of the next general assembly.

Active member involvement was described by BürgerEnergie Ostfilern eG, when they asked its members for input with respect to a loan that was to be provided to a wind park. The Jurenergie eG said that it would only require input from its members with respect to larger strategic matters. Energiegenossenschaft Odenwald eG confirmed that members were not working with them on projects, but were providing them with new ideas and opportunities relating to solar energy and its 'House of Energy'. A similar member involvement was suggested by the Bürgerenergiegenossenschaft eG, describing that members would come to its board to introduce new rooftop solar opportunities. An overview of the RECs and their degrees of member involvement has been provided in Table 16.

### Table 16: Member involvement with respect to the activities of the German RECs

Energie für Saerbeck eG	"I expect that around 90% of the members are looking for interesting interest rates under a 'green' cover. Some people believe these projects are good, and therefore they invest for ideological reasons. It will be a challenge to find new Vorstand members among the members that have invested. Currently one of the Vorstand members is 75 years old, so he won't be able to do it forever. I am curious whether we will find someone who is willing to take on the role of Vorstand member under the same conditions as current members, since the compensation for the job is not gigantic."
Paderborner Land eG	"Of the 260 members, 80-90 people were present at the general meeting. But members in general are not motivated to help out in the energy cooperative. There is some interest into $CO_2$ reduction, but this interest is limited, since the value creation tends to be primarily financial."
Bü.Wind Westfalen eG	"But most members are not interested to involve themselves in the energy cooperative, its operations and take up responsibilities. For them the cooperative is seen as an investment, and instead of giving their savings to the bank they invest in a wind park. They do not want more than the annual meeting and their share of the profits."
Bür.En.Gen. eG	"People are not always motivated, and when other members that put effort into the energy cooperative lower this effort, it is sometimes hard to keep the motivation to keep on working for the energy cooperative. My own motivation comes and goes. At this moment I could wish me more engagement from among the members."
En.Gen. Odenwald eG	"Members do not tend to work with us with projects, but new project ideas come to us, where they see opportunities for our energy cooperative to build a new PV-system. The idea for starting the House of Energy, also came from one of our members. The 3.5% dividends of our cooperative are interesting because savings are given lower interest rates, therefore many people come to us, to store their savings.""
Starkenburg eG	-
FWR Energie eG	-
En.Gen. Untermain eG	-
Bü.En. Ostfildern eG	"Since the people get low interest rates on their savings account, they are willing to look for alternatives, and to engage themselves somewhere else. It is our idea that the environment goes above high dividends, and we do not really like it when new members come to us only for the dividends. It is important that they get the feeling that they are an important part of the cooperative and that they can participate when decisions have to be made. For example, during the last general assembly, we discussed a loan into a wind park, and this resulted in fierce discussion."
Bü.En. Voralb eG	-
Bü.En.Gen. E-werk eG	"When looking at the activity among members, there is no involvement, it is only the Vorstand which is involved with the operations, and members just get the dividends. There are Vorstanden where one by one, board members quit and step out of their function and insufficient engagement is present among members to supply new board members. An energy cooperative is less seen as a social thing, and more as an economical one. The theme environmental protection exist more at the edge of our cooperative."
Windkraft Dillinger Land eG	"Members are not really active within the cooperative. They are given information once, maybe twice a year. They can go to the internet and look at the performance, and then once a year we organize the general assembly, and apart from that, nothing else happens."
Bü.En. BodenSee eG	"For the next years, we will have a challenge to gather new members for the Vorstand and Aufsichtsrat, and when the maximum age of 75 for board members is reached, we have to find new people. When we expanded the Aufsichtsrat with two people for two years ago, two members spontaneously raised their hands. This subject will also be the theme of the next general assembly, and to motivate enough people to apply for a position."
Deutsche Bü. En. eG	
Jurenergie eG	"We are the ones developing this park, and therefore we gather partners. This development is done by a full-time Vorstand member. In September 2012 we decided for this step together with the Aufsichtsrat. Such decisions can be made by the Vorstand and the Aufsichtsrat, since the members are only asked for input regarding the large strategies."

# 7.3 Finance domain

To describe the financial interview outcomes, five subjects of the STOF model finance domain will be applied. The *Investment sources* element will be combined with the *Capital* subject, since the RECs also provide information regarding their investment targets. The *Cost sources* element will be combined with the *Costs* subject, since RECs have been applying multiple strategies to decrease or circumvent their costs. The *Revenue sources* element will be combined with the *Revenue sources* element will be combined with the *Revenue* subject, because the changes in one revenue source have impacted the development of others. The *Risk sources* element has been used to describe the RECs together with the *Risks* subject, arguing that not only risk sources, but also its mitigation should be described. The *Financial arrangements* element will not be applied, since both costs and revenues have been described generally, not allowing for a clear and clean financial arrangement overview. The *Performance indicator* will provide room to describe the financial performance of cooperatives based on the four financial performance indicators selected in Section 5.2.



Figure 38: Finance domain element description focus

#### 7.3.1 Financial tabular overview

The financial data that has been assembled during the interviews has been integrated into Table 17 to provide a clear overview and structured overview of the 15 energy cooperatives. A part of the data from this table will be further explained in this section providing input for the business model analysis of Chapter 8.

Name REC	Year founded	Total kWp	Total members	Membership shares (2013)	Membership loans (2013)	Total balance (2013)	Equity ratio	Profit	Interest on last bank loans	Dividend on membership shares (2012)	Interest on member-ship loan	Single share price	Subordinated loan price	Calculated average investment per member
Energie für Saerbeck eG	2009	6.120	390	€3.537.000	€0	€4.851.000	73%	€25.700	(n.a.)	(n.a.)	-	€1.000	-	€9.069
Paderborner Land eG	2009	3.606	260	€970.000	€0	€7.000.000	14%	€40.000	3,0%	4,0%	-	€500	-	€3.731
Bü.Wind Westfalen eG	2011	0	620	€5.500.000	€0	€5.500.000	100%	€159.000	-	5,0%	-	€500	-	€8.871
Bür.En.Gen. eG	2010	1.011	200	(n.a.)	€0	(n.a.)	30%	-	2,4%	3,5%	-	€500	-	(n.a.)
En.Gen. Odenwald eG	2009	5.000	2.000	€8.000.000	€0	€35.000.000	23%	(n.a.)	1,5%	3,5%	-	€100	-	€4.000
Starkenburg eG	2011	600	500	€230.000	€2.070.000	€2.300.000	10%	-	-	(n.a.)	3,5%	€100	€1.800	€4.600
FWR Energie eG	2008	2088	230	(n.a.)	(n.a.)	(n.a.)	(n.a.)	(n.a.)	(n.a.)	(n.a.)	6,0%	€100	€1.900	(n.a.)
En.Gen. Untermain eG	2008	327	130	€15.000	€285.000	€1.000.000	1,5%	(n.a.)	2%	(n.a.)	(n.a.)	€100	€1.900	€2.308
Bü.En. Ostfildern eG	2011	373	250	€937.500	€0	€937.000	100%	€7.687	-	0,0%	-	€250	-	€3.750
Bü.En. Voralb eG	2009	118	250	€387.000	€0	€387.000	100%	€22.500	-	5,0%	-	€100	-	€1.550
Bü.En.Gen. E-werk eG	2012	286	850	€1.020.000	€0	€1.020.000	100%	-	-	-	-	(n.a.)	-	€1.200
W.kraft Dillinger Land eG	2012	0	455	€2.658.000	€2.658.000	€11.075.000	24%	<i>-</i> €120.783	3,4%	0,0%	9,0%	€500	€500	€11.684
Bü.En. BodenSee eG	2011	531	108	€683.000	€0	€1.200.000	57%	€29.640	3,7%	2,5%	-	€1.000	-	€6.324
Deutsche Bü. En. eG	2011	9.320	128	€1.000.000	€1.000.000	€10.000.000	10%	(n.a.)	2,9%	8,0%	4,0%	€500	€500	€15.625
Jurenergie eG	2010	844	879	€7.478.500	€0	€14.000.000	53%	€149.570	2,3%	2,0%	-	€500	-	€8.508

#### Table 17: Financial overview of the German RECs

#### 7.3.2 Capital

The German RECs get their investment capital from different sources, namely through their memberships shares, their subordinated loans and bank loans. Figure 39 describes four examples of financial structures applied by the RECs. The gathered capital of the Starkenburg eG constitutes for 95% out of subordinated loans provided by members, complemented by 5% of membership shares, with the financial structure being introduced by the project developer Agrokraft GmbH. The Deutsche Bürger Energie eG uses a 50/50 ratio for membership shares and subordinated loans, representing 10% of total investment each, supplemented by 80% in bank loans. The Energiegenossenschaft Odenwald eG, provides investment opportunities to its members through membership shares, with its 23% membership equity being supplemented with bank loans from the Volksbank Odenwald eG. The Bürgerenergiegenossenschaft E-werk Mittelbaden eG has not used any bank loans so far and has performed all of its investments with 100% equity.



#### Figure 39: Capital sources for the RECs

The capital of the members and banks is being invested into a wide range of renewable energy projects using different financial structures. Figure 40 illustrates four typical examples of financial structures that have been used to either invest, acquire or provide loans related to renewable energy projects and companies. The Windkraft Dillinger Land eG has set up a separate operating company holding its three windmills in the Windpark Zöschingen, with the cooperative being 100% shareholder in the company. Energy cooperative Jurenergie eG has used its capital to become co-investor in an existing operating company Eco-Energy KG, which is holding several ground based PV systems and wind mills. The operating company SaerPV Bioenergiepark GmbH & Co. KG. has been provided with 30% of its required capital through the Energie für Saerbeck eG, supplemented by 70% in bank loans. The BürgerWind Westfalen eG provides subordinated loans to wind park operating companies, with 10% of the entire capital requirements are covered by the cooperative loans, supplemented by 70% in bank loans. To keep an eye on the financial performance of the operating company, the BürgerWind Westfalen eG has taken a minority share in the company, representing 2% of the entire investment sum.



Figure 40: Investment financing structures by RECs

#### 7.3.3 Costs

When describing the costs that are incurred by the German RECs, the interviews have provided a wide range of sources which either lowered or increased overall REC costs. Due to the broad range of questions originating from the interview questions, no detailed overview could be generated on the specific costs per cooperative. Nonetheless did the interviews provide a broad span of financial expenditures, mentioned below per type.

One of the possibly largest costs for the REC constitutes of the board member salaries. Most cooperatives interviewed did not pay their board members and required them to perform their work on a voluntary basis, where others have been able to start hiring specialists. The Energiegenossenschaft Odenwald eG was provided with several paid employees of the local Volksbank Odenwald eG, supported by several intern students. After several years, the REC was able to fund its workforce themselves, currently providing 5 FTE spread among 7 employees, assisted by 5 students. The Jurenergie eG decided to start paying one of its board members, allowing him to work full-time for their development company. Apart from these two cooperatives, no other cooperatives have mentioned paying their board members, except the Energie für Saerbeck eG, providing €100/month to its managerial board. Most board members did not specify how much time per week they were engaged with the cooperative, but the president of the Bürgerenergiegenossenschaft eG was the only board member interviewed, who has been working full-time on a voluntary basis since his early retirement.

Although many board members are not paid by the cooperative directly, many RECs pay external companies for taking over their administration. BürgerWind Westfalen asked the project developer WestfalenWIND GmbH to take over the administration, marketing and PR, providing 0,5% of its 6,5% interest rate to the company. The Friedrich Wilhelm Raiffeisen ENERGIE eG has outsourced its administration to the project developer Agrokraft GmbH requiring an unspecified service fee. The REC Bürger-Energie BodenSee eG mentioned that they had outsourced their administration for free, to the marketing company of one of its board members. The Bürgerenergiegenossenschaft E-werk Mittelbaden eG outsourced its member administration to the software company of a board member,

but the interviews did not specify whether costs were related to the provided services. The Deutsche Bürger Energie eG outsourced the administration to its related project developer LaVigne Capital, with the Windkraft Dillinger Land eG paying the Volksbank Dillingen eG €17.077 per year for the financial administration and commercial representation.

When looking into the costs related to project development of the wind and solar projects, cooperatives use different ways of covering its costs. Most cooperatives interviewed expect an external installer or development company to take over all development costs, providing the renewable energy projects to them in a plug & play fashion. The Paderborner Land eG mentioned that it was having talks with wind project developers, looking for civilian participation, but the cooperative only wanted to invest into finished parks. Other cooperatives argued that project developers were making significant margins on the windmills and therefore project development should be done in-house as much as possible.

	Voluntary	Paid employee(s)	Paid external organization
Energie für Saerbeck eG	X		
Paderborner Land eG	X		
Bü.Wind Westfalen eG			X
Bür.En.Gen. eG	X		
En.Gen. Odenwald eG		X	
Starkenburg eG	X		
FWR Energie eG	X		
En.Gen. Untermain eG	X		
Bü.En. Ostfildern eG	X		
Bü.En. Voralb eG	X		
Bü.En.Gen. E-werk eG	X		
W.kraft Dillinger Land eG	Х		X
Bü.En. BodenSee eG	X		
Deutsche Bü. En. eG			X
Jurenergie eG	X	X	

#### Table 18: Managerial board costs of the RECs

Next to the employee overhead costs, many RECs mentioned start-up expenditures relating to their webpage, flyers, promotions and marketing material. Apart from these start-up costs, RECs described to compensate costs incurred by their managerial board and supervisory board relating to traveling costs, followed by other rather fixed costs such as the audit by the Genossenschaftverband, the rent of the roof for their PV systems and the cooperative registration.

Most RECs interviewed provided insights on the interest rates that were provided to them by the local Raiffeisen-Volksbank, Sparkasse or other national bank. During the interviews, the cooperatives were asked for the height of their last bank loan interest rate, which resulted into a range of 1,5% for the Energiegenossenschaft Odenwald eG and 3,7% for the Bürgerenergiegenossenschaft Bodensee eG, as seen in Table 17. Since the height of the bank loan interest rates are dependent on many negotiation factors and its subject is rather sensitive, no further attempts were done during the interviews to uncover the origin of the interest height. The RECs suggested that since their start, most of them had taken multiple bank loans related to new projects. The interest rates on bank loans were going down since the start of several RECs. The Bürgerenergiegenossenschaft eG mentioned that their first bank loan demanded a 6% interest rate, where its last loan required 2,35%. The Energiegenossenschaft Odenwald eG mentioned that investing into buildings allowed for lower interest rates between 1% and 2%. Multiple cooperatives have stated that the low interest rates are going up, the financial value proposition for the members will be decreasing, since savings accounts and other investment opportunities might become more profitable.

#### 7.3.4 Revenues

The revenues for the RECs all originate from the German national government and the renewable energy law (EEG) that provides a guaranteed price for 20 years, after the first kWh have been fed into the grid from either a windmill or a PV system. All RECs interviewed owned wind and/or PV

production capacity, providing them with a stable cash flow. 1 of the 15 RECs interviewed started selling electricity to its members, but its related revenue model has not been discussed during the interview. As discussed in Paragraph 7.1.1, many RECs are either considering or developing new earnings models parallel to their original FIT income.

	PV	Wind
Energie für Saerbeck eG	Х	Х
Paderborner Land eG	Х	ХХ
Bü.Wind Westfalen eG		XX
Bür.En.Gen. eG	XX	
En.Gen. Odenwald eG	XX	XX
Starkenburg eG	XX	XX
FWR Energie eG	Х	
En.Gen. Untermain eG	Х	XX
Bü.En. Ostfildern eG	Х	ХХ
Bü.En. Voralb eG	Х	X
Bü.En.Gen. E-werk eG	Х	ХХ
W.kraft Dillinger Land eG		Х
Bü.En. BodenSee eG	X	Х
Deutsche Bü. En. eG	XX	Х
Jurenergie eG	Х	XX

Table 19: PV & Wind revenue sources (black = current, blue = developing, orange = orienting)

When discussing the future developments of their projects and thereby revenue streams, multiple RECs argued that the development of PV is over and that wind power, electricity sales and warmth contracting are becoming growing fields of interest. These developments are visualized in Table 19, illustrating almost all RECs interviewed stopped developing PV. The Energiegenossenschaft Odenwald eG mentioned it was only developing new rooftop PV-systems because of its PR value and not because of its financial benefit. The project developer of the Deutsche Bürger Energie eG described the decreasing margins on large scale PV fields, requiring the project developer to look for new fields to provide its services. The Starkenburg eG mentioned that it would shift its solar energy focus to self-consumption, instead of feeding the electricity into the grid. Most cooperatives interviewed mentioned the decreased FIT for PV representing the cause for the limited expansion of solar energy in 2012 and 2013.

#### 7.3.5 Risks

The element of risk sources and its related risk management provided a set of risks mentioned by the RECs. One of the risks introduced during the interviews represented the potential retroactive decrease of the EEG. Multiple countries within Europe have lowered their FIT thereby lowering the necessary investment stability, but board members did not see any reason why the German FIT disappear. The board members showed a solid trust into their government and that it would uphold its promise of a 20 year stable compensation for their renewable electricity. One of the RECs, the Bürger-Energie BodenSee, stated that it would be highly improbable that the government would retroactively cancel the EEG.

Most RECs described the risk related to the operations of their power sources, arguing that productivity could stop do to a system malfunctioning. Energie für Saerbeck eG mentioned the possibility that a windmill might crash unto its PV systems, the Bürgerenergiegenossenschaft Ostfildern eG described lightning strikes or fire and the Paderborner Land eG suggested the risk that the PV data logger or the AC/DC inverter would break down. To counter such risk, the RECs use insurances to protect their investments.

Multiple cooperatives stated risks existed related to only owning one or several windmills. They argued that when the windmill has a production outage, this can significantly impact the cooperative. Therefore many cooperatives stated their desire to expand, allowing them to spread the risks over multiple windmills and other renewable energy sources. When discussing wind energy development with the Energiegenossenschaft Untermain, the stated that with rapid expansion, risk balancing issues are involved. When their cooperative equity investment of  $\in$ 300.000 would grow with  $\in$ 3 million equity for a wind park, the latter would provide a greater risk than the prior.

Several RECs mentioned the risk of production fluctuations, but added that these are the risks related to working with wind and solar energy. The cooperatives made a distinction, arguing that solar energy provides a more stable production throughout the year compared to wind, which can show strong fluctuations. The Paderborner Land eG mentioned the possibility to be insured against low production outcomes, but such propositions were labeled being 'rubbish'.

During the subject of project development, multiple RECs argued that they preferred the low risk plug & play wind parks, since all the risk related to project development had been taken by the project developer. These preferences were attacked by the Jurenergie eG and the Energiegenossenschaft Odenwald eG, who argued that these project developers were making significant margins on the windmills. Knowing the risks related to windmill development, both cooperatives have taken over the project coordination role, subdividing the entire projects into smaller parts, using experts per subject when necessary. The Volksbank Dillinger Land eG decided to wait with investing into the Windpark Zöschingen until the court had given the approval for construction. The cooperative bank did not want to risk the money of its members, before sufficient certainty could be provided.

The Paderborner Land eG mentioned a specific risk related to the low interest rates among Germany. The REC stated that because of the financial leverage of many cooperatives, their dividends could turn out significantly lower, when the percentages on bank loans would start rising again.

The Bürgerenergiegenossenschaft eG argued that it was aware of the risk related to running the cooperative primarily with a full-time volunteer, but the cooperative did not mention a straight away solution to reduce this risk.

When discussing future technologies and their possible application by the RECs, multiple cooperatives mentioned that new renewable energy technologies represented higher risks and were not yet developed enough to provide a low risk investment for their members. Many interviewees suggested that they would wait until new technologies, such as storage or smart-grids, would become financially feasible and would be mature enough. When this moment of maturity arrives, they would be open to look into its value proposition and possible implementation by their cooperative. The Energie für Saerbeck eG argues that they should not be the pioneer and others should prove the economic viability of a new technology first.

#### 7.3.6 Performance Indicators

From the finance domain elements of the STOF model, four indicators have been selected in the Performance management chapter. Each performance indicator will be described, first mentioning how its data was gathered, followed by a representation of the interview results related to the indicator.

#### **Equity ratio**

The equity ratios used among the German RECs vary widely, from 100% to 1,5%. When calculating the equity ratio, the following formula is being used:

Equity ratio 
$$=$$
  $\frac{\text{Total shareholder's equity}}{\text{Total Assets}}$ 

In hindsight, different explanations of the equity ratios have been applied by the RECs, labeling subordinated loans as equity. In this Thesis these loans are labeled as liabilities and are therefore not integrated into total shareholder's equity. The Deutsche Bürger Energie eG states that it uses a 20% equity ratio, but with the above definition, the equity ratio decreases to 10%. The Starkenburg eG used the 90% of its member loans to acquire a windmill and used its 10% membership shares as liquidity on the bank, resulting in an equity ratio of 10%.

	Equity ratio
Bü.Wind Westfalen eG	100%
Bü.En. Ostfildern eG	100%
Bü.En. Voralb eG	100%
Bü.En.Gen. E-werk eG	100%
Energie für Saerbeck eG	73%
Bü.En. BodenSee eG	57%
Jurenergie eG	53%
Bür.En.Gen. eG	30%
W.kraft Dillinger Land eG	24%
En.Gen. Odenwald eG	23%
Paderborner Land eG	14%
Deutsche Bü. En. eG	10%
Starkenburg eG	10%
En.Gen. Untermain eG	1,5%
FWR Energie eG	(n.a.)

#### Table 20: Equity ratios of RECs

#### Return on equity

To calculate the return on equity of the RECs, both total member equity and the profits (net income) had to be gathered during the 15 interviews.

Return on Equity =  $\frac{\text{Net income}}{\text{Total shareholder's equity}}$ 

From the data set of the interviews, no consistent overview could be generated, because of several complications and data gathering flaws, as described below.

When asking for the profits of the REC in the year 2012, five of the fifteen cooperatives were not able or willing to mention their profit. The Bürgerenergiegenossenschaft eG representative argued that he did not know the financial amounts and had to ask his financial administrator. The Starkenburg eG did not want to provide insights into its financial data, following from a decision of their Supervisory board. The Bürgerenergiegenossenschaft E-werk Mittelbaden eG had started accounting since 2013, so no profits were made yet.

The equity ratio requires the member equity size of 2012, but during the interviews the cooperatives predominantly provided data with respect to their current equity size. Since most cooperatives have been growing their financial balances between the winter and summer of 2013, calculating the return on equity based on summer 2013 equity data and 2012 profits, would provide inadequate indicators.

Several RECs apply a financial structure built on subordinated loans. These structures allow cooperatives to make a limited profits, allowing to still generate financial return for its members through its members through their loans. These cooperatives represent the Friedrich Wilhelm Raiffeisen ENERGIE eG, the Starkenburg eG and the Energiegenossenschaft Untermain eG, with two of the RECs describing the interest on the loans, instead of their returns.

#### **Return on Investments**

The Return on Investment has been introduced in Section 5.2 as the yield that is being provided to the members of the cooperative. Because several cooperatives use subordinated loans next to their memberships shares for funding new projects, the return on investments has been calculated as follows:

Return on Investment =  $\frac{((Size share) \times (Dividend)) + ((Size loan) \times (Interest))}{Size share + Size subordinated loan}$ 

The Returns on Investment of the 15 RECs are displayed in Table 21, since most dividend and interest percentages were explicitly mentioned during the interviews. In several cases the RECs mentioned a range, for example the Bürgerenergiegenossenschaft mentioned a dividend of 3% - 4%. Such ranges have been inserted into the calculations as 3,5%. In the case of Starkenburg eG, the REC stated that it

was generating 3% to 4% for its members. Since it uses 90% subordinated loans, it is assumed that these percentages represent the interest on their loans, since the dividends on membership shares will not significantly decrease or increase the ROI due to their limited total investment size of 10%. The percentages of the return on investments are rounded to .5% points, since the interviews were provided by estimations of the REC board members.

	Membership shares	Subordinated Ioans	Dividend on shares	Interest on loans	Return on Investment
Deutsche Bü. En. eG	€500	€500	8,0%	4,0%	6%
FWR Energie eG	€100	€1.900	(n.a.)	6,0%	6%
Bü.Wind Westfalen eG	€500	-	5,0%	-	5%
Bü.En. Voralb eG	€100	-	5,0%	-	5%
W.kraft Dillinger Land eG	€500	€500	0,0%	9,0%	4,5%
Energie für Saerbeck eG	€1.000	-	4,0%	-	4%
Paderborner Land eG	€500	-	4,1%	-	4%
Starkenburg eG	€200	€1.800	(n.a.)	3,5%	3,5%
Bür.En.Gen. eG	€500	-	3,5%	-	3,5%
En.Gen. Odenwald eG	€100	-	3,5%	-	3,5%
Bü.En. BodenSee eG	€1.000	-	2,5%	-	2,5%
Jurenergie eG	€500	-	2,0%	-	2%
Bü.En. Ostfildern eG	€250	-	0,0%	-	0%
Bü.En.Gen. E-werk eG	(n.a.)	-	-	-	-
En.Gen. Untermain eG	€100	€1.900	(n.a.)	(n.a.)	(n.a.)

#### Table 21: Return on investments of RECs

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#### Asset growth

The asset growth will describe the pace at which the cooperatives have been accumulating new investments and thereby have been able to grow their assets. The data of Table 22 primarily originates from the German Bundesanzeiger, providing financial balance sheets of many German companies and cooperatives (blue). This data is being complemented with the data of the interviews regarding the financial balances of 2013 (orange) and an average balance size for 2012 (when necessary), using the total assets of 2011 and the 2013 REC interview data.

Table 22: Asset growth of RECs (blue = equal to previous, gray = average, orange = interview)

	2008	2009	2010	2011	2012	2013 (summer)
FWR Energie eG	€1.124.922	€4.082.598	€5.706.578	€6.326.066	(n.a.)	(n.a.)
En.Gen. Odenwald eG	-	€1.490.339	€12.311.697	€21.107.461	€28.053.730	€35.000.000
Jurenergie eG	-		€1.217.304	€5.813.901	€9.906.951	€14.000.000
Paderborner Land eG	-	-	€491.248	€6.830.732	€6.915.366	€7.000.000
Energie für Saerbeck eG	-	-	€352.109	€802.652	€2.826.826	€4.851.000
Bü.En. Voralb eG	-	-	€269.020	€329.392	€358.196	€387.000
Bür.En.Gen. eG	-	-	€195.577	€1.146.994	(n.a.)	(n.a.)
En.Gen. Untermain eG	-	-	€8.136	€744.825	€719.296	€1.000.000
Starkenburg eG	-	-	€2.831	€2.768.677	€3.261.395	(n.a.)
Bü.Wind Westfalen eG	-	-	-	€1.430.931	€4.715.465	€8.000.000
Bü.En. BodenSee eG	-	-	-	€600.178	€1.348.545	€1.200.000
Bü.En. Ostfildern eG	-	-	-	€525.906	€851.543	€937.500
W.kraft Dillinger Land eG	-	-	-	-	-	€11.075.000
Deutsche Bü. En. eG	-	-	-	-	-	€10.000.000
Bü.En.Gen. E-werk eG	-	-	-	-	-	€1.020.000

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# Chapter 8

Analysis of German RECs This chapter will analyze the research results of chapter 7, allowing the research questions to be answered in chapter 9. Section 8.1 analyzes the different financial structures used among the RECs, with Section 8.2 describing four different business models types, followed by Section 8.3 making a selection of business model elements.

### 8.1 Financial structures

The analysis of the interview outcomes start with the analysis of the financial performance indicators provided in Paragraph 7.3.6. It is argued that a first segmentation between different RECs and their characteristics can be realized by distinction on a quantitative level. During the interview with Energiegenossenschaft Untermain eG, its board member mentioned that it wanted to move away from the loan-based model, towards the ownership model applied by Energiegenossenschaft Odenwald eG. The cooperative from the Odenwald uses membership shares for its equity, supplemented with 77% bank loans. The interview with Starkenburg eG discussed the same structure difference between Odenwald and their financing structure, which uses 90% subordinated loans and 10% member shares to fund their renewable energy projects. When comparing all RECs and their use of subordinated loans, two cooperatives stood out using the 'hybrid model', applying a 50/50 ratio between member shares and subordinated loans. The Windkraft Dillinger Land eG provides 9% interest on its loans, with an expected 0% on its shares. The Deutsche Bürger Energie eG provides 4% on its loans and expects 8% dividend on its shares. Since the first cooperative generates most of its returns through its interest, relative to the dividend income from the Deutsche Bürger Energie eG, a distinction has been made in Figure 41 between the REC primary source of financial return for its members. The BürgerWind Westfalen eG has been labeled (orange) since it uses its member equity to provide subordinated loans to wind park operating companies.



#### Figure 41: Ownership model vs. Loan-based model

The more a cooperative towards the upper right corner, the stronger its dependence on the subordinated loans for its returns. Both BürgerWind Westfalen eG and Starkenburg eG are positioned on the axis where the interest/ROI reaches 1, suggesting that both the interest rate and the ROI are equal. Although this graph provides an interesting approach to separate cooperatives based on their financial structure, it does not show the growth realized by the cooperatives. To reveal the cooperative expansion, the assets owned by the RECs in summer 2013 have been compared with their percentage of subordinated loans as part of their total assets.





The spread in total assets and the percentage of subordinated loans provides a wide asset size spread among both ownership based and loan based RECs. When comparing the asset growth of the different types of RECs, no indication can be provided which would state that loan-based cooperatives either grow faster or slower. The BürgerWind Westfalen (far right) has suggested an exponential asset growth, but also the Energiegenossenschaft has shown significant growth (€35 million). The hybrid cooperatives show similar growth rates, with the Deutsche Bürger Energie eG growing to €10 million in less than two years. Since the loan-based cooperative apply larger financial leverages compared to those RECs using membership shares, their Equity ratios have been compared with their Return on Investment in Figure 43. RECs in (orange) receive returns primarily through subordinated loans.





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The comparison of the cooperative equity ratio and ROI effectively visualize decisions made by the RECs. In the right lower corner, the 'equity flood' term has been introduced, referring to the decision by the Jurenergie eG and BürgerEnergie Ostfilern eG, not to close their cooperative for new members, allowing new member and their equity to enter the cooperative, as a result, both RECs have mentioned their high degree of liquidity relative to their investment. Jurenergie eG mentioned it had €3 million in cash, the BürgerEnergie Ostfildern eG noted several €100.000s. These equity floods have decreased the REC return on investments and increased their equity ratios. Both cooperatives mentioned that these low dividends formed a serious problem for their long term civilian attractiveness. Bürgerenergiegenossenschaft Voralb eG is an exception in the upper right, since the volunteer of the REC has stated its goal to take up as many administrative tasks as possible and monthly check all five PV systems, thereby enabling structural higher dividends. Taking into account the outliers and its causes, Figure 43 reveals that most ROI of the research sample lie between 3% and 5%.

### 8.2 Organizational forms

The research sample of this Thesis has been brought together based on a wide range of requirements, with one requirement demanding a broad collection of initiators. Table 14 in paragraph 7.2.1 describes who were the initiators of each REC, which actors joined the initiator and which actors started cooperating with the RECs after their foundation. The table reveals that predominantly project developers and external RECs have started new forms of cooperation with the interviewed cooperatives. To get a better understanding of the cooperation and long term devotion of actors towards the RECs, the partner distinction literature by (Hawkins, 2002) of paragraph 4.5.2 has been used. As a result, the actors involved with the RECs have been separated into the structural partners and contributing partners.

Table 23 reveals that most initiating cooperative banks and local governments have changed their roles. Many cooperatives would not have been able to get started without the support of these actors, but as soon as the RECs were able to function independently, governments and cooperative banks became contributing partners. Local governments are willing to promote activities of the REC and cooperative banks provide their financial experience to support the financial administration. The same shift towards contributing partnership can be seen among several project developers. The Honold Windenergie GmbH has sold 3 windmills to the Windkraft Dillinger Land eG and currently operates these windmills for a  $\in$ 17.077 service fee. The Solarcomplex AG sold 1/10th of its ground based PV field to a newly formed cooperative, but did not support the REC any further after the acquisition of its solar field. When looking at follow-up interaction with the RECs, five cooperatives have started new forms of cooperation with project developers after their initial start. Since Table 19 of paragraph 7.3.4 reveals a shift towards an increased use of wind power among RECs, a dependency comparison has been performed in Table 24. The comparison describes the projects that RECs have been involved with over the last 1,5 years.

Within the comparison, a distinction has been made between the developer independent growth projects and the developer dependent growth projects. The investment sums of the dependent growth projects could be readily extracted from either the interview data or the REC websites, but investment sums of independent projects were partially absent. The investment volumes related to the independent projects are expected to fall between  $\in$ 50.000 and  $\in$ 1.000.000, since most represent the development of own windmills. Only the Energiegenossenschaft Odenwald has shown strong asset growth, expanding its assets with  $\in$ 14 million in 1,5 years, but the investment allocation of these assets have not been provided. Several cooperatives have been labeled to represent 'limited growth'. The Energie für Saerbeck eG for example mentioned that it is not planning to expand its assets, since it desires to generate stable returns for its members.

Compared to most of the independent growth projects, the dependent growth projects have provided significant asset growth opportunities to multiple cooperatives. The Jurenergie eG has been provided with the opportunity by a project developer to acquire two 3 MW Enercon 101's, requiring a total investments of  $\in 12$  million. The project developer LaVigne Capital AG has developed several ground based PV fields and has sold these to the Deutsche Bürger Energie eG, representing  $\in 10$  million. Recently a regional utility company provided Starkenburg eG with a  $\in 800.000$  investment opportunity, allowing them to gain a 10% share in a local wind park. Based on the above examples and the data in Table 24, an analysis has been performed in Table 25 comparing whether the dependent or independent expansion of the RECs relate to their initiators.

	Structural partner	VR-bank	Contributing partner	Structural partner	Local government	Contributing partner	Structural partner	Project developer	Contributing partner	Structural partner	<b>Civilian initiative</b>	Contributing partner	Structural partner		Contributing partner	Structural partner	EnWB	Contributing partner	Structural partner	Other RECs	Contributing partner
Energie für Saerbeck eG	Х	$\rightarrow$	·Х	Х					X												
Paderborner Land eG	Х	$\uparrow$	×X			Х			X												
Bü.Wind Westfalen eG							Х														
Bür.En.Gen. eG						Х				Х											
En.Gen. Odenwald eG	Х	$\rightarrow$	·Χ	Х					Х												Х
Starkenburg eG							Х	$\rightarrow$	·Χ	Х											Х
FWR Energie eG							Х	$\uparrow$	·X												
En.Gen. Untermain eG			Х						X	Х											X
Bü.En. Ostfildern eG			Х	Х	$\rightarrow$	×X									Х						Х
Bü.En. Voralb eG				Х	$\rightarrow$	· X										Х	$\rightarrow$	Х			
Bü.En.Gen. E-werk eG													X	Ţ	► X						
W.kraft Dillinger Land eG	Х						X	$\rightarrow$	X												
Bü.En. BodenSee eG							Х	$\rightarrow$	×X												
Deutsche Bü. En. eG						X	X														X
Jurenergie eG				Х	$\uparrow$	×			X												

 Table 23: Distinction of REC partners (blue = initiator, black = non-initiator, orange = follow-up)

### Table 24: REC dependency on external partners

	External partner	Developer independent growth	Independent growth projects	Developer dependent growth	Dependent growth projects	
Jurenergie eG	Project developer	x	Development of 10 windmills	€12 million	Acquisition of two windmills	
Deutsche Bü. En. eG	Project developer	-	-	€10 million	Acquisition of multiple rooftop and ground based PV	
W.kraft Dillinger Land eG	Project developer & VR-bank	-	-	€11 million	Acquisition of three windmills	-
Bü.Wind Westfalen eG	Project developer	-	-	+/- €5 million	Wind investments of last 12 months	-
Bü.En. BodenSee eG	Project developer	-	-	€1,2 million	Acquisition of ground based PV field	-
Bü.En.Gen. E-werk eG	Utility company	-	-	€1,0 million	Acquisition rooftop PV & wind park shares	-
Starkenburg eG	Project developer	x	Development self-consumption PV	€0,8 million	Participation into existing windmill	-
Bü.En. Ostfildern eG	Utility company	x	Bought two rooftop PV systems	€0,25 million	Loan to wind park operating company	
En.Gen. Odenwald eG	-	x	Development of 80 windmills, HG & "Haus der Energie"	(n.a.)	-	
En.Gen. Untermain eG	-	€0,86 million	Development of HG &, windmills	€50.000	Participation into existing windmill	
Bür.En.Gen. eG	-	x	Bought several new rooftop PV systems	-	-	
Bü.En. Voralb eG	-	€58.000	Bought one rooftop PV system	-	-	-
Energie für Saerbeck eG	-	-	-	-	-	X
Paderborner Land eG	-	-	-	-	-	
FWR Energie eG	-	-	-	-	-	X

The comparison in Table 25 uses three categories when distinguishing the energy cooperatives of the research sample. The stabilized cooperatives are currently not planning to expand or do not have the opportunity to do so. For example the Bürgerenergiegenossenschaft eG desires to expand its production portfolio with wind power, but has not yet created a deal with project developers. The second category represent cooperatives which either acquire or provide loans to plug & play windmills and PV systems. The third category represent RECs who apply a more independent approach and desire to keep the development value creation within their cooperative. Both the Jurenergie eG and the Energiegenossenschaft Untermain eG have set up a development company, supporting the cooperative.

	Initiator	Stabilized	Expansion through project developer projects	Expansion through own projects
Energie für Saerbeck eG	Volksbank	Х		
W.kraft Dillinger Land	Volksbank	Х		
Paderborner Land eG	V.bank & Municipality	Х		
Jurenergie eG	Kreis			Х
En.Gen. Odenwald eG	Kreis			Х
Bü.En. Ostfildern eG	City		Х	
Bü.Wind Westfalen eG	Project developer		Х	
FWR Energie eG	Project developer	Х		
Bü.En. BodenSee eG	Project developer		Х	
Deutsche Bü. En. eG	Project developer		Х	
Bür.En.Gen. eG	Civ. Initiative	Х		
Starkenburg eG	Civ. Initiative		Х	
En.Gen. Untermain eG	Civ. Initiative			X
Bü.En. Voralb eG	Utility company	X		
Bü.En.Gen. E-werk eG	Utility company		Х	

#### Table 25: Expansion comparison based on REC initiators

The categorization provided by Table 25 indicates several developments with respect to the growth of the RECs. All cooperatives which were started by cooperative banks have stopped growing or show no desire to expand (Windkraft Dillinger Land eG). Three out of four cooperatives started by project developers still work together with these companies, with the project developer of the Friedrich Wilhelm Raiffeisen ENERGIE eG developing a €77 million wind park close to the region of the analyzed REC, founding 6 more cooperatives.

Although the above categorization may suggest stringent differences between types of cooperatives, RECs in general do not fit into one category indefinitely. The circumstances for cooperatives can change through time, with new energy projects being provided by developers, or new legislation favoring other types of investments. RECs may decide to acquire a plug & play windmill park and develop two other wind parks in parallel. There can be other cooperatives which believe that new projects should be financed by new cooperatives, since its investments would disrupt their returns. To allow for a detailed and intuitive analysis of the cooperatives, four typologies have been generated based on the research data and the previous analysis.

The first type of REC is represented by the *Developer independent cooperative*. These cooperatives want to keep the development value creation within the cooperative, allowing the REC to make higher returns on the long term. The second type is the *Developer dependent cooperative*. Also this cooperative wants to grow its production capacity and diversify its value proposition to its members, but uses pre-developed projects to reach its goals. The *Stabilized cooperative* does not show any significant asset growth and focuses on providing continuous value to its current members. The final type represents the *Integrated developer cooperative*, which are closely linked to the project developer with the board of the developer also being a board member of the cooperative.

#### Table 26: Typologies of the German RECs

	Developer independent cooperative	Developer dependent cooperative	Stabilized cooperative	Integrated developer cooperative
En.Gen. Odenwald eG	Х			
Jurenergie eG	Х			
En.Gen. Untermain eG	Х			
Starkenburg eG		Х		
Bü.En. Ostfildern eG		Х		
Bü.En.Gen. E-werk eG		Х		
Bü.En. BodenSee eG		X		
W.kraft Dillinger Land eG			Х	
Energie für Saerbeck eG			Х	
Paderborner Land eG			Х	
FWR Energie eG			Х	
Bür.En.Gen. eG			Х	
Bü.En. Voralb eG			X	
Bü.Wind Westfalen eG				X
Deutsche Bü. En. eG				X

The segmentation of the 15 RECs in Table 26 is not stable and shifts are possible from one category to the other. For example Jurenergie eG has started to shift from being a *developer dependent cooperative* growing into a *developer independent cooperative*, after its decision to develop a park of 10 windmills. Bürgerenergiegenossenschaft E-Werk Mittelbaden eG currently represents a *developer dependent cooperative*, because the E-Werk Mittelbaden provides the REC with investment opportunities for its under development future wind park. In the case that the REC is able to start developing its own wind park, hydro power plant or biomass heating grid, the cooperative would make a shift towards being a *developer independent cooperative*, reducing its dependency on the E-Werk Mittelbaden.



#### Figure 44: Typologies of German RECs

The ability of RECs to change their dependency on external developers has been visualized in Figure 44. This figure introduces the *project based startup cooperative*, since all cooperatives interviewed were founded around a single or multiple renewable energy projects, from which the REC started adopting a certain typology. From the results in Table 11 described in paragraph 7.1.1 it becomes clear that multiple RECs are considering to expand their value proposition to their members by providing electricity sales or warmth through a heating grid. To describe these developments together with the

four typologies of Figure 44, the PV product supply chain and value network visualization of (Frantzis, Graham, Katofsky, & Sawyer, 2008) of Section 4.3 has been adopted in Figure 45.

When describing the value propositions and value networks of the German RECs in Figure 45, the horizontal rows represents the value chains of PV, wind power and heating grids. The left columns represent the *Installers* and specialists within the PV, wind or heating sectors.



Figure 45: Value chain & value network of 4 REC business model typologies

The middle columns represent the cooperative members, who have become *Owners* of the renewable energy production sources. The sales of electricity and warmth are located in the right columns, representing the *end user* and consumers (e.g. civilians, companies, public sector).

The upper row of the individual typologies represent either external or internal companies who support the value creation within each of the value chains. The *project developers* apply their experience described in paragraph 7.2.3, representing planning, access to development sites, access to investors, experience with grid connections, wind measurements and building permits. To execute their work, the project developers use subcontractors when dividing a project into individual elements, leveraging the subcontractor specializations. The *operation and maintenance* of the PV systems, windmills and heating grids can be outsourced to external companies. Windmill manufacturers provide maintenance contracts to the cooperatives and utility companies, project developers or other SMEs can take over the responsibility of operating the renewable energy production sources. To support the cooperatives with their ambition to sell electricity to their members, the *end user services* companies provided supportive activities. These services can represent administration, billing of the used energy and energy efficiency consulting.

Within the value chains and value networks of Figure 45, the orange actors represent external organizations or non-cooperative civilians. The blue actors represent the cooperative members and cooperative-owned companies. The frames within Figure 45 represent which actor is able to structure the value network of the REC business model. The orange frame indicates that the external partner (e.g. project developers) structures the value network and decides which actors to be involved. The blue frame indicates that the cooperative decides how to structure the value network.

The value chains and value network introduced above have been applied to describe four different RECs in Figure 46, each representing one of the four business model typologies. The Windkraft Dillinger Land eG has been founded explicitly to acquire 3 windmills and to allow its returns to flow back into the region. The windmill operations have been taken over by the former project developer Honold Windenergie GmbH and a maintenance contract has been signed with the windmill manufacturer Nordex. The cooperative board mentioned that it was not actively looking to expand its organization, therefore this REC represents a stabilized cooperative. Starkenburg eG has realized its highest asset growth with the acquisition of a windmill developed by a befriended project developer. In parallel it has been developing several PV systems, representing a total of around 600 kWp. For the future it plans to become a civilian participation platform supporting expansion of windmills in its region. Participation projects are being set up with both project developers and regional utility companies, therefore this REC represents a developer dependent cooperative. Energiegenossenschaft Odenwald eG started its cooperative with developing rooftop and ground based PV, followed by the acquisition of several windmills of external project developers. The cooperative argued that the value creation should stay within the cooperative and therefore the REC decided to take over the project coordination role from the project developers. Currently the REC is developing 80 windmills, with 30 to 40 within its own region, sometimes in cooperation with local partner energy cooperatives. The REC decided to provide its members with electricity starting in 2013, therefore a cooperation has been set up with the electricity provider GENO-Strom GmbH, allowing the cooperative to sell its electricity under its own brand, the EGONaturstrom (EGO nature electricity). Apart from the regional wind energy developments, the REC decided to provide the city of Erbach with a heating grid, which is currently under development. Based on the previous examples, this cooperative represents a developer independent cooperative. The final typology is represented by the Deutsche Bürger Energie eG, which has been founded by the project developer LaVigne Capital AG. The project developer stated its desire to expand its traditional development value creation with the value proposition of financial civilian participation. The project developer has sold several ground based PV fields to its cooperative and currently makes the shift towards the development of wind parks and heating-grids. The cooperative is planning to start its own electricity sales company, labeled the DBE Strom GmbH, allowing the REC to provide electricity to its members. For the development of its projects, the cooperative aims to use as many local companies as possible, keeping the wealth creation within the region. From the above description it can be argued that this cooperative represents an integrated developer cooperative.



Heat contracts









## 8.3 REC business model elements

#### 8.3.1 Distilling the business model elements

When starting the search for the business model elements of the German RECs, the question was asked, which cooperatives are performing better than others. From the REC literature by (Volz, 2012) it follows that the most mentioned performance measure indicator represents the height of the dividend. When looking for the profitability of the individual RECs, the outcomes of Figure 43 have been used. The graph indicates that the loan-based model cooperatives show somewhat higher ROI than the ownership based model cooperatives. When comparing the financial structure of two developer dependent cooperatives, it shows that the structure of Starkenburg eG and Bürgerenergiegenossenschaft E-Werk Mittelbaden eG differ significantly. The first has an equity ratio of 10%, the latter has an equity ratio of 90%. Because of this inability of the financial structure to reveal business model elements, the second performance indicator, the membership growth, has been analyzed.

When applying this performance measure it is argued that member growth represents asset growth, since members have to buy shares to become cooperative members. The asset growth indicator has been used in Table 22 in paragraph 7.3.6 and revealed that both the Windkraft Dillinger Land eG and the Bürgerenergiegenossenschaft E-Werk Mittelbaden eG have shown rapid growth in 2012. The Windkraft Dillinger Land eG was able to gather €5,3 million in several weeks with a total of 455 members. Bürgerenergiegenossenschaft E-Werk Mittelbaden eG also required several weeks to gather €3,5 million with 850 members, requiring only €0,5 million. When analyzing the interview of the Bürgerenergiegenossenschaft E-Werk Mittelbaden eG more closely, one quote stood out:

#### "Without the E-Werk, this cooperative and its size, would not have existed"

The interview revealed that the E-Werk Mittelbaden has decided to sell one of its PV systems to a new cooperative. The regional utility company thereby willingly provided a value proposition to the population near the city of Lahr. A second potential element was revealed when during the same interview a cooperative board member mentioned that:

"The E-Werk Mittelbaden has a very solid name in the region, with solid financial performance since they are not doing any crazy financial things. The strong growth of members came from the trust the people had in this institution."

From this interview, two potential elements have been selected, representing the *value proposition* and *trust.* To see whether these elements would resonate with other cooperatives, the two potential elements have been compared with the Windkraft Dillinger Land eG. In this second case, the Honold Windenergie GmbH provided the value proposition by supplying three windmills. The element trust was present, because the Volksbank Dillingen eG had previously set up the SonnenBank Dillinger Land eG in 2009, containing 150 members. When analyzing the interview with this second cooperative a third potential element was revealed when the president of the cooperative bank described that:

# *"We invited these people (800) through the newspaper, through our Volksbank webpage and we put up some posters in our buildings."*

This example showed that the cooperative bank was using its network of members to reach future investors and therefore the third potential business model element has been labeled as the *network*. From the above analysis of the two cooperatives the potential business model elements *value proposition, trust, and network* have been selected. To reveal their validity, the other 13 interviews have been analyzed to see whether the elements were present among them.

When looking for the potential *value proposition* element, the Jurenergie eG interview reveals that without the two windmills of the project developer their total assets would represent €2 million instead of € 14 million. Without the development of the Bioenergiepark Saerbeck by the municipality, the Energie für Saerbeck eG would only have owned multiple rooftop PV systems, representing several €100,000's compared to its current total assets of €4,8 million. Without the decision of the project developer Solarcomplex AG to sell 1/10th of its ground based PV field, the BürgerEnergie BodenSee eG would not have existed. The cooperative could only be started because the project developer was

able to build a PV at that specific location. Starkenburg eG was able to expand its assets with a €2 million windmill, because a local project developer was willing to sell its windmill to the newly formed cooperative.

The potential *network* element has also been revealed by the Volksbank Paderborn-Höxter-Detmold eG when the bank described that it used its 60 local bank buildings to allow its members to also become members of the REC, providing investment opportunities at each of its buildings. Jurenergie eG described that at its start, the regional government asked all of its mayors to look for public rooftop PV opportunities, thereby promoting the newly started REC. As a result, the cooperative was able to install 11 PV systems, totaling 844 kWp. At the start of the Energiegenossenschaft Odenwald eG both the regional government (Kreis Odenwald), local municipalities and the Volksbank Odenwald eG worked together to allow for a rapid roll-out of rooftop PV investments, resulting into 60 PV systems, totaling over 5 MWp.

When looking for the potential *trust* element, two interviews provided interesting insights. The project developer WestfalenWIND GmbH mentioned that when they started with BürgerWind Westfalen eG two years ago, member growth was slower than during the interview in the summer of 2013. They stated that due to word of mouth promotion among the local population more people started bringing their capital to the wind cooperative, trusting the project developer that their investments would be in good hands. The Energiegenossenschaft Odenwald eG was able to grow rapidly partially because its employees originated from the Volksbank Odenwald eG, linking the positive brand image and trust people had in the Volksbank Odenwald eG to the newly formed energy cooperative.

From the above analysis it follows that the three potential business model elements are able to pinpoint the reasons why some cooperatives have been growing faster than others. To allow for a reflection on these business model elements, they have been compared with the elements provided by the STOF model.

#### 8.3.2 Comparison with STOF model

The comparison of the potential business model elements with the STOF model starts by selecting those STOF model elements which represent the same concept and characteristics as the potential elements. The potential *value proposition* element described above overlaps with the *value proposition* element of the service domain. The potential *network* element overlaps with the *resources & capabilities* element of the organization domain, since it allows actors to utilize their local network to communicate the value proposition. The potential *trust* element overlaps with the *perceived value* element of the service domain, because potential civilians may expect a higher value from the REC due their positive previous experience with actors within the REC value network.

The three STOF model elements described above have been compared with the other elements present within the three domains. The service domain indicates that the *value proposition* is a summarization of the *intended value*, with the intended value putting requirements on the *value network*, which starts delivering *value activities* based on these requirements. From this analysis it is revealed that the value proposition is the starting point, with the other elements representing secondary elements, since they are shaped by the value proposition. The *resources & capabilities* also provide input to the *value activities* element. Since it is argued that the *value network* is a secondary element, it follows that also the *interactions* and *actors* are secondary elements. The financial elements in the finance domain are monitored by the *performance indicators*, which measure the financial elements are shaped by the three potential elements introduced above.

The above analysis argues that each of the other STOF elements are non-complementary and are products of the potential business model elements found by the interviews. Following from this analysis, it is argued that the STOF model elements *value proposition, resources & capabilities* and *perceived value* represent the three business model elements which determine the business models of German RECs. The three business model elements shape the other STOF elements to which they are linked, therefore the three elements are labeled the *primary elements*, with all other representing secondary elements.

#### 8.3.3 Applying the three business model elements

To make the business model elements usable for the actors within the cooperative energy sector, the nomenclature as introduced in paragraph 8.3.1. *(value proposition, network, trust)* will be applied throughout the rest of this Thesis. To be able to compare the business model elements of RECs among each other, a visualization using a triangle is being proposed. The upper corner will be labeled the *value proposition,* the right corner labeled the *network* and the left corner will be labeled *trust,* as visualized in Figure 47.



#### Figure 47: Business model elements: value proposition, trust & network

The size of each business model element can be described by using a circle, with its center point located at one of the corners of the triangle, as seen in Figure 48. In time, the radius of a circle can grow or decline depending on developments within the REC and its value network. The interviews revealed that several RECs are strongly expanding the *trust* of the local community into their REC, where other cooperatives have been expanding their *value proposition* by adding electricity sales or heating grids. The *network* of a REC can show growth, when either its external partner or the REC itself expands its ability to effectively communicate the REC value proposition to future members or companies. The *value proposition* circle can decrease when the REC is unable to provide the same value proposition to its new members as it is providing to its current members. When RECs fail to deliver their intended value, they are exposed to the risk that the *trust* of the community in the REC will start to decrease The *network* element size starts to wane when the cooperative neglects its organizational relations with other actors or groups of individuals. Since the three business model elements represent the building blocks of many growing German RECs, they will be labeled as the *expansion triangle* throughout the rest of this Thesis.



#### Figure 48: Expansion triangle & business model element-size circles

The element size circles have been applied to describe eight German RECs in Figure 49. Three examples of Figure 49 will be further discussed below, providing insights into the reasons behind the changings sizes in time of the business model elements, each being part of the REC expansion triangles. The Windkraft Dillinger Land eG was provided with a large network due to its initiation by the local cooperative bank and its members. The trust into the REC increased because the REC showed that the bank was able to start a wind cooperative after starting a PV cooperative three years earlier. The value proposition has grown, because the REC allowed more civilians to participate in a larger project compared to the previous PV cooperative. The Bürgerenergiegenossenschaft Voralb eG has a small network, since it is primarily operated by a single person. The trust growth within the community may be limited, since the REC has only been able to expand with two PV systems in the last two years. The value proposition has diminished, because the REC is not able to generate new renewable energy projects for its current and future members. The BürgerWind Westfalen eG was given access to the network of the project developer WestfalenWIND GmbH, which has shown limited growth, since the project developer only used the local newspaper to announce its developments for the last three vears. The trust of the local population into the REC has expanded, since its member growth is showing exponential characteristics. The value proposition stays the same, since the ROI for new members has remained at 5%.


Figure 49: Application examples of the expansion triangle among German RECs

# 8.3.4 Expansion triangle & business model typologies

As discussed in paragraph 8.3.3, the expansion triangle represents the three building blocks of an effectively growing energy cooperative. From Table 23 and Table 24 it follows that multiple actors have started growing into contributing partners within the REC value network. The three business model elements of the expansion triangle are therefore integrated with the four business model typologies of section 8.2.



Figure 50: Integration of expansion triangle & business model typologies

When analyzing the project-based startup cooperative, Figure 50 argues that all three business model elements are necessary for the start of a new energy cooperative. Examples of such startup cooperatives are represented by the Bürgerenergiegenossenschaft E-Werk Mittelbaden eG and the Windkraft Dillinger Land eG. The developer dependent cooperative only requires the value proposition of the project developer when it desires to expand, since the REC itself possesses a sufficiently sized network and community trust. The integrated developer cooperative requires all three elements, due the close link of the REC to its project developer.

Based on this analysis it is argued that the vital business model element provided by the project developer is represented by the *value proposition*. Based on the relation of the *network* and *trust* element to the project-based startup cooperative and the integrated developer cooperative in Figure 50, it is argued that these elements have been primarily playing a supportive role. This difference between the vital *value proposition* element and the supportive *network* and *trust* elements, is explained by the following examples.

When the trust of the BürgerWind Westfalen eG would not have grown as it had, the cooperative would still exist, only would it be smaller. The same holds for the project-based startup cooperative (currently a stabilized cooperative) Windkraft Dillinger Land eG. When the cooperative bank would not have been able to gather sufficient members, it would not have bought 3 windmills, but for example only one. The Starkenburg eG was planning to buy its entire first windmill from a befriended project developer, but it was unable to gather sufficient members, so it eventually sold 49% of the windmill to the Energiegenossenschaft Odenwald eG. The vital and supportive elements, the primary and secondary elements, and their relation to the STOF model are visualized in Figure 51.



Figure 51: STOF model versus expansion triangle

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# Chapter 9

# Conclusions & Recommendations

This chapter shortly summarizes the findings of this Thesis in Section 9.1, followed by the recommendations for the Rabobank and further research in Section 9.2., with the last section reflecting on the execution of the research.

# 9.1 Conclusions

To provide input to the cooperative energy sector and the research into business model frameworks, the following research questions have been shaping this Thesis:

M.O. "What are the elements that determine the business models of German RECs and which business model typologies can be distinguished?"

Starting with business model typologies, the research revealed that the German RECs distinguish four different cooperative business models. These represent the *stabilized cooperative, the developer dependent cooperative,* the *developer independent cooperative* and the *integrated developer cooperative.* These RECs are able to shift from one typology to the other, depending on their ability to restructure their value network.

The analysis of the interview data has provided the Thesis with three business model elements, representing the *value proposition*, the *network* and the *trust*. These three elements have been combined into the *expansion triangle* which enables the comparison of energy cooperatives with respect to their ability to grow both in member size and total assets.

The four business model typologies and the expansion triangle have been combined, revealing the difference between the *value proposition* element and the *network* and *trust* element. The *value proposition* represents a *vital* element, since no REC is able to expand without a value proposition. The elements *network* and *trust*, represented the *supportive* elements, since they allowed several cooperatives to expand faster than expected.

# 9.2 Recommendations

# 9.2.1 Rabobank

When reflecting on the research outcomes of this Thesis, one case stands out which provides interesting insights for the local Rabobanken. The Windkraft Dillinger Land eG represents an energy cooperative started by the Volksbank Dillingen eG in Bavaria. Local civilians wanted to invest in an under construction wind park and asked the cooperative bank to discuss potential participation possibilities with its project developer. The cooperative bank and the project developer Honold Windenergie GmbH decided that three of the windmills were to be bought by a new wind energy cooperative. The cooperative bank held two public meetings, attracting over 800 people. Within several weeks the cooperative was able to collect  $\in$ 5,3 million among 455 individuals and companies. For the total investment of  $\in$ 11 million, an equity ratio of 24% was used, together with 24% subordinated loans of REC members and 52% in bank loans provided by the Volksbank Dillingen eG and several other cooperative banks.





Since the expansion triangle has been used to explain the rapid growth of the Bavarian wind cooperative, Figure 52 visualizes that the Rabobank could start playing a similar facilitating role. Since four energy cooperative business models have been described in this Thesis, multiple REC types emerge for the bank to focus on. Figure 53 proposes that the Rabobank should focus primarily on the project-based startup cooperatives, because the bank owns both local network resources and member trust which can be leveraged when adopting a facilitating role. Although there are opportunities for cooperatives, most impact can be realized when the cooperative bank involves itself with project startup co-creation.



Figure 53: Potential role of the Rabobank among project-based startups

During the interview with the cooperative board member of the Dillinger Land eG, it was mentioned that the bank prefers to start a single REC per renewable energy project. These project specific RECs have been visualized in Figure 54, with the Rabobank setting up new RECs for either individual windmills, wind parks, PV fields or heating-grids.

Taking into account the growth of multi-REC investments into windmills in the state of Baden-Württemberg, a second visualization has been provided in Figure 55. In this second case a renewable energy project will be invested into by local members of the cooperative bank and civilians, joined by RECs from outside the region. These external RECs invest in multiple renewable energy technologies, resulting into a local hybrid of broad and specific RECs.

For the Rabobank it is interesting to perform further research to reveal what possibilities are present within the Dutch energy sector to form new RECs. It should be revealed which actors in the Netherlands can provide one or more of the three elements in the expansion triangle. In a similar fashion, the local Rabobanken should be consulted to explore to which extent they are willing to take up the facilitating role as described in both Figure 54 and Figure 55.



Figure 54: Facilitating role Rabobank among project-based startup cooperatives



Figure 55: Integration of project specific REC & local/regional REC

# 9.2.2 Future research

Since this Thesis introduced four business model types, a second and more extensive research may reveal business models which were not part of the RECs interviewed in the research sample. A similar research should be executed to find out which subcategories exist within each of the individual business model types.

More statistical evidence is required to support the introduction of the expansion triangle, since it is currently constructed out of a limited set of cases. The expansion triangle might find applications in other sectors apart from the renewable energy sector. A follow-up research may reveal similar dynamics or other business model elements which are vital or supplementary to the successful expansion of an organization.

Since many German RECs have been started by local cooperative banks, these banks have a better view on the risks related to the cooperative projects. A correlation might exist between energy cooperatives that have been founded by cooperative banks and the interest rates that have to be paid by these energy cooperatives to their banks.

Several RECs mentioned that local civilians wanted to become a member of the cooperative, even when there was a waiting list. Complementary to this development, RECs mentioned that the majority of its members joined the cooperative for its financial benefits and because of the 0,5% savings interest rates among German banks. Since most cooperatives used and desired equity ratios around 30%, the long-term sustainability of their business case will be strongly influenced by the interest rates related to their bank loans. Therefore the question emerges what the effect will be on the ROI when the ECB decides to increase its rates?

During the interviews, the expansion of state-wide umbrella energy cooperatives was introduced. Because of these developments the questions arises how the responsibilities should be divided among the umbrella cooperatives and the local RECs? What organizational structure will be more effective? A single national cooperative constituted out of several state cooperatives, an independent umbrella cooperative per state, or local cooperatives linked to several national cooperatives, allowing for competition among these national cooperatives?

Research among the German RECs revealed a limited interest among members to become involved. Nonetheless members were willing to provide significant amounts of investment to support the projects developed by the cooperative volunteers and employees. Since most individuals in modern western society are highly occupied, a research among the Dutch population might reveal interesting insights with respect to their willingness to become involved within a cooperative apart from becoming a passive member, investor or customer.

The Thesis indicated that RECs tend to invest into clear and stable assets with stable returns. RECs mentioned not to be willing to invest into new technologies when these were not mature enough. The telecommunication sector shows many disruptive technologies that have made prior technologies obsolete. As a result, assets can lose their market value quickly, thereby increasing investment risks. From these notions spawns the question which (technological) sectors are more or less fertile soil for cooperatives to provide its unique organizational characteristics. Since certain technological sectors are dynamic, to which extent should the cooperative have assets, or should it become a platform of intercompany cooperation?

Crowdfunding has grown significantly in recent years. In 2012 \$2,806 billion was spent, compared to \$530 million in 2009 (Massolution, 2012). The growth of this sector supports the growth of new business models that can use the unique characteristics of crowd sourcing. The Dutch Windcentrale has been crowdfunding second-hand windmills and uses the cooperative to allow investors to participate. Therefore the question emerges to which extent and among which crowdfunding initiatives the cooperative business model can be effectively used to channel investments and resources towards its members.

# 9.3 Limitations

When performing the interviews, the German languages and especially financial, organizational and economic terms were not always known by the researcher. As a results, interviews were frequently halted to allow for the clarification of a term or concept. Due to these limitations, the full depth of the interviews could not be reached.

A research among German organizations requires an understanding of its culture, habits, preferences and expectations, to allow for a proper analysis of the interview outcomes. Since the researcher has lived in Berlin for seven years, these contextual elements were partially known, but still certain German decisions or views could not be unraveled because of the limited cultural experience within Germany.

At the start of the research, limited academic research was available with respect to energy cooperatives both in Germany as in the Netherlands. This caused the research to make many turns and twists which were caused by new insights and meetings with specialists.

Using 1,0 to 2,0 hours for each interview was found to be significant in several cases, but usually turned out to be too short to grasp the complete picture and complexity of each REC. Many subjects which held interesting information had to be shortened or skipped to allow other important subjects also a chance to be discussed. As a result, not all interviews were able to consistently address all the interview questions which were prepared.

It was decided that all 15 interviews were going to be performed in German since this represents the mother tongue of all board members. Due to this decision, the translation of the transcript from German into English may have allowed multiple flaws or misinterpretations to find their way into the research data. Feedback on the transcripts revealed though that only minor mistakes with company names or acronyms were encountered.

Most interviews were performed with a single representative of the cooperative. Using this approach challenges the objectivity of the answers, which was revealed during meetings with two representatives and interviews introducing internal differences of philosophies. Due to these observations, the preferences of a cooperative towards a certain model might be strongly dependent on who the interviewer will be talking to.

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# References

Afuah, A., & Tucci, C. (2001). Internet business models and strategies. Boston: McGraw-Hill.

- AGEE-Stat. (2012). *Zeitreihen zur Entwicklung der erneuerbaren Energien in Deutschland.* Bundesministerium für Umwelt, Naturschutz, und Reaktorsicherheit.
- AgentschapNL. (2010). *Op weg naar Intelligente netten in Nederland*. Den Haag: Ministerie van Economische Zaken.
- AgentschapNL. (2012). *Participatiemodellen voor de realisatie van windenergie op land.* Den Haag: Ministerie van Economische Zaken.
- AirBnB. (2013, June 3). *Annual*. Retrieved October 3, 2013, from AirBnB: https://www.airbnb.com/annual
- Aitken, M. (2010). Wind power and community benefits: challenges and opportunities. *Energy Policy*, 6066-6075.
- Akintoye, A., Hardcastle, C., Beck, M., E., C., & Asenova, D. (2003). Achieving best value in private finance initiative project procurement. *Construction Management and Economics*, 461-470.
- Allee, V. (2000). Reconfiguring the Value Network. Journal of Business Strategy.
- Alonso-Conde, A., Brown, C., & Rojo-Suarez, J. (2007). Public private partnerships: Incentives, risk transfer and real options. *Review of Financial Economics*, 335-349.
- Alt, R., & Zimmermann, H.-D. (2001). Introduction to Special Section Business Models. *Electronic Markets The International Journal*, 1019-1032.
- Amit, R., & Zott, C. (2001). Value creation in E-Business. Strategic Management Journal, 493-520.
- Anderson, E., Fornell, C., & Rust, R. (1997). Customer Satisfaction, Productivity, and Profitability: Differences Between Goods and Services. . *Marketing Science*, 129-145.
- Asmus, P. (2008). Exploring New Models of Solar Energy Development. The Electricity Journal, 61-70.
- Atkinson, R. (1999). Project management: cost, time and quality, two best guesses and a phenomenon, its time to accept other success criteria. *International Journal of Project Management*, 337-342.

AVIS Budget Group. (2013). Annual Report.

Baden-Fuller, C., & Morgan, M. (2010). Business Models as Models. Long Range Planning, 156-171.

- Barney, J. (1997). Gaining and sustaining competitive advantage. Reading, MA: Addison-Wesley.
- Bellman, R., & Clark, C. (1957). On the Construction of a Multi-Stage, Multi-Stage, Multi-Person Business Game. *Operations Research*, 469-503.
- Berman, S., Wicks, A., Kotha, S., & Jones, T. (1999). Does Stakeholder Orientation Matter? The Relationship between Stakeholder Management Models and Firm Financial Performance. *Academy of Management*, 488-506.
- Boehnke, J. (2007). Business Models for Micro CHP in Residential Buildings. University of St. Gallen.
- Bolinger, M. (2001). *Community Wind Power Ownership Schemes in Europe and their Relevance to the United States.* Berkeley, California: Lawrence Berkeley National Laboratory.
- Boon, F. (2012). Local is beatifull. Faculty of Geosciences. Utrecht: Utrecht University.

- Boons, F., & Lüdecke-Freund, F. (2013). Business models for sustainable innovation: state-of-the-art and steps towards a research agenda. *Journal of Cleaner Production*, 9-19.
- Bouwman, H., & Van Den Ham, E. (2003). *Exploring value networks enabling the delivery of back office content to mobile workers.* Tampere: ITI'03 Europrix conference.
- Bouwman, H., de Vos, H., & Haaker, T. (2008). *Mobile Service Innovation and Business Models*. Berlin-Heidelberg: Springer-Verlag.
- Bouwman, H., Faber, E., & Van der Spek, J. (2005). Connecting future scenarios to business models. *18th Bled eCommerce Conference e Integrity*, (pp. 1-14). Bled, Slovenia.
- Bouwman, H., Faber, E., & Van Der Spek, J. (2005). Connecting future scenarios to business models of insurance intermediaries. *18th Bled eCommerce Conference e Integrity*, (pp. 1-14). Bled, Slovenia.
- Bouwman, H., Faber, E., Haaker, T., Kijl, B., & Reuver, M. (2008). Conceptualizing the STOF Model. In *Mobile Service Innovation and Business Models* (pp. 31-40).
- Bouwman, H., MacInnes, I., & de Reuver, M. (2006). Dynamic business model framework: a comparative case study analysis. *16th Biennial Conference of the International Telecommunications Society: Opportunities and Challenges for Telecommunications*, (p. 15). Beijing.
- Bouwman, H., MacInnes, I., & de Reuver, M. (2006). Dynamic business model framework: a comparitive case study analysis. *16th Biennial Conference of the International Telecommunications Society: Opportunities and Challanges for Telecommunications*, (p. 15). Beijing.
- Bouwman, H., Zhengjia, M., Duin, P. v., & Limonard, S. (2008). A business model for IPTV service: a dynamic framework. *info*, 22-38.
- Bruns, W. (1998). Profit as a performance measure: Powerful concept, insufficient measure. *Performance measurement: Theory and practice, the first international conference on performance measurement*, (pp. 14-17). Cambridge.
- Bryde, D., & Brown, D. (2005). The influence of a project performance measurement system on the success of a contract for maintaining motorways and trunk roads. *Project Management Journal*, 57-65.
- BSW Solar. (2013). Results from the PV GRID research in Germany . *The Dutch 20GW Challenge*, (p. 7). Amsterdam.
- Business Model Foundry, G. (2013). *What's your business model?* Retrieved September 6, 2013, from Business Model Generation: http://www.businessmodelgeneration.com/
- Casadesus-Masanell, R., & Ricart, J. E. (2011). How to design a winning business model. *Harvard Business Review*, 1-9.
- Castells, M. (1996). *The information age: Economy, society and culture. Volume 1 The rise of the network society.* New York: MA: Blackwell.
- CBS. (2011). Hernieuwbare energie in Nederland 2011. Den Haag.
- CBS. (2013). *Hernieuwbare energie; capaciteit, binnenlandse productie en verbruik.* Retrieved September 6, 2013, from Centraal Bureau voor de Statistiek: http://statline.cbs.nl/StatWeb/publication/?DM=SLNL&PA=71457NED&D1=3,5,12-13&D2=6&D3=10-21&VW=T

- Chesbrough, H., & Rosenbloom, R. (2002). The role of the business model in capturing value from innovation evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change*, 529-555.
- Coelli, T., & Walding, S. (2006). Performance Measurement in the Australian Water Supply. In T. Coelli,
  & D. Lawrence, *Performance measurement and regulation of network utilities* (p. 40).
  Cheltenham, UK: Edward Elgar Publishing Limited.
- Connors, P., & McDonald, P. (2010). *Transitioning communities: community, participation and the Transition Town movement.* Osford: Oxford University Press.
- Cooper, R., & Madden, G. (2006). Telecommunications Productivity Measurement for a Regulated Monopoly in an Era of Major Network Expansion. In T. Coelli, & D. Lawrence, *Performance Measurement and Regulation of Network Utilities* (p. 91). Cheltenham: Edward Elgar Publishing Limited.
- Corpeleijn, P., Pijffers, W. J., Jansen, B., Stoof, T., & Versprille, R. (2012). *Businessplannen voor uitrol zonne-energie in de corporatiesector.*
- de Reuver, M., Bouwman, H., & Haaker, T. (2006). Testing critical design issues and critical success factors during the business model life cycle. *Proceedings 17th ITS European Regional Conference*, (p. 18). Amsterdam.
- DE Unie. (2013). *Diensten*. Retrieved September 11, 2013, from DE Unie diensten voor lokale energiebedrijven: http://www.duurzameenergieunie.nl/diensten/
- de Vrieze, M. (2012). *Innovative business models for photovoltaic applications.* Eindhoven University of Technology.
- Dess, G., & Robinson, R. (1984). Measuring organiza- tional performance in the absence of objective. *Strategic Management Journal*, 265-273.
- DGRV. (2012). *Study results German energy cooperatives.* Berlin: Deutscher Genossenschafts- und Raiffeisenverband e.V.
- Doganova, L., & Eyquem-Renault, M. (2009). What do business models do? Innovation devices in technology entrepreneurship. *Research Policy*, 1559-1570.
- Drury. E, M. M. (2012). The transformation of southern California's residential photovoltaics market through third-party ownership. *Energy Policy*, 682-690.
- Dubosson-Torbay, M., Osterwalder, A., & Pigneur, Y. (2002). E-business model design, classification, and measurements. *Thunderbird International Business Review*, 5-23.
- DVHN. (2013, Februari 19). *Groninger, Drentse en Friese energiecoöperaties zoeken samenwerking.* Retrieved September 11, 2013, from Dagblad van het Noorden: http://www.dvhn.nl/nieuws/groningen/article9832591.ece/Groninger,-Drentse-en-Frieseenergieco%C3%B6peraties-zoeken-samenwerking
- EGO. (2011). *Die erste Bürger-Windkraftanlage entsteht*. Retrieved September 11, 2013, from Energiegenossenschaft Odenwald: http://www.energiegenossenschaftodenwald.de/index.php/ego-anlagen/windenergie
- El Sawy, O. A., & Francis, P. (2013). *Business modelling in the dynamic digital space.* Los Angeles, California: Springer.

- Epstein, M., & Manzoni, J. (2004). *Performance measurement and management control: superior organizational performance.* Oxford: Elsevier Ltd.
- Faber, E., Ballon, P., Bouwman, H., & Haaker, T. (2003). Designing business models for mobile ICT services.
- Feldman, D. (2012). Photovoltaic Pricing Trends: Historical, Recent, and Near-Term Projections. Denver.
- Flieger, B. (2011). Energiegenossenschaften. Eine klimaverantwortliche, bürgernahe Energiewirtschaft ist möglich. Neu-Ulm.
- Fortuin, L. (1988). Performance indicators Why, where and how? *European Journal of Operational Research*, 1-9.
- Frantzis, L., Graham, S., Katofsky, R., & Sawyer, H. (2008). Photovoltaic Business Models. *Renewable Energy*.
- Froschmeir, J., & Haffmanns, H. (2009). Chancenmarkt Energie. *Profil das bayerische Genossenschaftsblatt*, 16-17.
- George, G., & Bock, A. (2011). The Business Model in Practice and its Implications for Entrepreneurship Research. *Entrepreneurship Theory and Practice*, 83-111.
- Granovetter, M. (1994). The handbook of economic sociology. Princeton: Princeton University Press.
- Gulati, R., Nohria, N., & Zaheer, A. (2000). Strategic networks. *Strategic Management Journal*, 203-216.
- GVB. (2011). Gestaltung der Energiewende nach genossenschaftlichen Prinzipien.Genossenschaftliche Konzepte zur regionalen Umsetzung der Energiewende unter Eindung von Bürgern und Kommunen. München: Genossenschaftsverband Bayern e. V.
- Haaker, T., Faber, E., & Bouwman, H. (2006). Journal of Mobile Commerce, 645-61.
- Haaker, T., Faber, E., & Bouwman, H. (2006). Challenges in designing viable business models for context-aware mobile services. *3rd international CICT conference.* Copenhagen, Denmark.
- Haaker, T., Faber, E., & Bouwman, H. (2006). Customer and network value of 3G+ mobile services. An holistic approach to balance requirements and strategic interests. *Journal of Mobile Commerce*, 645-661.
- Hamel, G. (2000). Leading the revolution. Boston: Harvard Business School Press.
- Hawkins, R. (2002). The phantom of the marketplace: Searching for new E-commerce business models. *Communication & Strategies*, 297-329.
- HBR. (2013). *Robert S. Kaplan and David P. Norton*. Retrieved Oktober 12, 2013, from Harvard Business Review: http://hbr.org/authors/kaplan-norton
- Hedman, J., & Kalling, T. (2003). The business model concept: theoretical underpinnings and empirical illustrations. *European Journal of Information Systems*, 49–59.
- Heijden, v. d. (2013, June 13). Opschaling moet, en institutionalisering ook! Retrieved September 8, 2013, from Kennisplatform Energie+: http://www.energieplus.nl/dossier-financiering/blogsenergie/opschaling-moet-en-institutionalisering-ook!.342297.lynkx
- Herlinghaus. (2008). *Erneuerbare Energien und Perspektiven für den Genossenschaftssektor.* Frankfurt am Main: DZ Bank AG.

Herlinghaus, A. (2008). *Erneuerbare Energien und Perspektiven für den Genossenschaftssektor.* DZ Bank.

Heynen, R. (2013, Juni 5). *De energiecoöperatie: een bedrijf of een lokaal speeltje?* Retrieved September 11, 2013, from Energie en Water: http://energieenwater.net/index.php/opinie2/opinie-energie/2449-column-de-energiecooeperatie-een-bedrijf-of-een-lokaal-speeltje

- HIEROpgewekt. (2013). *Overzicht*. Retrieved September 8, 2013, from HIEROpgewekt: http://www.hieropgewekt.nl/initiatieven
- HollandSolar. (2013). *Opgesteld vermogen zonnestroom Nederland*. Retrieved September 6, 2013, from HollandSolar: http://www.hollandsolar.nl/nieuws-pagina1-a160-opgesteld-vermogen-zonnestroom-in-nederland.html#.UYD0arVA2So
- Holstenkamp. (2012). *Approaches towards a Systematization of Energy Co-operatives.* Lüneburg: Universität Lüneburg.
- Holstenkamp, L., & Degenhart, H. (2013). *Bürgerwindparks als genossenschaftliche Kooperationsprojekte*. Lüneburg: Leuphana Universität Lüneburg.
- Holstenkamp, L., & Müller, J. (2013). On the state of energy cooperatives in Germany. Lüneburg.
- Hooijdonk, L. v. (2013). *De thermometer in de lokale duurzame energiebeweging.* Retrieved from Energie-Plus.
- Huijben, J., & Verbong, G. (2013). Breakthrough without subsidies? PV business model experiments in the Netherlands. *Energy Policy*, 362-370.
- Huselid, M. (1995). The Impact of Human Resource Management Practices on Turnover, Productivity, and Corporate Financial Performance. *Academy of Management*, 635-672.
- Johanson, J. (1999). Creating value through mutual commitment to business network. 467-486.
- Johnson, M. (2008). Reinventing your business model. Harvard Business Review, 57-68.
- Johnson, M., & Suskewicz, J. (2009). How to Jump-Start the Clean-Tech Economy. *Harvard Business Review*.
- Jones, G. M. (1960). Educators, Electrons, and Business Models: A Problem in Synthesis. *Accounting Review*, 619-626.
- Jonkers, J. (2012). New Business Models. Nijmegen: Nijmegen School of Managment.
- Kaplan, R., & Norton, P. (1996). *The Balanced Scorecard*. Boston: Harvard Business School Press.
- Kennerley, M., & Neely, A. (2002). Performance measurement frameworks: A review. In A. Neely, *Business performance measurement: Theory and practice* (pp. 145-155). Cambridge: Cambridge University Press.
- Klein, S., & Loebbecke, C. (2003). Emerging pricing strategies on the web: Lessons from the airline industry. *Electronic Markets*, 46-58.
- Kumaraswamy, M., & Anvuur, A. (2008). Selecting sustainable teams for PPP projects. *Building and Environment*, 999-1009.
- Lantz, E., & Tegen, S. (2009). *Economic Development Impacts of community Wind projects: a review and empirical evaluation.* Chicago: National Renewable Energy Laboratory.

- Li, B., Akintoye, A., Edwards, P. J., & Hardcastle, C. (2005). Perceptions of positive and negative factors influencing the attractiveness of PPP/PFI procurement for construction projects in the UK: Findings from a questionnaire survey. *Engineering, Construction and Architectural Management*, 125-148.
- Loock, M. (2012). Going beyond best technology and lowest price: on renewable energy investors' preference for service-driven business models. *Energy Policy*, 21-27.
- Madhavan, R., Koka, B. R., & John, E. (1998). Networks in transition: how industry events (re)shape interfirm relationships. 439-459.
- Magretta, J. (2002). Why business Models Matter. Harvard Business Review.
- Massolution. (2012). Crowdfunding Industry Report.
- McGuire, J. (1988). Corporate social responsibility and firm financial performance. *Academy of Management Journal*, 854-872.
- McGuire, J., Sundgren, A., & Schneeweis, T. (1988). Corporate Social Responsibility and Firm Financial Performance. *Academy of Management*, 854-872.
- Menches, C., & Hanna, A. (2006). Quantitative Measurement of Successful Performance from the Project Manager's Perspective. *Journal of Construction Engineering Management*, 1284-1293.
- Meyer, M. (2002). Rethinking Performance Measurement. Cambridge: Cambridge University Press.
- Morris, M., Schindehutt, M., & Allen, J. (2005). The entrepreneur's business model: toward a unified perspective. *Journal of Business Research*, 726-735.
- Needles, B., Frigo, M., & Powers, M. (2002). Strategy and Financial Ratio Performance Measures. *Indian* Accounting Review.
- Neely, A. (2002). Business performance measurement. Cambridge: Cambridge University Press.
- Neely, A., & Adams, C. (2000, August). Perspectives on performance: The performance prism. *Focus Magazine for the Performance Managment Professional*, p. 4.
- Nielsen, R. (1988). Cooperative Strategy. *Strategic Management Journal*, 475-492.
- Okkonen, L., & Suhonen, N. (2010). Business models of heat entrepreneurship in Finland. *Energy Policy*, 3443–3452.
- Osterwalder. (2004). *The business model ontology A proposition in a design approach.* l'Université de Lausanne.
- Osterwalder, A., & Pigneur, Y. (2002). An e-business model ontology for modelling e-business. *15th Bled electronic commerce conference* (pp. 1-12). Bled, Slovenia: Université de Lausanne.
- Osterwalder, A., & Pigneur, Y. (2005). Clarifying Business Models: Origins, present, and Future of the Concept. *Communications of AIS*, 15.
- Osterwalder, A., & Pigneur, Y. (2009). Business Model Generation.
- Paramenter, D. (2010). *Key performance indicators: developing, implementing, and using winning KPIs.* Hoboken, New Jersey: John Wiley & Sons Inc.
- Peppars, J., & Rylander, A. (2006). From Value Chain to Value Network : Insights for Mobile Operators. 128-141.

- Perkmann, M., & Spicer, A. (2010). *What are Business models? Developing a Theory of Performative Representations.* London: Advanced Institute of Management Research.
- Porter, M. (1985). *Competitive advantage: Creating and sustaining superior performance.* New York: Free Press.
- Preissl, B., Bouwman, H., & Steinfield, C. (2004). *E-Life after the Dot Com Bust.* Heidelberg: Springer-Verlag.
- Preston, L., & Bannon, D. (1997). The corporate social-financial performance relationship. *Business and Society*, 419-429.
- Richter, M. (2013). German Utilities and Distributed PV. How to overcome barriers to business model innovation. *Renewable Energy*, 456-466.
- Salman, A., Skibniewski, M., & Basha, I. (2007). BOT Viability Model for Large-Scale Infrastructure Projects. *Journal Construction Engineering Management*, 50-63.
- Schoettl, J., & Lehman-Ortega, K. (2011). Photovoltaic businessmodels: threat or opportunity for utilities? In R. Wüstenhager, & R. Wübker, *Handbook of research on energy entrepreneurship* (pp. 145-164). Cheltenham: Edward Elgar Publishing Limited Inc.
- Schumpeter, J. (1934). Theory of economic development. Oxford: Oxford University Press.
- Schwencke, A. (2012). Energieke Bottom-Up in Lage landen.
- Selz, D. (1999). Value webs: emerging forms of fuid and flexible organisations. Thinking, organizing, communicating, and delivering value on the internet. University of St. Gallen.
- Shafer, S., Smith, H., & Linder, J. (2005). The power of business models. *BUsiness Horizons*, 199-207.
- Shapiro, C., & Varian, H. (1999). *Information rules: A strategic guide to the network economy.* Boston: Harvard Business School Press.
- Shen, L., Li, Q., Drew, D., & Shen, Q. (2004). Awarding Construction Contracts on Multicriteria Basis in China. *Journal of Construction Engineering and Management*, 385-393.
- Songer, A., & Molenaar, K. (1997). Project characteristics for successful public-sector design-build. *Journal of Construction Engineering and Managment*, 34-40.
- Staab, J. (2013). Erneuerbare Energien in Kommunen. Wiesbaden: Springer Gabler.
- Stappel, M. (2011). Trends bei Neugründungen von Genossenschaften in Deutschland. Zeitschrift für das gesamte Genossenschaftswesen,, pp. 187-200.
- Tapscott, D., Lowi, A., & Ticoll, D. (2000). *Digital capital Harnessing the power of business webs.* Boston: Harvard Business School Press.
- Teece, D. (2010). Business models, Business strategy and Innovation. Long Range Planning, 172-194.
- Tesla Motors. (2013, October 3). *Design*. Retrieved from Tesla Motors: http://www.teslamotors.com/models/design
- TexelEnergie. (2013). *Oprichting van TexelEnergie*. Retrieved September 8, 2013, from TexelEnergie: http://www.texelenergie.nl/oprichting/118/
- Theurl, T. (2008). Klimawandel. Herausforderungen und Tätigkeitsfelder für Genossenschaften. *Institut für Genossenschaftswesen*, 19-22.

- Timmers, P. (1998). Business models for electronic electronic. *International Journal of Electronic Commerce and Business Media*, 3-8.
- Toor, S., & Ogunlana, S. (2010). Beyond the "iron triangle": Stakeholder perception of key performance indicators (KPIs) for large-scale public sector development projects. *International Journal of Project Management*, 228-236.
- trend:research. (2011). *Marktakteure Erneuerbare Energien Anlagen in der Stromerzeugung.* Klaus Novy Institut.
- van der Heijden, J. (2013). Meerdere pijlers onder verdienmodel nodig. Retrieved from Energie-Plus.
- Verweire, K., & Van Den Berghe, L. (2004). *Integrated Performance Management*. London: SAGE Publications Ltd.
- Volz. (2012). Bedeutung und Potenziale von Energiegenossenschaften in Deutschland. *Informationen zur Raumentwicklung*, 515-524.
- Weill, P., & Vitale, M. (2001). *Place to space. Migrating to e-business models.* Boston: Harvard Business School Press.
- Wigand, R., & Picot, A. R. (1997). Information, organization and management. New York: Wiley.
- Wirtz, B. (2011). Business Model Management. Wiesbaden: Gabler Verlag.
- Wolsink, M. (2007). Wind power implementation: The nature of public attitudes: Equity and fairness instead of "backyard motives". *Renewable and Sustainable Energy Reviews*, 1188-1207.

Wüstenhagen, R., & Boehnke, J. (2008). Business models for sustainable energy.

- Wynn, G. (2013). *The growing cost of Germany's feed-in tariffs*. Retrieved May 6, 2013, from BusinessSpectator: http://www.businessspectator.com.au/article/2013/2/21/policy-politics/growing-cost-germanys-feed-tariffs
- Yuan, G., Zeng, A., Skibniewski, M., & Li, Q. (2009). Selection of performance objectives and key performance indicators in public–private partnership projects to achieve value for money. . *Construction Management and Economics*, 253-270.
- Zeithaml, V. (1988). Consumer perceptions of price, quality, and value: a means-end model and synthesis of evidence. *Journal of Marketing*, 2-22.
- Zhang, X. (2005). Paving the Way for Public–Private Partnerships in Infrastructure Development. Journal Construction Engineering Managment, 71-80.
- Zott, C., & Amit, R. (2010). Business Model Design: An Activity System Perspective. *Long Range Planning*, 216-266.
- Zott, C., Amit, R., & Massa, L. (2011). The Business Model: Recent Developments and Future Research. *Journal of Management*.

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# **Appendices**

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# Appendix A – Interview questions

# Structure of the interview

The oral interview will entail the interview questions below. The interview has been divided into six segments:

- General inquiry: A set of short and straight forward questions with descriptive questions primarily asking for quantitative data.
- Value proposition & value network: the application of the theoretical business model framework which is built around several central concepts, also explained below.
- Organizational arrangements: arrangements built around relationships between parties involved with the renewable energy projects
- Internal organization: a look under the hood of the REC to allow for an understanding how the REC organizes itself.
- The financial performance: interview questions related to the financial status, and the operational results.
- Future developments: more open questions diving into the growth plans, and future expectations related to the renewable energy sector.

# **Preparations**

It would be very helpful when the following actions were done when preparing for the interview:

- Read the interview questions below and make sure that you can answer each of the questions.
- Bring the financial balance sheet (loans, equity, assets) of the REC of the years 2010, 2011, and 2012
- Bring the operation results (revenues, costs, investments) of the REC of the years 2010, 2011, and 2012.

# **Concepts** explained

Actor:	A party, organization, company, or group which has an economic and/or social stake in a project/development.
REC:	Renewable energy cooperative, abbreviation representing solar and wind Energiegenossenschaften.
Value network:	Within the value network concept, value is co-created by a combination of players. It generates economic value through complex dynamic exchanges between one or more enterprises, customers, suppliers, strategic partners and the community.
Vale proposition:	The value the firm offers to an actor and/or customer segment

# The general inquiry

- A.1 At the genesis of the REC, what were the reasons to start an REC?
- A.2 In which year was your REC founded?
- A.3 How many members do you currently have?
- A.4 How many solar installations do you currently have?
- A.5 How many kWp are all solar installations in total?
- A.6 On what type of building/property/land have you installed the solar installations?
- A.7 How many wind mills do you currently (co)-own?
- A.8 On what type of property/land have you installed the wind power facilities?
- A.9 How large is the geographic spread among the renewable energy production units?
- A.10 What type of activities is organized by your REC?
- A.11 How often are these activities organized by the REC?

# The value proposition

- B.1 When looking back to the start of your REC, what was the intended value proposition(s) that your REC wanted to create?
  - B.1a What are the tangible value propositions that your REC wants to create?
  - B.2b What are the intangible value propositions that your REC wants to create?

# The value network

- C.1 Within your value network, which actors were involved?
- C.2 What are the values and goals of each of these actors?
- C.3 What activities did each of these actors provide to your RE projects and when?
- C.4 What type of relationships emerged from these interactions?
- C.5 How much relevant technical and managerial skill was present among the actors?
- C.6 How did your REC shape expectations of the actors involved?
- C.7 How did the actors involved in the cooperation and the actors outside the cooperation perceive the created value?

# Organizational arrangements

- D.1 Following from the built relationships, which arrangements have been/will be made between the actors in the value network?
- D.2 How high is the commitment and the taken responsibility among the actors committed to the value proposition(s)?
- D.3 Which arrangements are present between your REC and your Genossenschaftverband?
- D.4 How do you perceive the contribution and cooperation between your REC and your Genossenschaftverband?

# Resources, skills, and internal organization

- E.1 How much relevant technical and management skills were/are present within your REC?
- E.2 How have these skills been applied during the execution of renewable energy projects?
- E.3 How have you organized your REC internally?
  - E.3a What type of members do you have (e.g. people, organizations, governments)E.3b How has your REC structured the voting procedure within the
  - Generalversammlung?
  - E.3c For which length of time are members occupying a position within the Vorstand or Aufsichtsrat?
  - E.3d How are board members compensated for their efforts?
  - E.3e What motivates board members to become actively involved into the REC?
  - E.3f How are the relationships among the members of project team(s) responsible for the renewable energy projects?

# The financial performance

F.2

- F.1What is the financial status of your REC?F.1aWhat were/are the investments into RE projects in 2010, 2011, 2012, and 2013?F.1bEnd
  - F.1b From which sources did you attract capital, and how high is this amount per source?
    - F.1c What were your considerations when choosing these sources of capital?
  - F.1d What were your considerations when choosing your equity ratio? What are the operational results of your REC?
  - F.2aWhat were your revenues from the EEG in 2010, 2011, and 2012?F.2bWhat were other forms of income, and how large were they in 2010, 2011, and 2012?
    - F.2c What is the interest rate of your REC on the loans provided by your members, and the loans provided by external financers?
  - F.2d What other expenses did you have in 2010, 2011, and 2012?
- F.3 What is the spread and average investment of your members?
- F.4 What is the maximal amount a member can invest within the REC?
- F.5 When expanding your project portfolio, which members get investment preference?
- F.6 Which risk do you perceive to be present related to your REC?
- F.7 How has this risk been shared/allocated among the involved actors?
- F.8 How sustainable is the profit generated by your cooperative?

# **Future developments**

- G.1 On which value propositions and projects is your REC currently working?
- G.2 Which market and legislative developments do you see, and how will they impact your REC?
- G.3 Which value propositions and future projects/services is your REC considering to provide in the coming 10 years?
- G.4 To provide these new value propositions, which actors do you deem necessary, and what would be their role?

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# Appendix B – Interviews with German RECs

# B.1 Energie für Saerbeck eG

Ansgar Heilker (Aufsichtsrat), Volksbank Saerbeck eG (Saerbeck), July 8<sup>th</sup> 2013

# "Why was the energy cooperative founded?

The start of the cooperative, originated from the climate protection concept that was created by the municipality of Saerbeck. This concept was built upon several pillars, and was introduced in 2008. One of the pillars of the climate protection concept was to reach climate autarchy, and also civilian participation was important for the municipality. This wish by the municipality was considered by the local cooperative bank when they heard from the concept during a local climate meeting. The mayor then said: "the civilians should be involved!" In 2009 no civilian participation was yet started, so the cooperative bank discussed to start of an energy cooperative, thereby helping the local municipality in reaching their goals. The cooperative bank then acted by proposing to start the energy cooperative. The municipality had been defining the broad road to go, but the details had to come from society itself. The municipality created broad concepts and ideas resulting into a climate community being created. From this community the cooperative was started. They asked the mayor for approval and he liked the idea. The board of the local cooperative bank provided the municipality council with a broad and rough concept for starting the energy cooperative. In September 2009 we explained them what a cooperative represents, since many people know an AG (Aktiengeselschaft) better than a cooperative. The cooperative was started, as a structure to allow for civilian participation. The municipality liked the idea, and they wanted to support it. Two employees of the Volksbank Saerbeck then started the preparations inside and outside normal working hours. Since we are rather independent to choose our hourly planning, we could mix our bank work and energy cooperative work. Before starting the cooperative, the Energie für Saerbeck had to approve their plans to the Cooperative Union in Rheinland Westphalia (Rheinisch-Westfälischer Genossenschaftsverband), with the union overlooking both the cooperative bank and the energy cooperative. Eventually on the 21<sup>st</sup> of December 2009, 9 people founded the energy cooperative. Several of these (legal) people were: the Volksbank Sae rbeck, an employee of the Volksbank Saerbeck, Mister Ansgar Heilker, the Mayor of Saerbeck, an old-Volksbank president, the former head of the local school, another employee of the Volksbank Saerbeck, and a Saerbeck PV specialist. The mayor was asked to participate, to allow people to see that the business model was built to allow for civilian participation on public roofs (school), resulting in the mayor becoming a supervisory member. Mister Heilker is also member of the Aufsichtsrat. The former head the school and the former Volksbank president are Vorstand members. We have chosen these two people, because they are older, and are known here in the village and portrait seriousness and sustainability. After the start of the cooperative, we wanted to invest. For the solar energy system, we chose an engineering cooperative that has been helping energy cooperatives with all of their technical challenges. The financial, economic and legal subjects were taken care of by the cooperative members from the Volksbank. At the start of 2010 there was an overview of what could be realized within the year, and this represented 126 kWp, which had to be bought for the rather high price of around €400.000. All the investment were made with an equity ratio of 30%, so we needed €120,000 in equity. The other 70%, came from the Volksbank, with an interest rate around 4%. The members of the cooperative provided the equity for the investments, and when profits were to be made these would be distributed among the members. In the year 2011 we used the same approach and asked the people once more to invest in new projects, with again an equity ratio of 30%. In 2012 a more complicated structure was created. The municipality had bought an old army ammunition depot of 90 hectares, 5 km away from the village. The whole depot were to be altered into a bio-energy park. A total amount of 5.74 MWp was installed, requiring a total of €10 million. Since it was more risky, this PV was constructed within a GmbH &Co.KG. Within this legal entity also an equity ratio of 30% was applied, which was funded by 63,5% through the energy cooperative, and the other 36,5% provided by private investors, with minimal amounts of €200.000. We needed the extra investments by the private investors, since we could not get sufficient investments together through our energy cooperative. The energy cooperative provided €1,950,000, and five private investors provided the rest. The society was named SaerPV bioenergiepark GmbH & Co. KG.

The GmbH was named the Saer PV BioenergiePark. Next to the PV park, 7 wind mills were to be built of each 3 MW, with one of the 7 windmills being funded by our energy cooperative. Our cooperative has 100% ownership of the windmill, and again we provided 30% equity representing  $\in$  1,900,000. The bank loans necessary for the entire investment came from the WGZ bank (cooperative central bank) from the Sparkasse. In parallel with these investments our cooperative also covered another smaller roof with a PV-system.

# "Which projects will you undertake in the future?"

Up till now our energy cooperative will not work on new projects, since we have expanded rather quickly. For example the balance sheet has grown from  $\in$ 352,000 in 2010 to  $\in$ 803,000 in 2011 and  $\notin$ 4,851,000 in 2012. During our start year in 2010 we made a loss of 19K, in the next year we made a profit, but the losses of the previous year had to be compensated by the profits generated in 2011. Eventually in 2012, we could provide our members with dividend from the revenues originated from the EEG. When all the production facilities are running, our energy cooperative will be generating  $\in$ 150,000 to  $\in$ 200.000 per year. Since a part of the revenues are attributed to amortizations to calculate for asset value loss over time, we will have a luxury problem in 20 years, since we will have a strong liquidity with limited new renewable projects. These amounts of liquidity can be used to repay bank loans and with lower costs on bank loan the dividends for our members can be increased. Amortization of the projects will take 20 years, and with this build up of liquidity, members can be given back their investment in case they want it back or one of them dies. Current returns are somewhat lower, but on average we expect that returns will be around 4%. When a member wants to get his investment back, the investment can be accessed five years after the initial investment. At that point we will repay the nominal value of the cooperative share, we therefore have no stock exchange.

# "Where have you built your renewable energy projects?"

All renewable energy projects are within the municipal borders, with no investments outside the region. Our Volksbank is involved with the energy cooperative, because it is beneficial for our bank to be an active participant within this initiative. Due to this initiative, there has been more cooperation between the local cooperative bank, and the municipality resulting into a new kind of network. When developing these projects, we are looking for local partners. For example the local PV installer installed several PV-systems and the local insurance company (Provinzial) was involved. Eventually the added value of the projects have to stay within the region. We currently have 390 members, of which 75% originate from Saerbeck, with the rest of the members originating from the municipalities located next to the Saerbeck municiplality. Members can participate with at least €1000, with a maximum of €120.000, with an average investment of €9,000. Currently many people have problems finding the right places to invest their funds into and therefore our 4% interest rates provide good investment opportunities. Due to the cooperation between the government and the energy cooperative we have erected an energy awareness walk in the village. Through images people can see the energy efficiency examples and see how energy can be saved. Another cooperation between the municipality and our Volksbank emerged due to our connection to the local warmth grid, that was also created for the school and church.

*"Which activities does your energy cooperative organize apart from your general assembly?"* Activities employed by the energy cooperative represented a trip with around 100 members to the construction site of one of the PV systems, and apart from that, once a year, we organize our general assembly. Other activities represent work by the engineering cooperative that checks our renewable energy facilities.

*"So up to now you do not have any engineers or technicians in your Vorstand or Aufsichtsrat?"* The mayor left the Aufsichtsrat, and the PV technical specialist became the new member, thereby providing expert knowledge. Although, this board member does not have to provide his technical services to the cooperative, since maintenance service contracts are signed, both for wind and solar. The Vorstand is getting a small compensation since 2013 of  $\in$ 100/month, and the Aufsichtsrat is getting no salary. Our loans at the cooperative bank are annuity loans, the repayment amounts increase per year, and the total interest costs therefore decrease every year, which in the end result in constant total capital costs.

## "Which risks exist regarding your investments?"

There are multiple risks, for example there is a chance that a windmill might fall down, maybe on top of our PV-systems, or someone might steal the PV systems. Another risk is the continuity of the EEG, there is the risk that the renewable energy law might change, and therefore I advice everyone involved with renewables to wait until the elections are over until it becomes clear how much the FITs are going to be changed. Since the laws might change, the investment context is currently under pressure. This uncertainty affects all renewable energy sources, PV, wind and biomass. Our wind park has not yet been built, but we believe that we will get the FIT, since we are already building the site. But I can imagine that projects that are only projected and planned might get affected by FIT changes. I expect that the EEG will be limited after the new Bundestag has been elected, since the annual expenses of the EEG have risen rather significantly and its cost expansion therefore might be slowed. Another risk originates from contract-partners filing for insolvency, but when this happens we just have to find ourselves another partner.

*"To which extent do you consider working with energy storage in combination with wind power?"* The energy cooperative is looking for opportunities to invest into new projects, for example storage, but before investments are performed, these technologies have to be mature enough. Our cooperative should not always be the pioneer, for now we consolidate and wait what is going to happen. Based on new developments, we can make decisions for new investments, but these have to be economically viable.

## "For how long are the Vorstand members elected?"

Our Vorstand members and Aufsichtsrat members are always elected for a period of three years, but when wanted another three years can be added.

# "What motivates people to invest in your energy cooperative?"

I expect that around 90% of the members are looking for interesting interest rates under a 'green' cover. Some people believe these projects are good, and therefore they invest for ideological reasons. It will be a challenge to find new Vorstand members among the members that have invested. Currently one of the Vorstand members is 75 years old, so he won't be able to do it forever. I am curious whether we will find someone who is willing to take on the role of Vorstand member under the same conditions as current members, since the compensation for the job is not gigantic.

# *"My preparations tell me you own 5900 kWp PV in total, is this correct?"* We currently have around 6100 kWp total installed PV.

### "How have you grown to 390 members in three years, have you knocked on every door?"

When gathering our cooperative members, we first started to promote the cooperative among the members of the cooperative bank during the annual meeting, which gathered around 100 to 200 people. In 2010 we then went to the local press to provide news items about our cooperative. Based on the meeting at the cooperative bank, people who were interested were contacted and about 60 people became cooperative members in 2010, and 74 more were added in 2011, and now we have 390. The municipality has provided news items and often provided information about our projects. Also the ZDF and ARD talked about our initiative, which resulted in requests to participate from all over Germany and Europe. In our first two projects only inhabitants of Saerbeck were allowed to invest, but during our last project, the Bioenergiepark for PV and wind, also inhabitants of the surrounding cities were granted investments opportunities. During the investments, first the inhabitants of Saerbeck were provided investments opportunities, and only after everyone from Saerbeck was provided an investment opportunity, people from outside Saerbeck could invest. In the end we have completely drained our municipality of funds and therefore we needed others.

# "Are you cooperating with other energy cooperatives in this region?"

In the future we might want to cooperate with other energy cooperative to join together our administrative tasks. For now it is a growing market, but in the future we might have to slim down.

# B.2 Paderborner Land eG

# Andreas Lahmer (Vorstand), Volksbank Paderborn eG (Paderborn), July 9th 2013

# "What is your role in the Volksbank?"

I am currently part of the competence center for renewable energy at the Volksbank. I do the project financing for wind projects, focuses on energy efficiency and material efficiency. My Volksbank is currently one of the 10 biggest Volksbanken of Germany, and the Volksbank Paderborn has financed 350 million euro relating to solar power projects. Next to the Paderborn energy cooperative, there has been another energy cooperative next to the area.

# "Can you tell me something about the founding story of the energy cooperative?"

Paderborner Land eG has been founded by three Volksbanken in 2009, together with the Kreis Handwerkerschaft (craftmanship society), since the cooperative involved many future PV systems and should preferably use the local workforce. Municipality Salzkotten, and municipality Lichtenau were involved also. Then 4 to 5 PV systems were constructed on public roofs. Then it was decided to broaden the view to private rooftops. Their biggest PV system was built near Altenbeken, with 2,7MWp together with 400 kWp on the roof on an industrial building and a new PV system of 520 kWp was built on a community building related to trash collection. The participation of civilians was required by the municipality to fund this new PV production facility.

## "What is the reason that you came together?"

The main reason for starting the energy cooperative was built on the change that is happening to the energy supply. The energy supply is moving away from a centralized supply and towards a decentralized energy supply. There will be multiple suppliers, and this decentralized production requires other structures. Our original thought was that there are multiple civilians without the opportunity to invest into a PV-system, and there were many people that asked the Volksbank for opportunities to invest into PV. These people should be allowed to invest into new PV systems, and from this desire we end up at the motto of the cooperative: "What a single person cannot realize, realize many". We thought that such investments did not fit our bank, it should be something different but should still be a cooperative since we believe it to be very democratic. When starting this energy cooperative, we did not want to do it by ourselves, but wanted other to join in.

# "Which party was the first initiator of the energy cooperative?"

All parties involved were mutually involved, not one party was more dominant over the other. This movement is a movement of mutual devotion. The Volksbank provides the financial infrastructure, with the energy cooperative board members working voluntary, both the management board and the Aufsichtsrat. The start of the energy cooperative was started after several meetings with the foundation members. The cooperative was founded, and the statutes were provided to the RWGV (Rheinland-westphalische Genossenschaft Verband), with the Verband guaranteeing our quality.

# *"With the last PV project the necessary funding of equity was fulfilled within one day."*

# "Can you tell me something more about the process of founding the cooperative?"

After the foundation we started new projects within Lichtenau and in Salzkotten, the PV systems were installed with money from new members, which could buy cooperative shares of  $\in$ 500 each. The investments were partially financed through bank loans, and partially through membership shares. For the first PV system we needed  $\in$ 1.000.000 of which  $\in$ 200,000 would be equity from our members. The rest would be provided through

bank loans and each of the three Volksbanken provided a part of it. Currently we have around 260 members from this region, which provided €1.000.000 in equity. By using the news of the local newspapers the story of the energy cooperative was spread. But also the local Volksbank buildings were providing energy cooperatives with flyers. The workforce of the local cooperative bank then gave extra information when people came to them when they were interested in the investment opportunities.

The members for the energy cooperative were gathered through the local buildings of the Volksbank. There are 60 buildings of the Volksbank across the Paderborn area, with every bank able to respond to new demand for investment. With the last PV project the necessary funding of equity was fulfilled within one day. This energy cooperative structures investment in such a way, that funding is gathered only when new projects are available. An engineering firm was then asked to support the energy cooperative, afterwhich there was a search for a local PV supplier, and based on their proposals a supplier was chosen. Per project different PV suppliers were asked to help out.

## "How engaged are the people that own cooperative shares?"

Of the 260 members, 80-90 people were present at the general meeting. But members in general are not motivated to help out in the energy cooperative. There is some interest into  $CO_2$  reduction, but this interest is limited, since the value creation tends to be primarily financial. The bigger PV systems that was added to the portfolio resulted into somewhat higher starting costs and as a result the investors of the first projects experienced negative results. Members did not mind these losses, since they wanted to push the energy transition, and missing out on one year of dividends was not perceived bad.

# "What does your cooperative do next to the PV projects?"

Next to the PV activities, our energy cooperative is now looking for projects together with project developers. Our energy cooperative does not want to become some kind of bank, we want to own the energy production for the longer term, and own both solar and wind. Therefore we are now looking at 11 to 12 windmill opportunities. The Landkreis has to provide the allowance for putting down the windmills and by using civilian participation structures, the 'go' by the Landkreis might come sooner, by increasing the acceptance of civilians towards windmills. For the  $\leq$ 40,000,000 necessary for the wind parks, we will need  $\leq$ 10,000,000 through our members, and therefore we would need about 2,000 new members. Currently several project developers are looking for civilian participation and come to us, in parallel our energy cooperative goes to project developers to suggest the civilian participation within their wind projects. Our energy cooperative itself is not involved with the technical development of the wind parks and leaves this to the project developers.

### "Why are you so involved with the energy cooperative and put in so much time?"

The board members of the energy cooperatives are involved primarily ideologically. When they would do this from a financial standpoint, the energy cooperative would not be feasible. On the long-term the energy cooperative is to grow towards 2,000 or 3,000 members. To reach this amount we eventually need people whom are to be paid by the revenues from the renewable energy production. Eventually the energy cooperative should be able to become independent and run without the help of the voluntary workers. When you have a small energy cooperative with small profits of around €5,000/year, it will be far too small for independent long term success. Without the external help (volunteers), such energy cooperatives might falter. But until now the energy cooperative is not able to stand on its own feet, without the voluntary help of its Vorstand and Aufsichtsrat.

### "Can you tell something more about the new cooperative close to Paderborn?"

For a new energy cooperative, the Höxter Energiegenossenschaft, many actors joined forces: eight municipalities (representing 200.000 inhabitants), all local banks, and all local grid operators. These organizations decided that within this energy cooperative all its members were start-up members. With 18 members, all these parties allowed for more future professionalism, with 300 members. By now this energy cooperative has built one PV-system, and there are good wind power opportunities, with current plans to build wind parks explicitly for this energy cooperative. New projects originate partially from the grid operators, partially from the land owners, and from project developers. The Volksbanken, the local Sparkasse, and the local newspapers were promoted the energy cooperative projects and mentioned the necessary funding. The Vorstand was built by the presidents of the local grid operators, and the mayor of the local municipality.

Within one project, the local land owner possesses 45% of the shares, the cooperative Höxter owns 45%, and the local grid operators own 10%. German grid operators are no energy producers, but instead also provide the gas infrastructure, the water provision, the waste. Bringing all these 18 parties together is extremely hard. But it makes sense to structure a cooperative on such a size, since a large cooperative allows for economies of scale. For example back-offices are brought together and are centralized, and therefore not every municipality requires one Vorstand. Within Kreis Höxter there will be one energy cooperative, which allows for sufficient revenues to fund full-time employees.

# "Why have you decided for another equity ratio than 30%?"

Our financial balance is around €7,000,000, with 970.000 euro equity in 2012. This amount of equity has been growing since there are have been more projects. A total profit of 40.000 was generated, which results into a dividend of 4%. Because of the costs based on new projects, dividend incomes are

smaller, since its costs have to be paid, but we can make these costs because it is our goal to become bigger and develop ourselves. In 2010, we had a balance €500,000, in 2012 this was €7,000,000. With the last PV project an equity ratio of 10% was used, since the loans are far more cheaper (3%/year), and thereby the dividend for equity providers increases. Since the FIT for PV has gone down significantly, the dividends on the PV systems were so low, that a low equity ratio was necessary to allow for a somewhat interesting dividend. Cooperative banks say that they want to allow the energy cooperative to get loans on the cheapest way. For 10 years these interest rates on the loans are fixed, after which these rates are going to be re-negotiated.

"I learned about a cooperative using member shares and member loans, do you use this?" We do not use such member loan, we want real equity, with members shares representing  $\in$ 500, and in Kreis Höxter  $\in$ 1,000. Such subordinated loan structures are not used by us, because we want that everybody can become owner of all the renewable energy production facilities. We do not want to use the cooperative as a investment construct, since therefore exists the bank. The cooperative is an equity instrument. I do not see a special perk to use member loans. Using 100% equity with our energy cooperative for 15 windmills and needing  $\in$ 50 million, you will need a lot of marketing. But when I only need  $\in$ 10 million equity, then this would be no problem.

# "Do you have a separate company for the windmills?"

This is not necessary. It does not really matter which legislative entity you choose, as long as the energy cooperative is doing this itself and properly. A reason the create a separate company which owns one or more wind parks is interesting for tax payments to the local government, thereby providing allowing taxes to flow to the municipality where the windmill is located. Another reason for building such a separate company structure might be useful for deviating risk. When the wind mill may go bankrupt, your cooperative will stay unhurt, but this is not necessary for us.

# "What will motivate people to replace the current board members?

When eventually new board members are necessary, these can be sought among the members or externally. We eventually need new board members, since the current members cannot continue doing it. Next to growing, it is also important to have a higher degree of professionalism within the energy cooperative. To be able to provide this professionalism, it is necessary to pay for the Vorstand, and therefore this requires a significant higher amount of investments. To realize this professionalism, a stronger growth of the energy cooperative is foreseen for the next year through new windmills.

# "Which risks do you see and how you do deal with them?"

The technical risks related to the renewable energy production facilities are limited, since they are covered by insurances and guarantees by their manufacturers. There are potential risks of growing interest rates, thereby making the dividends relatively uninteresting. The first five year, the new members cannot take their investment out of the energy cooperative, which is noted in the statutes. There also exist Ertragversicherung (production insurance) but these are rubbish, since the production volume risk is always present. Of course there are risks of parts of the PV-systems breaking down, for example the data logger, or the DC/AC inverter. There might be a risk that the EEG falls apart, and in that case the cooperative would be in a financial bad weather, with our members asking for their investments back.

"Are there other services that you are considering?" For further expansions of our service portfolio, one example would be selling the produced electricity to the members of the energy cooperative. Investing into biomass/biogas plants does not fit in the future plans of the energy cooperative, because of its complicated nature. We are not sure whether we can be able to handle such a project. Working together with other energy cooperatives to sell the electricity produced might be one of the ways of new future services.

*"...members in general are not motivated to help out in the energy cooperative."* 

# B.3 Bürgerwind Westfalen eG

Catharina Hoff & Friedbert Agethen (Vorstand), WestfalenWIND GmbH (Lichtenau), July 9th 2013,

# "When did your cooperative start and why?"

We are a somewhat different kind of energy cooperative. It started in 2011 and we were founded because there were multiple resistance movements against more wind in our region. Then our project development firm started discussing how we could we allow local people to participate in the wind projects? Local people can become shareholders of a operating company, but doing this requires a lot of time, and not everyone wants to become a partner of such a company. Such companies require certain entrepreneurial activities and risks, of course returns are linked to such a company, but the risks are still there. But not every civilian is able to invest large amounts of money among these companies. Even when there are people that have a positive disposition towards windmills, these still cannot really participate.

# "What are minimal investments in such companies?"

Such investment can start at €10,000, but such an investment is still too much for many people and another reason for not investing can be the fact that the investment is done for a long period ranging over 20 years. And some people say they are too old for such investment. For these people, our development company has founded the energy cooperative. While setting up the energy cooperative, our company WestfalenWind was looking for people who were positive about windmills. These people came from different background out our region. These were representatives of banks, of craftsmanship cooperatives, and among these people we asked for their opinion, and with them we founded our cooperative, and created the concept that every member from our Kreis and the neighboring Kreise can become a member starting at €500.

## "Which banks were involved?"

Involved was the Vorstand of the Sparkasse Paderborn Dexter, who has become an Aufsichtsrat member of the energy cooperative.

# "What was your main intention when starting the energy cooperative?"

The main keywords are 'stakeholder value' and therefore we have developed a concept which allows surrounding civilians near the windmill to invest. When people invest into our wind park, people do not get the highest return, but they get a good return. People can say they are connected to the wind park, and benefit from the wind park. This was our main intention.

# "Do also richer people invest into your cooperative?"

It surprised our energy cooperative that wealthy private people were investing strongly. Currently the average investment represents 11,000 euro. These investment sizes represent the investments done into limited partnerships, and we did not expect these. We expected ¤4,000, we thought that people would not be willing to invest for 15 years, with a stable and proper dividend. These were our main criteria and therefore the cooperative was founded.

## "Who initiated the civilian participation in wind projects?"

The local government ventilated their opinion that local people should be more involved with wind power projects, but they had this opinion in the background. But the government had no view on how to organize and implement such participation in a useful manner. The cooperative is given an interest rate of 6.5% on the loans it provides to the wind mill operating firms. Why 6.5% interest rate? Municipalities or Kreise do not know this, since it requires business experience in the field of wind energy. What municipalities should do in our opinion, but did not do here, they should have provided an integrated concept. But the municipality has not accepted this, and rather responded negatively. They were not negative towards our cooperative or the civilian participation, but we wanted to create a more local social value. Therefore the WestfalenWIND GmbH suggested creating a fund where a certain percentage of the interest rates should flow into. This fund would reinforce and strengthen the cultural and social activities in the regions surrounding the windmills. There should be constructed a civilian foundation. The more windmills, the more foundations money. But the government was against the foundations, since they felt being bought by the project developers. They did not want be held responsible for allowing new windmills in their neighborhood only because the local fund was set up. We wonder how large the sum for the fund has to be that the municipality cannot ignore it, and how large it should be that we keep our credibility.

# "What was the role of the banks when starting the energy cooperative?"

Our project development company has initiated the energy cooperative, and representatives of the local Sparkasse are founding members and are part of the Aufsichtsrat. These persons are members of the cooperative as a person and not as the Sparkasse. When you have such people on the front of your cooperative, you show fairness and cleanness, and it provides trust.

# "How did you get to know the first members of your cooperative?"

We started with the Vorstand and Aufsichtsrat members, and then we contacted the press to explain our concept. From these our first members emerged and then mouth to mouth promotion was set in motion. We consecutively made a homepage and flyers, followed by an information meeting at the local airport. We chose the airport because it allowed for a good view on the wind park which was being built.

*"So your webpage says you currently have 507 members, is this correct?"* Currently we have 620 members.

# "To which extent do new members invest in existing wind parks?"

The energy cooperative is one big pool, members put money in this pool, which is being invested into different projects and always under the same terms. In essence every member invests in all wind parks.

### "How do you structure the investment of new members?"

The cooperative itself only becomes a small shareholder in a windmill operating company. The largest part will be provided through a loan to the company. For an investment the sum 'x' is provided by the bank and the sum 'y' is being provided by the cooperative through a loan.

#### "So you invest with an equity ratio of 15% to 20%?"

When we invest we use a 70% bank loan, with 10% being loans that originate from the energy cooperative and 20% is equity by partners. Of the total investment, the cooperative becomes shareholder for 1% to 2%. The energy cooperative is given an interest rate of 6.5% on the 10% loan, which is provided independent on the wind park performance, thereby providing regular income for the cooperative. For every new wind project, a 10% loan of total investment by citizens with 6.5% interest is okay, but if you increase the size of the loan, the capital costs will rise significantly, since the other loans are provided by banks for 3% to 3.5%. The equity providers for the wind parks are given 8% return, although with a higher uncertainty, compared to cooperative members, whom are given 5% which is certain. There can only be gathered such amounts of new equity through members as which can be put aside for new projects. Through this structure, the members cannot say that they invested in a specific project.

# "Do you currently have a member stop?"

No we do not have a member stop, since we have projects that are currently under development. We have the project Wewelsburg for which we collected  $\in$  3,000,000, then we developed the Weiberg for  $\notin$  2,000,000, which is already filled up. And now our cooperative is building its own windmill for which we require  $\notin$  1,000,000.

#### "For all these investments you use an equity ratio of 30%?"

Yes approximately, but this is currently developing, and we could also work with a 20% of 25% equity ratio.

# "How have you expanded your cooperative in time?"

Our member growth looks somewhat like an exponential growth, but eventually it will become an Scurve because we cannot keep on taking in any new members when no new windmill locations exist. When this moment will be is still unclear. When we have a membership stop there might be some internal changes, with members interchanging shares.

# "Who pays for the costs made to develop the windmills?"

The cooperative collects the money and invests it, and she does not have anything to do with the development of the project, since it buys a finished windmill. There is a fixed price for which the cooperative buys the windmill and then operates it themselves. There are no costs relating to planning, since all this has been settled in the past. Our cooperative comes in when all things related to project planning and development have been finished.
"When WestfalenWIND develops all these projects, who owns this development company?" WestfalenWIND is a company owned by multiple natural persons, of which one am I (Mister Agethen). We initially worked together with four people, and now several others joined that fit in our company. It is never our intention to cooperate with Stadtwerke for example, since they have different types of decision making structures. Many things are decided here at the table, we can take risks where others do not because they keep on weighing them. We are a small and homogenous group that has done several things together, which are aware of the risks and consciously take risks. All risks are taken by our company and at the end of the project they are taken out. For example last summer we started planning a new park which we want to build next year, but there is no building permit, and we can only get the permit when we win a certain court judgment. We hoped that things would turn out our way, since we already started preparing for a positive response, and luckily we got it. We took the risk whether it would become something or not, and when it would not, we would be stuck with the costs. When it becomes something, then we are lucky, and these are risks that the development company is taking, but these risks have nothing to do with the cooperative. The cooperative only exists to provide finances and allow hopefully as many people to participate. They are only one element of the total concept, and they do not play the main role.

#### "How large are the wind parks that you have been investing in?"

The wind park Wewelsburg contains 11 wind mills, Weiberg 5, and HaarenLeiberg 20 windmills of which one is completely owned by the energy cooperative. And apart of these there exist multiple other projects which will be hopefully develop in the future.

#### "What effect does the uncertainty relating to the height of the EEG have on your plans?"

The risk of the EEG lowering are not really inserted into the project planning. There are continuously risks involved with planning and building wind parks. In 2000, the EEG law changed and no one knew how it would go. But we did not let us being influenced by these uncertainties and kept on planning ahead, and in the end we had to decide to either build, buy or develop it. When we negotiate with the windmill manufacturer, the EEG developments are always in the background. Windmill manufacturer will not provide windmills, when the future cash flow is not sufficient enough, because they know banks will not provide loans when future cash flows are too low. Terms related to the EEG Feed-In-Tariff are inserted into 'deals' between project developers and the windmill manufacturers. It makes no sense for the manufacturer when they start building the windmill and they eventually do not get paid. A scenario for future projects might result in a change in the loan structure. Higher returns from older projects might then be combined with lower return projects from new projects. As a results, the dividends to our members might go down from 5.0% dividends to perhaps 4.5%. When lower interest loans are to be provided to a new wind park, the members have to decide on this, since they will also experience the lowering dividend, based on their shares in the energy cooperatives. We have to ask for approval among our members for such investments and when they vote against it, the cooperative closes up.

#### "How does your cooperative differ from the cooperative in Paderborn?"

Compared to Paderborn Land eG, the BürgerWind Westfalen is completely different. When the BürgerWind Westfalen started its cooperative, they talked with the Paderborn Land eG. We found out they were having completely different perceptions on how to run an energy cooperative. We asked them whether the Paderborn Land eG would integrate its structure into their cooperative, but they did not want it. Up till now, Paderborn Land eG has not funded or built any windmill, since they are no project developers, since they are all volunteers. They have no access to new wind parks, so the Paderborner Land eG has to find finished windmills and buy these. Then the Paderborner Land eG came to us and asked us to sell them a wind mill, upon which we said, why should we, when we can fund it ourselves. They did not consider that they have to a new supply of projects, for them it was a strategic failure not to involve them with our cooperative. They could invest inter-regional, but then their regional identity will be blurred.

#### "When in the future will the membership among the Vorstand and Aufsichtsrat change?"

Last year a member of our cooperative was voted to become a part of the Aufstichtsrat. The Aufstichtsrat of the energy cooperative can contain up to three members, with every year allowing one of the members to leave or to be re-elected. This has the advantage that not the entire Aufstichtsrat leaves and a new one has to enter, but that also experienced members are present when new ones join in. The Vorstand is for 5 years, with the possibility to be re-elected. But most members are not interested to involve themselves in the energy cooperative, its operations and take up responsibilities.

For them the cooperative is seen as an investment, and instead of giving their savings to the bank they invest in a wind park. They do not want more than the annual meeting and their share of the profits.

#### "Do you see this as a problem?"

We do not see this as a problem, since the main goal of the energy cooperative is allowing for a rise of acceptance within the local region. During meetings that explain the possibility to invest in the wind parks, the amount of people that used to complain has been reduced, because more and more people are present that are already participating. They think that they cannot stop it, so they might as well profit from their presence in their region. This is pretty much a conversion in the region that protesters now have started to become members of the cooperative. This does not mean that only positive news is being brought by the press, or the government becomes faster in their services, but the resistance among the people has visibly lowered.

*"Do people start promoting more windmills?"* The people do not become ambassadors of the wind mills, but they do become less negative, thereby more indifferent. The owners of the building ground will not become ambassadors of the wind parks, they stay in the back when locals protest against the wind parks. There will always be sufficient amounts of people that are against the wind mills. You will always find sufficient people who are against something and little who are in favor.

*"...people do not become ambassadors of the wind mills, but they do become less negative..."* 

#### "To which extent do you allow people living close the wind park to invest first?"

We use the principle that when new wind parks emerge people closer to the park are given investment preference over potential members living further away. Since there were many cooperative shares to be sold, there did not exist a structure in which first all new members could buy one share, after which more shares could be bought. Shares were sold on a first come, first served basis. At the start of the energy cooperative, there were more shares than people, so it took half a year to gather €1,000,000, respectively between summer 2011 and winter 2011. Then it took another 7 months, till summer 2012, to gather a total of €3,000,000. These amounts were primarily gathered by word of mouth, and the local banks were not used for marketing purposes. The total capital we have gathered now, in summer 2013, reaches €8,000,000, and we gathered that amount within one year, respectively €5,000,000 in one year. Every time new projects were developed by us, we mentioned its development in the local newspaper. Without mentioning that the energy cooperative needed more equity, the locals found out that the project developer was constructing new wind mills, and contacted them for new cooperative shares. These inquiries emerge so quickly, since our name as a project developer and energy cooperative is becoming guite known among the locals. The members are mentioning that they are not looking for becoming investors in windmill parks themselves, since then they have higher risks involved, and investing themselves requires longer times of having the capital inserted into the assets. Some elders of 60 are mentioning that it is not quite interesting to invest in a period of 20 years, since they do not know for how long they might live, or when they need the money. But when the members want their investments back, they can ask the energy cooperative to repay their shares. But when the member invests in a windmill operating company, then the member cannot get his investment back right away. Investing themselves as civilians, incorporate higher risks, and many people do not want these risks.

#### "How does your current balance sheet look like?"

Our financial balance will be checked upcoming weeks by the Genossenschaftsverband. We have already provided public regarding our financial situation, but when the auditor sees some mistakes, the numbers can be changed. Costs subtracted from the revenues are represented by paper based marketing, and personnel costs. The cooperative has a secretary, which does the member administration, and is the contact person of the energy cooperative with for external organizations. The  $\in$ 159,000 income are generated through the interest from the loans provided to the windmill operating companies. The loans of the energy cooperative are set for 20 years, and these are repaid starting after 15 years. The energy cooperative expects that the market interest rates on different types of investment might strongly influence the tendency of the members to keep their investment in the cooperative. When market interest rates rise, the chances grow larger that members see more profitable opportunities elsewhere. At the end of the loans, in 20 years, and all loans are repaid, it

could be decided that the energy cooperative will repay its members, and stop its existence. Another path could be reinvesting the money into new projects.

## "Why have you decided to fund one windmill with equity instead of loans?"

There has been a change in a law for energy cooperatives, since civilians were provided dodgy investment funds, which are not as straightforward as they told they were. As a result, stricter regulations emerged, which might damage energy cooperatives who are not owners of wind mills. This energy cooperative has some characteristics of a financial investment fund, and therefore characteristics of a point of capital accumulation and therefore we invested in the wind mill which also operate ourselves.

### "Where do the members come from?"

Apart from individual civilians, also local foundations and another energy cooperative have invested in the Bürgerwind Westfalen eG. These investments tend to be somewhat higher than the average investment of local civilians. Our members originate for 70% from the Kreis Paderborn, 20% come from surrounding Kreise, and 10% come from non-surrounding Kreise. Currently persons from the non-surrounding Kreise cannot participate anymore, and the focus should lie on people from the region. Now we are at the tipping point, that we ask ourselves, for how long do we allow for new members to join, and when do we say stop, since more and more people want to become members.

"To which extent do you consider working together with other cooperatives outside your region?" No, cannot really imagine us doing this. We are currently developing several projects ourselves and when possible, we could invest in projects outside our region. We do not want to create new energy cooperatives outside the Kreis Paderborn. Even when there are many people asking for an opportunity to invest in our projects that originate from outside our current Kreis, it is hard to get to wind projects outside our region. Here we know all the necessary parties, and therefore the people outside our Kreis should do it themselves and start their own energy cooperative.

#### "What are the risks that you see for your cooperative?"

The risk for the cooperative members lies in the possibility that the operating company might file for insolvency, but we believe this scenario to be rather improbable. The risk that the windmill manufacturer might file for insolvency is also small, since Enercon is currently market leader with a 60% market share. There is a risk that the wind power production capacity of our wind mills turns out lower than expected.

## *"How large do you think is the risk that the EEG might disappear?"*

Everything that has been built so far under the EEG will remain, but for everything that is newly being built is hard to predict. As far as we know, there are almost no policies which are relatively cheap and effective as the EEG FIT that we currently use in Germany.

## *"Do you want to expand more into the operating direction or not?"*

*"...the €3,000,000 equity that we gathered in our first year is just too little."* 

Actually not. In the future we want to focus on providing loans for new windmills. Becoming an energy cooperative which focuses on operating windmills, is not our initial focus, but perhaps new developments will shift us more into that direction, but that is still to be seen. The other energy cooperative want to become this operating cooperative, but they do not get these windmill projects of the ground, and we are. So I believe that the energy cooperative, for now, is a fine way of providing capital and lowering regional resistance, but in the future, maybe other structures could be used. In Germany many energy cooperatives have started, but these will not exist long, since these cooperatives do not have a long term strategy. As a cooperative you need a certain size, the €3,000,000 equity that we gathered in our first year is just too little. When an energy cooperative only has such amounts of assets, they are just too small.

"The Paderborner Land eG wants to hire employees in the future for its cooperative, what about you?" Between our energy cooperative and the Paderborn Land eG, there are different types of business model philosophies. Among energy cooperatives internally, not always a single and clear strategy emerges, since internally opinions differ on how to build the energy cooperative. But also some members own shares in both Bürgerwind Westfalen eG and Paderborn Land eG. It is very interesting to see how these different types of energy cooperatives are going to perform in the future.

## B.4 Bürgerenergiegenossenschaft eG

## Rolf Weber (Vorstand), Home address (Wetter), July 10<sup>th</sup> 2013

## "Why start an energy cooperative in this region?"

I became involved with environmental subjects in 1998 and started coming together with like minded persons, to start developing ideas to get something of the ground locally to fight the climate change. In 2007 mister Weber already was involved with the local Gymnasium, which requires him three full time days per year. For the PV system on this Gymnasium, the legal form of the GBR, 'Geselschaft Bürgerlichen Rechts', was used. Since he wanted to build hundreds of PV systems, he was looking for a legal form which required less overhead work per PV systems. In the GBR form there would be greater financial risks for our members. When a panel falls off a roof, on the head of someone, all members are responsible for its recovery, when the case is outside the terms of the solar insurance. With the legal form of the cooperative, members are only financially liable for the amount they invested into the cooperative. With the above experience mister Weber, together with other people who were ideologically involved with the fight against the climate change, we started the energy cooperative Bürgerenergiegenossenschaft eG in Hagen, Nordrhein-Westphalen in 2010.

#### "What things can be done locally with regard to renewable energies?"

In the area that the energy cooperative is being active, the geographic characteristics do not favor wind mills, since the Ruhr area is heavily populated. At the same time biomass resources are limited because of the small amount of farmers in the region. Developing more waterpower is difficult, since the sector is rather overregulated, with strong resistance by pro-fish-habitat NGO's. Our cooperative is looking at waterpower, but our primary focus lies on PV. We are renting roofs and we are installing PV-systems on them.

#### "How did you start your first projects, and how did you contact the owners of the roofs?"

The first project of our cooperative was started through our first members. We got the contacts to the roof-owners through our own network. For example, a former mayor was Vorstand of a local livingbuilding cooperative, and he was the mediator of our energy cooperative involving the installation of PV on the roof of the living-building cooperative. Another example is the biological station in Enneptal. of which a Vorstand member is also a member at our cooperative, and at the same time is an Aufsichtsrat member of another building cooperative. Through this building cooperative we could rent multiple roofs. Trust had to be built with such roof-owning parties and after multiple talks, agreements would be signed. The first PV-system of the energy cooperative was physically built by our members, together with a local installer. Next to the cooperative roof, we made contact to the local cities, and they with us. The local government of Sprockhövel has invited us, and in a meeting in front of local civilians, we introduced our energy cooperative and our approach towards renewables. During this meeting, the Sparkasse chairman was present, and said that our energy cooperative and his bank should not overbid each other, but should start looking for cooperation first. After talks with the Sparkasse, we talked with the municipality representatives of the building available in that municipality. And eventually, the city allowed us to use their roofs, and at the same time the local Sparkasse provided our cooperative with loans. Together with Sparkasse we named this project the Sprockhöveler SonnenInvest, and created flyers, promotional material and news items in the local newspaper. We welcomed 50 members, and with these members, we were able to fund 6 PV systems, with 30% through member equity, and the other 70% being funded by the Sparkasse.

#### "To which extent do people from neighboring municipalities contact your cooperative?"

In some cases the roof owners come to us, since they want income by renting out their roof to external companies. In the city Hattingen, we have built 2 PV-systems at public buildings of the city. Most of its roofs were rented to a German wide PV developer, who gives significant financial benefits for cities who provide their roofs to the company. The Hattingen city experienced that there were little problems with the PV-systems of the energy cooperative, and I suggested that our service is just better than the service of the nationwide roof-renting company. When something is wrong with the PV-system, our cooperative is near, and we can help right away. Since the other company has so many roofs and multiple managerial layers, getting problems solved takes longer. There is no proper relationship between the city and the nationwide PV firm.

#### "Are you currently pensioned?"

At this moment I am 58 and not employed. I worked 27 years at an insurance company, and tried to convince them to start with environmental insurances. Since no significant progress was made in 10

years, he quit his job in 2009, since he lost his motivation. Since then he is currently full-time involved into the energy cooperative.

#### "How does your structure differ from the energy cooperative Paderborner Land eG?"

Because of the structure that is already present within the local bank cooperative, administrative tasks can be delegated to employees already working for the bank. By doing this, the energy cooperative can use the structure present to support its own operations. Within our energy cooperative, about 20 volunteers are active, and several members are part-time involved, with me full-time, but this supportive structure by the bank is not used.

#### "You currently have around 35 PV-systems?"

Our energy cooperative currently has 38 PV-systems, representing about 1000kWp in total. It should go up with 10 PV-systems per year, but with the current EEG developments, this is harder. The current FIT is €0.15/kWh, and currently is going down monthly, relative to once a year, or once every half year.

### *"What is the spread of your installations?"* Ennepur-Ruhr-Kreis und Hagen and represent the geographic focus of the energy cooperative.

#### "What are the origins of your contacts for new projects?"

The first contacts for a new PV-system are structured through our network of members, and then the contact is brought to me, after which I am handling everything.

#### "To which extent do you use the same installer?"

We are working together with two different installers. If we would do a tender per project, it would require too much time. We need people we can trust. An example of a failure: a fundamental failure, an installer put the module in the shadow. with other bad experience came from installers that you could not count upon. Next to good experience and trust, we required a 'green' developer, who also uses green electricity. Sustainability was not always incorporated in the business development. And also transportation requires energy, so we want preferably PV-systems from close by. But currently we are working with Chinese PV developers, since the German PV manufacturers are too expensive, since SolarWorld is too expensive. During the general meeting, the members allowed the further expansion, and preferred growth over a strongly sustainable PV source.

#### "Which competencies do you have in your Vorstand to help the cooperative?"

I have studied Industry Marketing and Informatics. Our cooperative has an auditor who is a commercial man and who does the accounting, in the Aufstichtsrat there is an energy consultant who helps us with keeping an eye on our PV-systems. Then we have a heating craftsman who has been working in bio-renewables for multiple years, and then we have someone from the Verbraucherzentrale (Consumer Union), he knows the prices of energy on the market. We as an energy cooperative did not have the right know-how for PV, but in time this knowledge expanded after working with the PV-systems. And now we have an electricity worker who has become a member and who can professionally check the physical performance of our PV-systems. None of these members, Vorstand or Aufsichtsrat is being paid.

### "How large is the motivation among the members to help you out with your work?"

People are not always motivated, and when other members that put effort into the energy cooperative lower this effort, it is sometimes hard to keep the motivation to keep on working for the energy cooperative. My own motivation comes and goes. At this moment I could wish me more engagement from among the members. We currently have 200 members, of which 20 are involved, this 10% is quite good, I believe compared to other energy cooperatives, this is a rather high ratio. At the last assembly about 40 members were present. At these general meetings we ask for general decisions. Christian Felber, wrote about the common good economy and developed a system in which he described a business for economic, social and ecological performance, thereby not only looking financial, but also from a human perspective. You could think of this common good economy, when getting funding from a bank, asking where they invest other money. At the same time, you could think of whether you use recycled paper for flyers or not. http://www.gemeinwohl-oekonomie.org/en

### "When members vote, do you have a single vote per member?"

Within our cooperative, voting is always one member, one vote, independent on share volume. These arrangements are defined by law.

#### "Why did you choose the equity ratio of 30%?"

It is common to accept loans from banks, since it requires paying less money for the company. By using bank loans, we can grow the dividends to our members. In essence, we as a cooperative do not wish for this structure, and rather invest 100% with our own equity. But financially, it is more interesting this way. In the same time, it is hard to gather sufficient amounts of funding, to build a lot PV-systems in such a short notice, therefore we needed bank loans, to fund the expansion. The growth of new members was not fast enough. We provide members with 3% to 4%, and in our cooperative members do not invest in a specific project, but provide equity to our energy cooperative.

#### "At which banks do you get your loans?"

We are working together with both Sparkasse and the Volksbank, but we are not working together with larger banks that are national, since these banks do not provide local responsibilities. Our 'home' bank is the GLS bank 'Gemeinschaftbank für Leihen und Schenken'. She is like the Triodos Bank from the Netherlands. We choose the bank based on the contacts locally. Example: when talking with a city, the Sparkasse has to put their profits back in the city, and therefore we want to work together with Sparkasse. When choosing for Sparkasse, it is more important to get strong partners in your network, instead of getting several .1% dividends more for our members. When we talk to the local banks for loans, only a little amount of people ask for how sustainable the bank actually is. When talking to the banks about this subject, they did not always have a straightforward answer.

#### "Do you experience the same ideological motivation among your members?"

Most members tend to have a positive disposition towards fighting the climate change. When members want to invest more than 10.000 euro, they should come talk with us to find how their philosophy sticks together. The total amount of interest we had to pay for loans to banks has dropped last years. Our maximum interest rate at the start of our cooperative was 6% and now we are at our lowest, with around 2.35% at the bank. When these interest rates go up, it becomes rather hard to keep on building PV-systems.

#### "Which other costs do you have within your cooperative?"

The energy cooperative provides me with the ability to use public transport, and it pays for these costs, just as it pays for the marketing material, and our web page.

### "At which moment will you be able to hire people to work for your cooperative?"

At the point that we have multiple 100-dreds of PV-systems, we could hire a secretary to take care of the administration, but in this region, it is kind of hard to expand with renewables, since combined heat and power is not possible here.

"When you build new projects, do you ask current members to invest or do you look for new ones?" Currently we need more members, since we are working on 6 PV-systems, and to get these amounts of people we cooperate with the local Volksbank, which looks for members among their ranks. Through our network of members, we are looking for new members. Through the press we are looking for new members, but we are not leveraging this channel very much. For the effective use of banks, we found that when their higher up hierarchy is less interested, it is rather hard to promote our cooperative through their channels, and this is not going as fast as we hoped. At the same time, there were multiple local banks which were not interested in allowing the energy cooperative to use their marketing channels. They were holding back, because they did not know how the energy cooperative might impact their business.

#### "What is the maximal investment?"

We currently do not have this problem that we have to cap our investments, but our highest financial participation lies at €25,000.

#### "What do you see as risks for your cooperative in the future?"

With respect to risks, we do not see many of those, since PV is a rather stable investment. Sometimes a PV-system is mal-performing and is not producing energy and we did not know exactly what the cause of its mal-practice was. Now we are having talks with the insurance company about this subject. Nonetheless there will be always some risks involved which are not covered by insurances, and that the energy cooperative is taking. There is the risk that the EEG is being changed, with the payment being lowered a year back. But we don't think this will happen. There is a strong risk, when something happens to me, since I am strongly involved. Among the active members, there can be some activity,

but there are risks that the current operations cannot perform properly when I turn out absent, but I am aware of this risk. In the case we need someone to work for us, we could pay someone, but thereby the dividends would become lower.

## "Where do you see new growth for your cooperative?"

With respect to wind power we are having some talks, but these things are rather unsure. Then there is smaller wind, and then there is waterpower. Another alternative is energy efficiency. This is not really worked through and we did not really look into this.

#### "Which activities do you set up next to your general assembly?"

Our Vorstand meets once a month, and next to it exist 4 working groups: administration, PV, public relation, and group focusing on the theme wind and water.

## "To which extent do you cooperate with the Genossenschaftsverband?"

The Genossenschaftsverband has helped us strongly during our expansion and we are very grateful for this. Also now, when there are some problems with cooperative related details, we can ask them for help.

"Are there possibilities for cooperation with energy cooperatives outside the Ruhr region?" There are no plans to work together with energy cooperatives outside the region, by for example investing in their wind parks, since they cannot gather sufficient equity. We focus on investing in the region, by the region, and therefore we are considering expanding our geographic scope to the Märkischen Kreis.

## B.5 Bürgerenergiegenossenschaft Odenwald eG

## Florian Voigt (Cluster management), Haus der Energie (Erbach), July 11<sup>th</sup> 2013

#### "There are strong differences between your cooperative and the ones I visited earlier."

The concept that we are constructing here has a strong example role for the rest of Germany. The Genossenschaftsverband is sending us to people who are interested in our model, since we are a good example. There are some reasons why the energy cooperative worked here, and why it might not work within another setting. You cannot copy paste our model to other regions, the environments are different. Important for a new cooperative, is knowing what are the bottlenecks, and which requirements have to be present locally to make the cooperative work successfully.

#### "How did you end up at the energy cooperative Odenwald?"

I was working for the Kreis Odenwald and was focusing on the renewable energy theme. The local Kreis thought this to be interesting since renewable energy would bring new jobs to the region and would improve local economic dynamics. The government has the ambition to create a regional value creation cycle. Therefore they wanted to become independent through the renewable energy, but also other projects were done, like glass fiber, because private firms did not want to invest. The Odenwald Regionalgeselschaft (regional company), was initiated by the Odenwald Kreis to work on the renewable energy theme. But since governmental efforts to invest into renewable are strongly limited by the laws of the state Hessen, the Kreis were not able to make significant steps. Based on these circumstances they decided to start an energy cooperative. To help with the start with the energy cooperative, local municipalities of the Odenwald Kreis were involved. But also strongly involved was the Volksbank of Odenwald. The Volksbank has supported the energy cooperative by supplying employees. They did not provide money, but their own personnel. The Management board members of the energy cooperative were management board assistants at the Volksbank. The cooperative differentiates itself from many other energy cooperatives, since among these, the cooperatives are being started by motivated civilians, who want to do something with renewable energy. Then they do it voluntarily. But they are not really technical. Since they are usually also working next to their voluntary work for the energy cooperative, their available time is limited. "Das sind Feierabend Genossenschaften". Therefore the projects they can develop are rather limited. But in our energy cooperative, this limited time is not the case, since people were able to work full-time on the subject. After the first start of the energy cooperative and its first projects, it showed to be a well performing organization. Then it was decided to bundle all local initiatives that focus on renewable energies, and let them all work together with the energy cooperative as their label.

### "What was the vision for the energy cooperative at the start?"

The Volksbank Odenwald has started working on the energy cooperative theme, because they saw the potential of harnessing the financial benefit of the local economic development. With the growing PV sector, and growing demand for PV related loans, the Volksbank saw the potential of renewable energy. They also experienced a need for a platform which would allow civilians with no PV opportunities to invest into PV-systems. The energy cooperative was to provide this platform. Next to the loans, also the opportunity of providing PV-related insurances, made it interesting for the Volksbank to start the energy cooperative. By pushing the local economy and by creating demand for more PV-systems, local installers were provided more work, which would reduce the risk of insolvency, which in the end would turn out better for the Volksbank.

#### "What people were involved with the work for the energy cooperative?"

People working for the Vorstand of the Volksbank were working for the energy cooperative and in parallel were given their salary from the Volksbank. During the foundation of the energy cooperative, parties involved were: the local Volksbank, the local municipalities, and local businesses. The cooperation with the local municipalities was strongly important, since it would allow for access to public roofs (acrobatic hall, schools). They provided minor investments into the energy cooperative, but primarily their positive disposition towards the energy cooperative was very important. The municipalities were given rent for their roofs by the energy cooperative. The municipalities were also politically in favor, since they also had their own climate goals, and through the energy cooperative they would be better able to reach these goals. One step further went the Kreis Odenwald by stating that on the long term, they want to provide their region with 100% renewable energy, both in electricity and warmth. When looking at these goals by the Kreis Odenwald, the energy use has to go down, and the local renewable energy supply has to go up. When looking at the local supplies, even with 50% of the surface being forests, it still is not sufficient to provide the local population with 100%

warmth through burning wood. And when we are not able to finish this project successfully, then no region in Germany will. The region of Odenwald is structurally weak. There is no industry here. We have tourism, but most people work outside the Kreis, and their money and value creation is leaking out of the region. By creating local jobs through local renewable jobs, these people will spend their money here, and not outside the region. And through this project we generate spill-over effects. And this picture was the vision of the local Volksbank: reinforcing the local economy. The Kreis focused on the renewable energy sector for reinforcing their economy, because there is a strong need to get away from fossil fuels, because of their price increases, and secondly, the legislative environment was interesting, through the EEG. When an energy cooperative is not being provided the legislative environment of the EEG, it becomes extremely hard to be economically active in the renewable sector.

### "How has the EEG influenced your energy cooperative?"

The EEG has two advantages, one: it provides a steady price, and two: this price is provided for 20 years. This allows us a lot of assurance for the coming 20 years, we can make steady plans. This allows steady income, and will allow for little risk for our energy cooperative.

#### "To allow your cooperative to grow, to which extent did you start hiring people?"

During the start of the energy cooperative the help of students was very helpful. These were performing work for us, which would not cost the cooperative a lot of money, and especially in the PV sector, these could be set to work rather quickly. For us the work is not strongly technically, we plan the work, the tender for the roof is then provided to several local installers, whom then provide a bid, followed by a choice of installer, who then does the work for us. There are also energy cooperatives who are strongly bound to one supplier of PV, and these sometimes provide start-up money for the cooperative, and sometimes the foundation members are also working for a PV construction company. Hereby the question arises whether the energy cooperative is getting proper deals with its partner supplier, or does the PV construction firm uses the energy cooperative as its sale channel? We are independent of PV suppliers and have a pool of suppliers of whom we know provide good quality.

"You have been growing rather quick and eventually you were able to be hired by the cooperative?" Our start was pretty successful. In 2009 we had a strong expansion of our PV portfolio, and at that time the EEG for PV was very profitable and also 2010 and 2011 were very good years, when looking at the price versus production. We were able to provide our members with interest on their shares, which is actually kind of odd, since usually energy cooperatives are not making money in their first 3 to 5 years. As soon as we got sufficient income to pay for our first Vorstand member, he was administratively transferred from the Volksbank to the energy cooperative.

#### "During my preparations I found out that you own around 5 MWp?"

We currently own over 5MWp of PV-systems, and we are participants in two windmills. We are not doing this by ourselves but in cooperation with others. The first windmill of 2 MW was done together with the energy cooperative Starkenburg, the other windmill we own together with the Odenwald Kreis and a local municipality, which has 3MW, and here we only partially own the windmill. Currently the theme PV is strongly decreasing and it has gone almost to zero since 2012. Because of the new EEG rule we now have to use 10% of the energy produced of every roof, and only maximal 90% sent to the grid is being compensated for. For private houses, this proposal is still interesting, because currently we get 15 cents per kWh from the EEG, and with prices around 20 cents per kWh. We as a cooperative go upon someone else's roof, thereby generating the electricity ourselves, and then have to sell it back to the owner of the roof. To be able to do this, we have to be able to sell him the electricity ourselves. These requirements provide us with strong administrative challenges. When we would do PV projects this way, we would only get 90% and the other 10% would be sent back into the grid for free. With only getting revenue of 90% for our electricity, our margins become smaller. We are stilling performing PV projects, but these become almost non-profitable anymore. The projects that we are performing are for example built on top of child care buildings, because these allow us to promote our cooperative locally among the parents. Nonetheless for us, the theme PV is pretty closed. We could restart our focus on PV when the law would change again, or the module prices would become low enough that would allow for a profitable PV-system even with only 90% of the electricity being paid for. When in the future, module prices go down further, we could eventually start selling the solar electricity to the grid.

Because of the above reasons, the theme wind power becomes more interesting. As a result we bought a finished and developed windmill together with the energy cooperative Starkenburg. The project developer of the windmill was involved within the energy cooperative Starkenburg and

favored the cooperative over other investors, and allowed for the energy cooperative to buy the windmill. This project developer did all the work and planning himself, and provided our energy cooperatives the windmill. This is an advantage for us, we have little risk, we do not have to plan the entire windmill, but it comes at a higher price, with the project developer getting a significant margin. Even with the higher price, we decided to invest into the windmill and allow our energy cooperative to gain experience within this sector. As a result we provided 49% of the required equity. We have learned through our experience with the two windmills that it is more effective to do things ourselves.

## *"The local energy cooperatives surrounding our region... ...do not have much project development experience."*

Therefore we started getting access to the land in our region for future windmills through leasing, and we are also performing the project development of local windmills. We do not have the technical skills, so we ask external parties to provide parts of the entire windmill construction project. There were also all-inclusive project developers who came to us and provided us with an entire windmill, but also with a margin for them. We denied their offers, because these

developers put their own margins on the margins already provided by firms they hire. The project coordination lies with us, but also the risk lies with us. When at a certain moment for example a specific type of bat emerges, which halts the construction of the windmill, the upfront investments have to be paid by our cooperative. We provided this choice to the general assembly and provided this choice to the municipalities and they all said that our energy cooperatives should perform this riskier project coordination role. We decided to take on the role of project coordinator, because when external parties would perform the project development, a lot of money would flow out of the region. The risk that we are taking through this role as project coordinator, we can take, because we already have a firm foundation, and we are currently planning up to 80 windmills, with 30 to 40 in the Odenwald Kreis, and the rest outside our region. Sometimes these windmills are being projected by only ourselves, and sometimes in cooperation with local partner energy cooperatives. Among others, we are strongly working together with the energy cooperative Untermain in Bavaria. The local energy cooperatives surrounding our region has the problem that they are small, and do not have much project development experience. Therefore they have to cooperate with the project development experiences.

## "To which extent did energy cooperatives in the surrounding area already exist?"

Not everywhere energy cooperatives existed, and therefore the local municipalities outside the Odenwald Kreis ask the energy cooperative Odenwald to cooperate with them, instead of starting their own energy cooperative.

"How do you handle the risk when you decide to help out municipalities outside your region?" We do not see it as a risk and more as a chance. We choose to expand outside our Kreis, because it lowers the risk of one windmill project going wrong, since it is less bad if one out of 30 fails, instead of one out of 80. The more potential windmill locations I have, the smaller the impact when one location cannot be used anymore. When developing new windmills, we spread the risk, by mutually investing in the same windmills. Between the overlapping region Odenwald and the region Untermain we plan together, but on the long run, it is fine with us when the energy cooperative starts planning new windmills in the next mountain ridge on their own.

#### "When I see it correctly, you help out a growing energy cooperative?"

When looking at the cooperation between our cooperatives, our philosophy is different from normal companies, since an essential part of the thinking, is to help out other cooperatives. The Volksbank is a cooperative, and they decided to help the cooperative. For the Volksbank it is a win-win situation, and also we are helping the energy cooperative Untermain. Our cooperation also provides us with buyer advantages, when buying windmills; it makes a large difference when you buy 30 or 80 windmills. Through this cooperation we can create synergy effects.

## *"Do you agree with the statement that you can only do these developments because you invested strongly in PV in 2009?"*

The foundation of our energy cooperatives is based in the many PV-systems we own. It allowed us to grow into what we are currently doing with respect to windmills. But at the time, we did not expect to be here where we are now. Currently the theme wind power is very interesting, and when new energy cooperatives are started, they should actually start focusing on wind power, but since the

development of wind power takes up to three years and it has risks involved, they can only buy finished wind parks. When new energy cooperatives are emerging, they should look at the local environment and the legislative framework to find out which projects are attractive. We did not focus on PV because we liked it so much, but because it was financially attractive, and currently, wind is rather attractive. In several years, all these locations will be built, after which no new locations will be given, and then our expansion will stabilize. After wind, we need a new energy sector which we can expand. Therefore we are looking for renovation contracting, and energy contracting, which we are currently starting. This will be the next growth market, and this growth will not halt as abruptly as PV in the past and wind in the future. We currently have a renovation quote of 1%, meaning, 1% of all houses in Germany is being renovated per year. Renovation meaning, energy efficiency improvement: a new roof, new windows, improved insulation. Currently municipalities are not investing into energy renovation, since they do not have the money to invest, even when it would be more profitable on the long run. Here the energy cooperative sees chances. A school could be provided a 15 year long energy contract for a price similar or lower compared to their current energy supplier. Then our cooperative invests into a new energy system, which will reduce the running costs and will allow us to pay back the investment together with a margin. Afterwards, the school owns the energy system. For us, municipalities are the ideal partner, since they cannot file for insolvency. With smaller and new energy cooperatives, energy renovation of public buildings allows them for new chances to expand their business.

#### "What are future developments for your energy cooperative?"

Currently we are building the 'House of Energy' which will provide room for 300 employees of multiple companies related to the energy sector. Within this building we provide the entire house with energy through biomass (pellets). Here, again, we want to gain experience on how to provide heating. In parallel, we are discussing the opportunity to participate at a pellet production facility, thereby expanding our cooperative within the value chain. In parallel we are working on electricity sales, where we are selling eco-electricity. Since 2013, we supply our members with electricity, through our partner GENO-Strom, which itself provides several thousand customers. This cooperative buys electricity and sells it to its members. Some of our members are also provided energy by this energy cooperative, but through the partnership with our energy cooperative. All the risks lies with GENO-Strom, but our members allow us to change supplier. So as soon as we think it is necessary (cheaper prices somewhere else), we can switch our customer pool to a more cost-effective supplier.

## "How can people become a member?"

When someone wants to become a member, he or she has to invest at least  $\in 100$ , and can maximally invest  $\in 5,000$ . Originally, we had a maximum of  $\in 10,000$ , but because we got so many members, we decided to lower this amount, to make sure we would not get too much equity. We do not want too much equity, since we want to invest the money provided by the members. We also don't want a too high investment by members, since we want as many locals as possible investing in our cooperative. We rather have many people, than a few who invest larger amounts. Through this, we increase the local acceptance. Multiple members have mentioned they wanted to invest more than their  $\in 5,000$  but are not yet allowed. As soon as the new windmills are finished, we might increase the maximum to  $\in 10,000$  or  $\in 15,000$ , and our current members will be asked to invest, and the millions will flow towards us. We do not have to worry about getting the equity.

#### "How does your financial situation look like?"

Currently we have invested around €35 million of which €8 to €9 million equity. In 2011 we provided our members with an interest of 3.5%, and for 2012 we again estimate an interest of 3.5%. These numbers are provided to our members during the general assembly. When members want to get their money back, we provide them with the ability to get the nominal value of their shares after two years. In the summer 2012, around 360 out of our 1000 members showed up during our general assembly. Our loans are provided by the local Volksbanken, and the DZ bank (Nationwide Volksbank) also provides us with significant loans, since the risk is too high for local Volksbanken, because they might get too overly invested into one sector or cooperative. We would like to cooperate with the local Sparkasse, but they did not want to provide us a loan since we are strongly linked to the Volksbank.

## "What motivated you to set your level of equity ratio?"

We have chosen our current equity ratio, because the current interest rates on bank loans are so low. Because of the loans, we increase the dividends of our members, and second we can generate more projects, since we have more capital. When we only would use equity, we were not be able to provide our members 3.5%. Currently we can get bank loans for 1% to 2%. The interest rates for building

projects are generally lower than those of wind park projects, but the average lies between 1% or 2%. The 3.5% dividends of our cooperative are interesting because savings are given lower interest rates, therefore many people come to us, to store their savings. When in the future the savings accounts provide 3% to 3.5%, then we should try to go up with our dividends, to make the investment still interesting. When the bank loans become more expensive, we might have to increase the equity ratio, and as a result lower the dividends to the members. Currently, some people only come with €100, but also people exist who come with €5,000 to 10,000 euro, with this second group looking for higher dividends.

#### "What other sources of incomes do you have?"

Other sources of income are being generated through the rental of office spaces within our House of Energy. The Odenwald Kreis energy related department administration is going to rent an office, and are coming to the House of Energy with respect to all subjects related to energy. (e.g. building and energy management). They are going to leave their prior buildings, which they rented from a private party, and are leaving for this building. The Kreis is making the switch, because the building is completely new, and therefore has a high quality, and because the profits of our energy cooperative flow back to the people of the community instead of going to a private owner. Through this cooperation, we generate synergy advantages, and due to this, we are currently completely booked, complemented by a waiting list. Our building is attractive, because our rental rates are somewhat competitive and we make sure that we are not overpricing our office spaces. Another reasons for companies to come are the synergy effects. Everybody who has a question about energy, will first come to our building for advice. And when your energy related company is not present within this building, then an energy company is not sure whether your customers are going to find you. When customers want multiple advices, they will go from one company, to the one next door, and not to the one three villages further. The Landsratamt (district office), the local municipality of Erbach and our energy cooperative have together built on this idea.

*"When we have at least a thousand customers, then we can start thinking about selling our own electricity."* 

"How many employees do you currently have?" Currently we have three people working here fulltime, together with some part-timers, totaling up to five full-time spots. Next to these full-time positions, we have 5 students working here which come from the region. We have good contacts with Hochschule Darmstadt, and its professor is also part of our Aufsichtsrat, and through him many students come to us. These students have to do external research, and therefore they look for companies to work for, and we provide these spots for them.

#### "What other future developments do you see for your energy cooperative?"

When looking at our future developments, we currently have a customer pool of electricity users, and these users are currently getting their electricity from GENO Strom, but we can switch them when needed. For now, you could describe our cooperative as buying-cooperative, who provide lower prices for our members, but this is a middle step. Now we are building our customer pool, and at the same time we are building power capacity. But in the future, when the market developments fit, and when we would get more money for our electricity by selling it to our members instead of using the EEG then we could make the transition and transfer all our customers. Currently get 9ct/kWh from the EEG and our customers now pay 25.2ct/kWh. When we have at least a thousand customers, then we can start thinking about selling our own electricity.

#### "Which developments do you see in the renewable energy sector?"

The legislative environment might change in the future, since there will be a new parliament in the autumn of 2013, and these might change the EEG and its compensation expenses for wind energy. Future developments might be a differentiation between coastal wind parks and inner land wind parks, since coastal parks are more profitable. The EEG may give inner land wind parks a higher compensation, because they provide energy locally. Windmills also become cheaper, but the learning curve is never going to be as fast as what happened with the PV module prices. For now PV prices are stabilizing, for wind, the prices have gone down, and there are some decreases, but this will not be much. The theme energy storage is very interesting, but our water storage potential here is limited, since we do not have much water. Storage requires a very high start-up investment, and this could

scare away energy cooperatives at first, with high investments representing high risks. Then we should ask ourselves, who is investing in it, and who is getting the profits. And storage becomes interesting as soon as we are starting to sell our own electricity. We are waiting till the storage developments are financially feasible, and this might take 3,4 to 5 years.

## "To which extent do you think of setting up a cooperative that might sell the renewable electricity of all energy cooperatives surrounding your region?"

Not yet. Since up till now there is no need for it, but it could be possible when you want to sell your electricity. When we will sell our own electricity to our members instead of just producing it, then we can look whether it is lucrative to also use storage when we have surplus energy which is not needed by our members.

### "What kind of education did you have?"

My education lies in forestry, and has positively impacted landscape planning, which is especially useful for windmills, since you have to build roads and compensate for the chopped trees. Our financial expertise lies within our director, who came from the Volksbank and now works for us, and the third person does marketing, but many other services we are getting through a cooperative accountancy firm, and our software through a cooperative software developer who provides software solutions for the cooperatives in Germany. This cooperation between the cooperatives works rather good, since the cooperatives are willing to grant each other things, the deals are less competitive. The Aufsichtsrat is not being paid, but their costs are being compensated for.

*"Do the Aufsichtsrat members become a financial compensation?"* No, they do not become a compensation, only cost cover relating to driving costs for example.

"Apart from you Vorstand, your employees and the students, which other people work for you?" Members do not tend to work with us with project, but new project ideas come to us, where they see opportunities for our energy cooperative to build a new PV-system. The idea for starting the House of Energy, also came from one of our members.

#### "How do you benefit from the Genossenschaftsverband?"

The Genossenschaftsverband is auditing our organization annually, and thereby our members get the assurance that our cooperative can be trusted. And since we are being checked by our Genossenschaftsverband, members can be sure that we are not investing in bad projects, or are taking money for ourselves. Not only annually, but also throughout the year, we can go to the Genossenschaftsverband to ask for reassurance that we did our calculations correctly. Sometimes we have to pay for their services, but for smaller questions their services are usually free of charge.

"What would your advice be to starting energy cooperatives that currently are engaged with wind?" It is hard to start new wind parks, since it is hard to get access to the building grounds. And even when you get access, it requires at least three years of planning. By the time, your cooperative members will have spent their energy and motivation. There is a chance for cooperatives, when they are given a turn-key windmill, but also getting this windmill is not easy. These turn-key windmills are also more expensive, and the cooperative still bears risks when operating the windmill. When a cooperative only owns one windmill, there are strong risks. For PV, production volume risks are smaller compared to windmill production volumes since there are strong differences between annual wind energy production volumes. When the first years provide low wind speeds, then the energy cooperative might die. The windmill market is hardly disputed, everybody wants windmills, not only cooperatives, but almost every investment fund wants to invest into wind parks, since the banks provide almost no interest rates anymore. And because of the high demand, the price of windmills is rather high, because project developers know this demand for profitable investments among investors. The future of these smaller energy cooperatives lies in providing energy contracting, since these projects can be smaller. The theme contracting does not know examples yet, and this is primarily caused by the low oil and gas prices. But when prices keep on rising, the energy contracting really becomes necessary.

#### "So in the future the drop in windmill prices will start a new growth?"

Currently in Germany, many high wind spots are still available, but in five years, all these spots will be given away. I expect that in five years, there will be no more spots which are properly qualified to allow for building new windmills. Now, in northern Germany, almost all wind places have been built,

and now they are working on re-powering, but this is done by the people who already own the access rights to the land.

## B.6 Starkenburg eG

Franz Schreier (Aufsichtsrat), Personal office (Heppenheim), July 10th 2013,

## "How did you became part of the Starkenburg energy cooperative?"

I am a founding member of the energy cooperative Starkenburg, and has studied physics, and has been heading a firm for industry energy consulting worldwide. People who are involved with the energy cooperative, all have a heart for the cooperative. The founding members work for the energy cooperative out of a conviction, and we do not have a commercial interest, and we distribute the income among the members through our dividends. It is our vision to bring 100% renewable energy to our region, with the region Starkenburg representing the city Darmstadt, including Mannheim and Heidelberg.

#### "Which persons were involved with the start of the cooperative and why?"

With the foundation of the energy cooperative Starkenburg, at the end of 2011, 13 people were involved. The energy cooperative was founded because an opportunity existed that allowed investing in a wind mill with maximal civilian participation, with a local wind project developer provided the windmill to the energy cooperative. At the start of the energy cooperative, many of the members knew each other from Metropol Solar, a network that wants to get the region to become 100% energized through renewables. And we see ourselves as a provider of access to renewable production facilities, and especially to those who cannot own one themselves. Most people involved in the energy cooperative are entrepreneurs in the energy field, and provide a large pool of competence to be used by the cooperative. One of these concepts lies in the professional experience of a local wind project developer. This project developer could sell his wind mill to a wind mill operations company, but explicitly wanted to make a Bürgerwindrad (community windmill). When you want to create maximum result, you should allow the wind mill to be accessed by everyone, and thereby creating a certain acceptance. Our cooperative does not have the intention to maximize profit, but also the project developer did not have this intention since he did not sell his wind mill to a higher bidder. Another renewable energy project, a PV-system, came to us through one of our founding members. This member builds wind mill components with his firm, and he has created a building and prefinanced the PV-system and allowed the energy cooperative to re-finance the investment. We were able to get access to bank loans, since we had the assurance that we would get the PV-system, just as with the assurance related to the windmill.

The windmill that we bought from the project developer was financed 51% by our cooperative and 49% by the Odenwald eG. We did not ask for the total  $\in$ 4,000,000 million right away, because we applied some entrepreneurial caution, and also therefore we asked Odenwald eG to invest, also we could not get enough participants, and therefore this dual investment structure was found to be the most secure. Odenwald eG and Starkenburg eG started the Windstark1 operating company, owned by the two energy cooperatives, which would operate the windmill. And now we are at the point that we want our share back from the Odenwald eG, and the Odenwald eG is developing new windparks in which we do not see a need to invest, so then they can shift their investments from our windmill into theirs. At the same time, we now have a high liquidity, and we could easily finance new smaller projects up to  $\in$ 400,000. With our latest project we installed a 40kWp PV-system on the roof of a farmer. This amount of 40 kWp is within a certain EEG corridor which provides interesting financial incentives, which allows a part of the solar energy to be used by the owner of the building. Another project we did, we invested into a child daycare, and allowed the PV-system to provide energy at that moment when the kitchen needs the electricity to cook for the children. One of our members has a

*"We are no financial sharks, we want stability…"*  strong and good communication with the local press, another member has sold his firm and developed several PV-systems and runs a watermill and is strongly networked in the region, and then there is an old electrical engineer who worked for Siemens, who knows much about energy systems. Then there is an Aufsichtsrat member who runs a windmill operating firm, and knows the world of the energy suppliers very well.

Our cooperative currently generates 3% to 4% for our members. We are no financial sharks, we want stability, we do not promise the highest returns. When projects perform above expectations, its excess performance is being put into the 'bath tub' and evenly distributed among all shareholders. Members are individually linked to one or more renewable energy investments, and thereby share its

performance risks. For now we do not see bad results. When individual projects would perform under expectations, there is still the income through the excess performance of the other renewable energy projects. It is within our philosophy, based on 'church tower thinking', that those people who live closest to a renewable energy source, should be able to invest into that specific project. Therefore we used the onion ring principle. Those people living physically closest to the renewable energy source should be allowed investment, after them, investments will be granted to those who live further away, and then even further away, etcetera. This process is being continued until all investments are done. When there is one person who wants to invest €100,000 and there are 10 who want to invest €10,000, then the latter group gets preference. An investment of €100,000 is preferred from a more inner layer, relative to smaller investments from a more outer layer.

#### "These project related loans allow members to invest in specific projects?"

When people invest into our projects, they provide us with a loan, which is being repaid by us over time, plus the interest rate. For a PV project of  $\leq 200,000$  we require 100 shares of each  $\leq 2,000$  to be used. The repayment rate to our members is being calculated rather conservatively, and each project passes our specialist members, who check the project based on their professional expertise. Because of all these different types of expertise, and the network we have present through our energy cooperative, there is a very good mood among the members of the energy cooperative, there is a communication is good. When there is a problem, then there is always someone who has an answer to the challenge. The excess money from our projects is being gathered, so that in case a single project does not perform properly, the loan owners still get their promised interest rate. The members provide the cooperative with a subordinated loan. One investment represents  $\leq 2,000$ , which then represent 2 times  $\leq 100$  and  $\leq 1,800$  of a subordinated loan. The member shares are used as liquidity on the bank, and the 90% loans of our members were used to buy the windmill.

#### "Could you show me your financial balance sheet?"

We do not give away our balance numbers, since this was opposed by the Aufsichtsrat, but the general numbers are public. For the year 2012 we have a balance sum of  $\in$ 2,300,000 and last year we had a positive result, but more details cannot be given. We currently have above 500 members. The highest investment was  $\in$ 100,000, then several members provided  $\in$ 50,000, but most members provided  $\in$ 2,000.

## "How have you covered your risks?"

The risks that we have with our wind park are covered by a Vollwartungsvertrag (full maintenance contract). When the windmill stops producing energy, we have a deal that its average production will be compensated for financially.

## "Into what investments are you currently looking?"

For the future we expect a stronger focus on our own energy consumption, the EEG is only one way to generate value for your solar energy, you could sell it to the grid right away, or you could use it at the place of production. For example a hospital requires large amounts of energy, and they pay 17 to 18 ct per kWh. As a cooperative, we start focusing more on own energy consumption, which is demonstrated in the last two projects, and currently we are developing another PV project of 30 kWp, which also focuses on own energy consumption. Currently though, we focus on the smaller PV-systems, since the market for larger PV parks is somewhat over. Our philosophy is to stand close to the people and build small and up close PV projects.

### "To which extent are you planning more windmills?"

Currently we have a lot of plans to build more wind mills, but it is a strongly fought for market, so I cannot say much in this interview. There are multiple municipalities, local utility companies and civilian initiatives who want to build wind mills, since these parties do not have the internal structure laid clear yet and we provide them with the platform to do it through civilian participation. Through our platform we raise the local acceptance for the windmills.

#### "Are you planning on working with paid employees?"

Eventually it will be going that direction, but for now we are all engaged voluntary at our energy cooperative, especially two people are strongly active to do the project development and the operations around our Windstark1 windmill. We are currently growing organically and we have strong roots. During our preparations for new windmills, we sat together with the local banks, the Sparkasse and the Volksbank. And they assured us extremely low interest rates, since their capital

would be in addition to the equity provided by our members, which could be  $\in 1$  million extra, on top of an already accumulated  $\in 3$  million. Through the structure we use, in case of insolvency, the bank gets preference over the loans by the members.

#### "So you work together with Stadtwerke and municipalities?"

This is correct, but the cooperation with the municipality of Heppenheim is limited, since in your own region you are not as much valued as outside. With our political situation in Heppenheim, the politicians of the CDU/FDP do not really like our cooperative. We do not have a negative incentive, we want to reinforce the government, we want to introduce renewable energies, and want to let civilians participate. We will become stronger and stronger, and after a while, they cannot neglect us anymore. We have become a great team, we keep each other together, we organize great meetings, and every single person of our group is networked in the region. Information is gathered by single people and redistributed among these people.

#### "So do you cooperate with the Odenwald energy cooperative?"

We only work together with Odenwald with respect to the one windmill. They use another philosophy than we do. We are rather very self aware and tend to be less focused on profit maximization. We promote renewables with enthusiasm, joy and fun, and this motivates us.

## "What energy cooperatives in the surrounding area are you working together with?"

In the surrounding areas we work together with local energy cooperatives, we provide local presentations and helped several with their foundation. We inform other cooperatives through our experience. Another cooperative in the area currently develops 3 windmills and multiple PV-systems and was started in the end of 2012. They have found someone who has been developing the windmills and who is willing to sell them to this energy cooperative. The project developer is not getting a low price, he is getting a sufficient price. He could have maximized his profit, by selling the windmill to Juwi, but the people of the project developer are not wired that way, they are settled here.

#### "What is your vision for the coming 10 years?"

Our long term goal is to have full-time representatives together with administrative support. Then we do not only have a virtual organization, but also actual people involved with our own office. New energy fields we are looking at are biomass and waterpower, with waterpower being not economically feasible yet, but might be interesting for proponents of water power.

## B.7 Friedrich-Wilhelm Raiffeisen Energie eG

Isabel Gawellek & Melanie Heß (Legal & administrative), Agrokraft GmbH (Bad-Neustadt), July 15<sup>th</sup> 2013

## "Can you tell me something about your background before starting?"

I am Isabel Gawellek and I studied business law, and I work here since one year, primarily focusing on wind, for which I support, plan, and I have two projects of my own which are being developed for cooperatives. My name is Melanie Heß, and I studied foreign languages and office administration. Here I am responsible for the administration of the cooperatives.

#### "Why was the energy cooperative founded and what was its vision?"

The philosophy of our energy cooperatives lies in the goal that the money of a village or city, stays in that village or city. And people can be responsible for their own projects, because then the acceptance rises among the local population, and the taxation of the energy cooperative flows back into the village. We as an energy cooperative use the onion ring principle, where we first ask people of one village or city to invest in a project and thereafter ask people from the surrounding regions to invest. When at that point, still not sufficient funding is available, people throughout Germany can invest.

#### "What was the initial reason to start an energy cooperative?"

When looking at the situation in our region, we saw a lot of savings which were just getting very low interest rates at the banks and at the same time we knew that renewable energy would be the future. A local project development firm was started by the Bauernverband Bayern (farmers union of Bavaria) and the network for mechanical and business support of Rhön-Grabfeld. Many farmers are members of the Farmers association of Bavaria. This business was started to fill a need with respect to biogas plants that the local farmers wanted to build. It did not make sense to build these biogas facilities at each farmer' place, but it would make much more sense to let these farmers work together with 15 to 20 farmers, that might together build something. The cooperative organization form would then be the best way to organize such cooperations. The heat from burning the biogas then is being used as warmth through a local heating system in local villages. These actions also overlap with the philosophy of Friedrich Wilhelm Raiffeisen: "What a single person cannot realize, realize many". A single farmer cannot build a biogas installation, but together they can build it. Then the Agrokraft together with the involved players starts an energy cooperative to hold the assets. The Agrokraft supports the foundation of energy cooperatives, it helps them with gathering capital, and with their administration. Local civilians then become members at a local energy cooperative and start investing in the energy cooperative to allow for local renewable investments to be made. The Agrokraft therefore is a rather normal services oriented company.

#### "What was the vision for the future that Agrokraft had when it started?"

Each village should get its own energy cooperative, with local people who are engaged with the theme, who believe in the project, and who want to promote renewable energy. We get contact to the local villages through the mayor, but also local civilians make contact with us and provide opportunities for investments.

#### "What is your role as Agrokraft relative to the energy cooperatives?"

Our role is helping the energy cooperative to make a start, and if they want, we can take over the administration for the cooperative, we can help with new projects, but in essence each cooperative is responsible for their own work. The Friedrich Wilhelm Raiffeisen eG was the first cooperative in the region, and our cooperative structure then was copied by 38 other cooperatives. When comparing the role of Agrokraft with other project developers, we are not as big as many of the other developers, but we use a different kind of model. Each of our projects is being finished by a civilian participation.

#### "Is it correct that new energy cooperatives are founded to fund new wind projects?"

In one of our projects we are currently developing a wind park with 18 wind mills. Scine this project is rather large, six energy cooperatives have started in the area surrounding the future wind park. These cooperatives started an additional energy cooperative to run the wind park Streu & Saale eG.

"To which extent are these cooperatives run by volunteers?"

Up till now there are no profits, so nobody can be paid yet. Maybe in the future this might be possible. It will take a time before someone can be paid from the money from the wind park, and for now everything is being done voluntarily.

#### "Who pays the planning costs for such a project?"

The costs for the planning of this wind park are partially taken by the Agrokraft and partially paid for by the local energy cooperatives.

#### "Who initiated the idea for the wind park?"

The first idea for the wind park emerged when the government of Bavaria decided that every municipality should create a land usage plan, and then regional areas were pointed out that were to become wind power areas. These areas are very large and expensive, and therefore it is said that alone you will not succeed. When you want to keep the value creation within your region, then you can only succeed with a large community.

## "Which actor came with the desire to allow for civilian participation?"

The Agrokraft promotes the use of civilian participation, and we weighed the options for a GmbH and the cooperative, and locally it was decided to use the cooperative model.

#### "Did the Bavarian government demand civilian participation?"

In Bavaria it is the case that, he who has the capital and he who get's access to the area, can build the wind mills. We said that in our way you have the most positive disposition among the local population.

#### "How was the development of the wind park Streu & Saale initiated?"

Around 2009 or 2010 the regional plan was finished and civilians started saying they wanted to create wind power at these locations. People came to us and asked whether we would like to help them, but also Agrokraft is getting out there and talk to people with good pieces of land and propose to develop something.

#### "On how many wind parks is Agrokraft currently working?"

The Agrokraft is currently working on at least five wind projects, with Streu & Salle being the biggest, with the other wind parks representing 3 up to 5 wind mills, with 15 employees working for the Agrokraft.

#### "How are the responsibilities distributed among the Agrokraft and a cooperative?"

When the Agrokraft and a local cooperative are working together, the Agrokraft takes over the planning, but every important step is being communicated to the local cooperative. We really need several local people that believe in the project and can convince the critics. There are regular meetings where we provide information, and talk about the project developments and where we need more investments.

#### "So local people already invest in the wind project, even when the project is not official yet?"

To start the local wind projects, the upfront costs are paid for by the local civilians, who are providing high risk capital which has a high interest rate. Even with the total loss of the investment, there are sufficient people locally who want this project to start and who pay for the upfront costs. Investments can be done through  $\in$ 2,000, representing  $\in$ 100 membership share and a subordinated loan of  $\in$ 1,900 with a high interest loan, which finances the development. At the end of the project, which represents 4 to 5 years, the investors are given an interest rate of 8% to 9% per annum together with the total repayment of the loan.

#### "How do you convince local people to invest risk capital?"

We provide them a decision making vote so they can see that everything is being done on a fair basis. We are not going to a single person's land and say that we are going to develop a wind mill on his land. Everyone in the surrounding area is given a certain compensation, thereby increasing the acceptance. More people are given a lease, even when the wind mill is located on the property of only one owner.

## "How large is every wind mill in the Streu & Saale park?"

The wind mills that the cooperatives are erecting are 3 MW and they have a hub height of 150 meter and a tip height of 200 meter. These will be either wind mills of Vestas or NordeX, but windmills originating from Siemens would take too long since they could only provide windmills in 2015.

#### "What are the project costs?"

The total project costs for the wind park Streu & Saale require  $\in$ 80 million, and of this we are looking for 30% equity. It is a challenge whether we can gather these investments from among the people in the surrounding area. Of the required  $\in$ 24 million, we already gathered one million in risk capital among the locals, which really shows the positive vibe surrounding this project. When the wind cooperative does not get enough capital together, let us say only  $\in$ 10 million, then the other  $\in$ 14 million will be gathered all over Germany and will be bundled within another energy cooperative. This external energy cooperative then only gets a 10% voting right within the wind park energy cooperative.

#### "How did you create the enthusiasm among the local population to invest?"

I do not know where this large enthusiasm for the project and for the local wind park is coming from, but I think that the local civilians understand that if they have to take actions into their own hands. When an external party will develop the project, he will sell it to an investor and is gone. For the project we work together with the BayWa from Munich, which have more experience with wind park development. The civilians started to understand that when they invest, they also get decision making rights. And when they are more in charge, they can give sub parts of the project to local companies. When developing the wind park Streu & Saale we are not doing it ourselves, but we are working together with another project developer from Bavaria. In the Bavarian state, wind mills can only be built in areas that are meant for wind energy production. Therefore, on other future wind power areas, other project developers were faster to secure the lands in such wind power regions, and at these spots our Agrokraft cannot get access anymore. Outside the predefined wind power areas, it is not allowed to build wind mills.

## "To which extent is the Agrokraft responsible for the development of renewables for local cooperatives?"

When the local energy cooperatives are planning new projects, they tend to depend on us, since we already have some experience with renewables. But when we provide them with a potential future partner and they do not like him, then we are open to provide another. But basically we will only introduce future partners whom we trust, and with which we have experience. Agrokraft does not work together explicitly with one supplier of PV or wind turbines manufacturer, and with each new project we will negotiate again.

#### "Which risks do you have with your wind park?"

When developing a new wind park, there has to be assurance that no endangered or special birds are flying around the future wind power area. When this is the case, the wind park has to be halted.

## "What kind of people invest in the energy cooperative?"

All kinds, every social layer is represented. When looking at the investments by the locals, we ask for a minimal investment of €2,000. This amount already is a somewhat higher investment, but it is not that big those civilians cannot afford it. Nonetheless there are members of cooperatives that invest €50,000. We can start building the wind park as soon as we get the building permission that satisfy the requirements of the Bundesemissionsgesetz (federal emissions law). Then the local Kreis has 7 months to respond to the building plans, and they check the local municipalities, and they check all the requirements that we provide to them, and in the end they make the go no-go decision.

#### "What kind of local people become active in the energy cooperatives?"

When looking at the local energy cooperatives, a wide range of people become active in the cooperative. This can be local farmers, but also a Sparkasse employee, and in general just motivated and engaged locals who also have a job in parallel and all do it voluntary. Usually also the local bank itself has become a member of the local energy cooperative. We are currently engaged in multiple conversations both with the local Volksbanken as well as the Sparkassen, as well as larger commercial banks, but we prefer the local bank over the non-local banks when looking for bank loans.

### "To which extent are local events organized for the cooperative members?"

The energy cooperative has the legislative requirement to organize the annual general assembly. Next to these, the members are provided with newsletters to give them updates, but apart from these, nothing else is being done.

"The 2 MWp is owned by which energy cooperative?"

The Friedrich Wilhelm Raiffeisen eG owns the 2MWp and is located here in Bad Neustadt, but all the other energy cooperatives are independent of this one.

### "What is the running time of the membership subordinated loans?"

The loans related to the risk capital have a running time of 5 years, but when the entire project has to be invested then a loan for 20 years is being provided by its members to their cooperative. The  $\in$ 2000 investment contains  $\in$ 1,900 loan and  $\in$ 100 cooperative share. When all the assets have been paid off and there are profits generated by the system, then the general assembly and our members can decide what to do with the profits of the cooperative. Surplus profits can be paid to the shareholders or can be reinvested. At the moment that a local energy cooperative cannot get enough equity to fund the one of their projects, bank loans can be attracted. The equity ratio goal for the wind energy cooperative Streu & Saale is 30%, for the other energy cooperatives, I cannot tell you. The compensation for the management board and the Aufsichtsrat represent compensation for their driving costs that they are making for their energy cooperative, but no monthly financial compensation. Members of the Aufsichtsrat are for example an architect or a retired man, and all of them have contacts locally. Also board members are present which have built larger structures and who have experience with handling larger amounts of money.

## "What were your revenues for the year 2012 from the 2 MWp?"

The total amount of our revenues and the profits are not clear to me, but our local energy cooperative has generated enough, so that bank loan interest rates can be paid and the financial surplus can be distributed among our members.

#### "Do you work for the energy cooperatives?"

We get paid monthly to do the administration of the local energy cooperatives. I.e. we are providing a service for the energy cooperatives. This service is not obligatory to the energy cooperatives, and every cooperative can decide for themselves whether they want our service. The local energy cooperative are not a member of the corporation Agrokraft, the cooperatives merely get services from us: foundation assistance, administration out-sourcing, renewable energy project support.

#### "What has been the interest rate for the year 2012?"

For the year 2012 we had an interest rate of 6%, just as with the previous years.

## "Is there a maximum that a member can invest?"

Currently there is no maximum on what a member can invest into the local energy cooperative.

## "How do you organize your union-ring principle?"

When a local energy cooperative invests into new projects, the financing primarily has to come from locals, when no more funding can be generated in the local town or village, people from the entire Kreis can be asked, then people from the region, then the Bundes-country and then from entire Germany. But the primary focus lies on getting the investments from the local village or town, since both the local acceptance and the local decision making power is important, allowing big investors or corporations to no entrance. Since the Vorstand decides whether new members are allowed to join a local energy cooperative, the board can also decide not let a person become a member when they are from outside the local area. Our local energy cooperative only has PV-systems that we own.

#### "Which risks do you see for the local energy cooperatives?"

When addressing the risk, the local energy cooperative sees as their only risk that insufficient sun will be shining.

#### "Where do you want to go with the Friedrich Wilhelm Raiffeisen energy cooperative?"

Our vision for the future is that every village or town will get their own energy cooperative and every region will get their own regional development cooperative, and the local people will use the potential of PV or other possibilities and thereby reinforce themselves through the financial overflow. This overflow then can be invested into the local child care, or local social projects. And the locals can reinforce themselves with their own money.

#### "The EEG payments have been going down for the last years"

What will happen to the EEG in the future is a thing we cannot really say, but when you are afraid that some laws might change, then nobody does something.

## "Do you develop new PV projects in this municipality?"

We currently have a total of 22 PV-systems, which all run accordingly, but we do not have plans for 2013 to expand the amount of PV projects, but in the future there will definitely come new things.

#### "What are you doing with new developments such as storage or power-to-gas?"

Other themes were are engaged in are the biogas facilities projected by Agrokraft, which insert biogas into the gas-infrastructure, but with energy storage, we are not doing anything at the moment. Of course Agrokraft is looking at the developments, since we have a strongly engaged workforce with many ideas, who educate themselves continuously, and who go to inter-cooperative meetings.

## "What is the average investment of a member?"

Among our members, many people provide the  $\in 2,000$ , but there are also members who provide  $\in 10,000$  to  $\in 20,000$ , but I do not know the average investment per member is. A member can also just become a member, but then only becomes dividend from this membership share. When a member wants to invest more than  $\in 2,000$ , he/she has to buy packages of  $\in 100$  membership share and  $\in 1,900$  subordinated loan.

#### "How many members do you currently have?"

The Bad-Neustadt energy cooperative currently has around 230 members. The 6 energy cooperatives that joined together for the wind park Streu & Saale have a combined 450 members, which are only the people living locally.

## B.8 Energiegenossenschaft Untermain

## Karlheinz Paulus (Vorstand), Alter Obstkeller (Mönchberg), July 15<sup>th</sup> 2013

## "Do you originate from the Odenwald area?"

Here we have the Main-valley, and it separates the Odenwald area from the Spessart area, and I'm originating from the Odenwald area, with our energy cooperative being located within the state Bavaria. The focus region of our energy cooperative is made out of two Landkreise and the Stadt Afschaffenburg, which reflects 370.000 inhabitants of which the governments are already working together on the subject transportation infrastructure and economic improvement.

When comparing the philosophies of different energy cooperatives, we have the same philosophy as Odenwald: an energy cooperative should be big enough to work together with local Stadtwerke or later on with larger energy utility companies. As a small local energy cooperative this is not possible, since they do not have the competence and the know-how, and this can only be done by a larger energy cooperative. The Agrokraft GmbH founds these smaller local energy cooperatives, but at the same time also starts a larger energy cooperative that together with the local energy cooperatives runs a wind park.

#### "How is the structure of your cooperative being shaped?"

The structure of our energy cooperative is being shaped by the way the region is structured. Here in the region we have a rich Main-valley, and poorer regions: the Spessart and the Odenwald. This difference is caused by the Gewerbesteuer (business tax), the taxation from local businesses that go to the local municipality. Since there are many companies in the valley, and the workforce drives from the hills to the valley for work, the valley prospers and attract new people, with the non-valley regions losing inhabitants, with the municipalities getting extinct. Therefore it is important for the local municipalities that something happens locally, and this happens when new wind mills are being built. because the taxations will also flow to the local municipalities. We have to gather capital, and it makes a difference when you buy 40 wind mills instead of 5. At the same time we see the future possibility to sell the wind electricity directly instead of through the EEG. When in the future the old coal plants are being stopped, their cheap electricity cannot be provided to the grid anymore. Their coal is cheap since the plant has already been amortized. At the moment when new coal energy plants are going to be built, then their price cannot be as low as the price of our wind mills. In 10 years there is the possibility that we are going to sell the electricity straight away to the grid. To be able to effectively sell the electricity, I need a sufficient amount of it. When you are bigger, the risks are lower that some of my wind mills are under performing, since the positive gain of one area can compensate for the lower performance of another. Our cooperative sees this as the downside of the Agrokraft philosophy. When you want to negotiate with the sector, you need the specific knowledge, and you need this since it is a billion euro market, and you cannot do this as a hobby.

#### "So you will have to grow big when you want to make a difference?"

When looking at where money is being made, the big sums of money are not being made in running the wind mill, but primarily by the project developers. The plug and play wind mills, that are provided to energy cooperatives by project developers, are usually given too high a price and the energy cooperative will carry all the risk.

## "How has your energy cooperative started?"

In 2007 people from my village had gathered and started a foundation that was to promote the renewable energy theme. The members were primarily people who already owned a PV-system on their roof, or rented a roof somewhere else, these are people that were building PV-systems themselves, but also those that were building small hydropower facilities, and some were energy efficiency advisors. At a moment we saw people with capital and no roofs and roofs with people with little capital, and then we looked for different ways to invest into PV. Around 2007/2008 the German cooperative law was changed, and then we decided to start an energy cooperative. Through the change in the law, it has been made easier and quicker to start a cooperative.

#### "Who were involved with the start of the energy cooperative?"

A group of seven people started the energy cooperative and invited the local cooperative banks and proposed them our ideas. In the Landskreis Miltenberg, we have a total of four cooperative banks. And each bank has its region where it provides its services. Next to the cooperative banks, we also invited the local Sparkasse. The banks then provided bank loans and promised to handle bank loans quicker.

At the start of our energy cooperative, we wanted to start right away, and wanted to buy our first PVsystem, but we did not have the 20% equity. The banks then allowed us to fund the first projects with 100% bank loans, after which 20% was refunded in a 3 month time frame through investments from new members. To get these arrangements, it is useful that you know the director at the top of the banks, which believe in the concept. But the support for the energy cooperative by the banks is not provided through personnel. That is the difference between us and the Odenwald energy cooperative, which was given personnel by the local Volksbank. We do not get this, and therefore personnel are a problem.

#### "Am I correct that you currently have 327 kWp?"

This is up to date, and we are looking to buy an existing PV-system. We got the contacts to the existing PV-system through the Odenwald cooperative since they have a better network with the local business. Since the PV-system is in our region, we might buy the PV-system together, and in parallel our cooperative is considering building two other small PV-systems. The owner of the PV-system is selling his PV-system since he requires capital for investments into a new bigger PV-system. Since our cooperative is providing a sufficient price for his PV-system, the owner is willing to sell. The PV-system required €800,000 at the time of construction.

## "Am I correct that you have not built a wind mill yet?"

Currently we are participating in several wind mills, and the person that is building the wind mills is known by our cooperative for already 10 to 20 years. The developer is coming from the region Baden-Württemberg, has been developing 5 wind mill projects and provides them for a reasonable price. At these wind mills, next to our energy cooperative, also the Odenwald cooperative and another energy cooperative are participating. We provide  $\in$ 49,000, of the total investment of  $\in$ 25 million. But we do not want to invest more, since we are also building a local warmth distribution network in a village, where we hope we can provide warmth to over 40 to 50 houses of a total of 100 houses.

#### "How has your vision changed throughout the years?"

When looking at our plans from the start of our cooperative, we thought that the first thing to do would have to be the PV, since these are easily calculated and built. After our foundation we waited with investing in PV, since the EEG was too low, but in the summer of 2011 it made sense again, the module prices were again low enough, after which we started building again, resulting into three extra PV-systems. After Fukushima the conservative government of Bavaria changed their mind from anti to pro-wind, but in the meantime the surrounding Bundes-states of Hessen and Baden-Württemberg have already been building wind mills. When you start building higher wind mills, you get into air streams that are more laminar, have higher speeds, and that are not as turbulent as lower height wind speeds. The wind speeds at 100 meter located at the coasts are still somewhat higher than our wind speeds at 150 meter, but it comes close.

As a cooperative, it is our goal to eventually sell the electricity to our customers, and by doing so, it does not cost the 7ct/kWh to bring the electricity from the northern German coast to the south. Therefore you get 5ct/kWh for your wind electricity in the North, and you get 8ct to 9ct here. And therefore you would not need the EEG, when we can send the electricity straight to our end consumers. In the future the demand for local use of wind energy will be growing. Here in the Untermain we have the luck that we have several large industry areas which require energy. For Odenwald it is harder, since they miss out on the energy intensive industry and therefore has to send their electricity from their region to for example Darmstadt, but the higher up connection is owned by one of the four large energy utility companies.

This energy transition is very exciting, since the energy market will change significantly, with local energy suppliers providing energy to locals, with the larger energy companies providing the back-up power. The question rises, who is going to buy the gas fired back-up power, and how is it going to be financed? No one knows how often these plants have to be operated, and therefore no energy company decides to build large gas fired power plants, therefore they are not getting bank loans. We need gas powered plants, and therefore we need an EEG for gas power plants. Then the question arises, where are we going to build these gas plants, and how big are we going to build them? Several big ones, or many small ones? These power plants then provide an opportunity for energy cooperative to invest into. This is the future. The local companies have built four gas powered energy plants together with E-on, and we should look into the length of these deals, and at their end, when we grow big enough, we can re-negotiate their deal.

#### "How many members do you currently have?"

We currently have 130 members, and we want to double this number at the end of the year.

#### "What was the motivation of the local Volksbank not to support you with personnel?"

When discussing the cooperation with the local Volksbank we did not consider asking them to provide personnel. We heard this type of cooperation from the Odenwald just recently. The local banks may promote our energy cooperative among its members, but when our cooperative files for insolvency, their members might ask for their money back at their local Volksbank. At the Odenwald energy cooperative the local Volksbank can look inside the energy cooperative and see how it is performing, the local bank in our region cannot do this, and therefore they do not want to promote our energy cooperative might lose its independence. We have decided for more independence and it currently impacts us negatively, but maybe in five years it will not. We will be needing large capital investments, and such amounts cannot be provided by our local cooperative banks alone. The Sparkasse in Odenwald does not really want to cooperate with the energy cooperative Odenwald, since they see Odenwald eG as a 'child' of the local Volksbank. Maybe in our case in two years, our independence allows us to choose our source of bank loans. Since we did not decide for an alliance with the local cooperative banks, we can also not use the political power and influence locally.

#### "How does the cooperation with municipalities look like?"

Among municipalities there are strong differences in how they perceive our cooperative. And also the Landrat (district) does not favor wind mills, since they have heard from the Bayern government for 10 years that wind mills would not fit into Bayern. Our Landrat is formally in favor of windmills, but tries to stall the process. With some local municipalities we find cooperation, and when the Landrat keeps on stalling, we will start making our own plans and will bring them to court. The local municipalities do not have money for such wind mill plans, but we can collect the money. We want them to go to court as long as they do it with us.

#### "What kind or structure do you use to develop your windmills?"

Just like other energy cooperatives, we also have people working for us. These people will get paid when the windmill is turning, these are two engineers are working on our wind park. Our cooperative has started a GmbH, which employ these engineers, and they are getting paid for their effort as soon as the wind mills are performing. This wind park development company is 100% owned by our energy cooperative and in this GmbH we are the managing directors, with the GmbH being funded through risk capital. Currently we are talking with companies to provide this risk capital. In the future they might be able to invest with sums up to €250,000 or €500,000, but for them to be allowed to invest these amounts, we require them to provide some risk capital. The companies might want to invest since they are given interest rates for their capital and improve their image by consuming local renewable energy. By cooperating with us, in ten years, they might get electricity from our wind mills which ends up being cheaper than off-shore electricity. Local companies such as BASF are looking all the way in Russia to assure their gas for their power plants, but also smaller companies up to 500 people are doing the same, since they want to keep on producing in 20 years time. Therefore these companies try to lower their external gas and electricity demand and start looking for opportunities to produce it locally. Not every company in our Landkreis thinks like this, but we contact those that do, which respond positively to our concept. For example BASF provides us €20,000 for the risk involved with planning and preparation, which allow them to invest €200,000 to €500,000 of the total required €20,000,000 of the total wind park. We are working on a structure in which the ownership of a wind park operating company is divided among several parties. A part is owned by the energy cooperative, a part by the local municipalities or Stadtwerke and a part by the local companies, with no party having more than 50%. Our energy cooperative might not get a 50% share, since it might not be possible to acquire such large amounts through our members. The Odenwald eG is planning a wind park operating GmbH with 50% ownership for the municipality, 20% owned by companies, and 30% owned by the Odenwald eG. Municipalities cannot go bankrupt and therefore they can acquire 100% of their necessary investment through bank loans.

#### "When your cooperative grows, is it possible that these percentages change?"

This could be, but whether we will still build windmills by then is the question. We have started with €100,000 and now we are talking about 20 million, this some jump. Currently we have invested €1 million but in the future we have to make the jump to €20 million. We have collected €300,000 among our members together with €700,000 with bank loans, we will make a step toward €20 million, and since we cannot do this by ourselves we need partners. Also the risk balance is out of place when we

would invest €300,000 into several PV projects and then €2 million to €3 million into one wind park. For the development of our wind park we need the cooperation with companies that know the concept of risk capital, and which are provided with a 10% interest on their loans, with the chance that the loan will not be repaid. At the end, when the wind mills are producing electricity, the risk capital providers are repaid. The project development GmbH will sell their wind park to a new GmbH that is funded by the companies, our cooperative and the local municipalities. But when the wind park cannot be built, the development GmbH will go 'kaput' (it will break). Also the Agrokraft uses a similar structure in which the cooperative members provide risk capital outside the energy cooperative of these investing members. By creating such an independent company, the development company might disappear when the project cannot continue, with the energy cooperative continuing operations. Our cooperation with Agrokraft originated from our need for knowledge how to start an energy cooperative. For this service they required €5,000, and therefore energy cooperative make losses at the start of their existence since they have to pay this and other start-up costs.

#### "Do you cooperate with the Genossenschaftsverband?"

Outside the auditing by the Genossenschaftverband required by law, we do not use this Verband often, and because of their auditing there are little insolvencies among cooperatives.

#### "Which skills do you have among your Aufsichtsrat?"

Among our members present in the Aufsichtsrat, there is a former cooperative bank president who knows how to organize a cooperative and how its protocols should be executed. But he is doing this as a pensioner. My motivation originates from the excitement to be part of the Energiewende and to have started it and contributed to it through the cooperative way. Currently it has become almost half of his work, since he is also working for the energy cooperative in Odenwald. Another motivation for him is the argument of local value creation. He would rather make money locally than have to do it through Juwi (international renewable energy development and Investment Company).

#### "Which revenues did you have in 2012"

Last year we had between  $\leq$ 50,000 and  $\leq$ 60,000 in revenues, resulting in provided our members with  $\leq$ 10,000 of interest. At the start the members provided us with loans, which allowed us to build the PV-systems, but we are going to change this by introducing membership shares. Since we were founded by Agrokraft, we started with subordinated loans, but at the Odenwald energy cooperative they did it differently. They sold shares to members, and each year they provide the members with dividends. And now we are changing from the loan-model towards the membership share model, since the loan-model does not function properly. Also since from a regulatory perspective, having membership loans is perceived difficult. In our case, we have to pay the members their interest from their loans, but we are not able to lower the amount that we could give to our members and use a part of it to invest into new projects, as a result we reduce our flexibility. By lowering the member dividends we could hire an administrative worker. Therefore, we have chosen that for all our future projects we will finance it through our new member shares.

## "Which equity ratio would you like to apply?"

For our new projects we are aiming for an equity ratio of 30%, since banks do not want to fund up to 20%. Currently we have to pay 2% to 2.5% interest rate on bank loans, and we are calculating with capital interest rates of 4% to 5%, which is the interest rate we expect from the investment by our energy cooperatives. After 20 years the total amount of the money has been doubled. It will be hard to get a higher percentage out of it.

## "What is your view on new developments such as storage?"

With respect to new developments such as energy storage we are currently waiting. We are not actively looking at the subject. The technology is more for the end-user and eventually it might come to us. A future theme for us is energy contracting, and also selling warmth through a local heat distribution grid. Hydropower might also be interesting, but it is involved with rather stringent nature protection legislation.

## B.9 BürgerEnergie Ostfildern eG

## Armin Schnabel & Jürgen Fahraender (Vorstand), Bürgerhaus (Ruit), July 18th 2013

We are both voluntarily involved for this energy cooperative. Mister Fahraender is the former buildmayor of the city Ostfildern, and because of his background he was asked to participate for this subject. Another partner of the cooperative is the local cooperative Volksbank, and mister Schnabel has certain commercial knowledge, and as a result mister Fahraender is more responsible for the technical things, and I focus more on the commercial, accounting, and tax related subjects. Before the start of the energy cooperative we did not really know each other. We had seen each other now and then, but really getting to know each other occurred through the energy cooperative. The local city and the Stadtwerke were planning on starting an energy cooperative since surrounding cities were also starting energy cooperatives. Then the city went to the local Volksbank, which has experience with cooperative organizations and understand the cooperative law, and they asked if there was interest for cooperation. As a result two local Volksbanken and the local Stadtwerke (i.e. the local city) together started looking for persons which would engage themselves with this new energy cooperative. Then mister Fahraender and mister Schnabel set together to design the cooperative and discuss themes like the height of the membership share, which eventually resulted into the statutes. The Baden-Württembergische Genossenschaftsverband has been helping out during the foundation of the energy cooperative. Starting the cooperative required a business plan and future financial plans, and after all formalities we were founded on October 2011 and therefore we organized a public event, which was visited properly. It was called an energy forum, and together with the city we were introduced to the public, and eventually to gather members. For the first year we expected 50 members providing approximately €1,000, but at the end of the first year we had 152 members totaling €518,000.

#### "What is the reason that the city tends to be so positive?"

Our city of Ostfildern is a combination of multiple villages connected into one region, and the city has a history of attending to renewable energy and city improvements, with the city continuously reflecting on how they are performing and which next steps to take. During the energy forum they provided their future plans and one of the practical building blocks was to start an energy cooperative. Independent on the local political party that is dominant, the focus of the city to act ecological does not change.

#### "What was your goal for the energy cooperative when you started?"

At the start of our energy cooperative we did not mention numbers, we did not say in 2020 we want to reach this or that. We have approached the theme pragmatic, and we decided to look first what it was we could do with PV, since it was the most logical and closest to us. We asked ourselves the question: what can we do to contribute to a locally generated energy supply and then allow local civilians to participate. We want to bundle the money provided by the civilians and invest it into renewable energy production facilities, and through it, we want to shape the energy transition locally. In an interview on the local radio our mayor mentioned how good it is to allow local civilians to participate in renewable energy, and allow people to look up, see, and say: "Look! That is where I have invested my money" Our challenge now lies in realizing this vision of locally generated renewable energy, and do to it in an economic way, and to thereby provide our members with a certain dividend following from their investments.

## "With which actors have you been cooperating?"

During the start of our energy cooperative we discussed several basic things such as the logo, the content of the flyer, and we built a simple webpage. We then communicated it to interested people that one cooperative share represents  $\in$ 250 and every person can maximally invest into 40 shares (i.e.  $\in$ 10,000). With the first member shares we started to invest into our first PV projects. Our first contact with roof owners that show potential for a PV-system, went through the municipality, since most roofs were owned by the local government, which are for example child-care buildings or fire-departments. The city Ostfildern provides us the roofs, and we are realizing the PV-systems. We are not only cooperating with the city Ostfildern, we also work together with churches. Another actor that provided a roof came through a regional entrepreneur who was just constructing a building for his company and discussed the potential for putting PV on its roof, in parallel, our cooperative currently has talks with multiple companies discussing new projects. One of the firms says that they want to act ecologically but do not want to focus on PV on their roof. The company says that they focus on their building for an external party to generate energy. Companies

and farmers are currently coming to us and ask for opportunities to work together. When discussing these new projects, one of our requirements demands that the roof is either new or has been recently renovated, such that it holds for the coming 20 years. Companies from outside the city area of Osterfildern are also coming to us, which shows that we are not bound to the city Osterfildern only. When discussing new plans with roof owners we will look if there is not a local energy cooperative already present, if so, we do not want to compete with them, and let them do the project, but when no local energy cooperative is at hand, we are willing to discuss further. In another example we worked together with the government of Thübingen, since they built a new city hall, and while discussing our cooperative then suggested that they should look for opportunities to do the funding through their own energy cooperative. When they decide to start their own, then we do not want to compete.

### "You have started with projects on public roofs. How are the developments now?"

The more our cooperative uses the internet, and uploads pictures, the more people come to us for information. As a result, multiple cities have come to us to ask how we did it. We have been doing a good job so far, but had several  $\in 100,000$ 's in cash, which was quite a problem. But now we have invested  $\in 250,000$  in a wind energy project, and we have filled three more roofs with PV, and as a result the cash money available has been almost completely used. With these new investments we expect to generate dividends by the year 2014. For the year 2012 we proposed the members 1% dividends, but one member proposed not to get the dividends for the year 2012, and insert the 2012 dividend into the 2013 dividends, and the rest of the general assembly agreed. At this annual assembly around 100 people were present of a total member count of 250. In April 2013 we did the Kindergarten, we working on the local Gymnasium, and a fire department has also recently been provided with a PV-system.

#### "Which other resources do you have within your cooperative?"

We now have a member present in the Aufsichtsrat who is professionally involved in the renewable energy sector. He is a valuable source of advice and supports us when choosing the roofs and helps out when we have to choose the best proposal from among the local PV installers. Other members are a tax advisor and the Oberbürgermeister (Lord Mayor) mentions the energy cooperative ones in a while in the local media. Last year in October, we were asked to update the municipality parliament on our current developments, and this provided us with a platform for the press which resulted in higher amounts of new members joining the cooperative. Next to the press, we promote the cooperative at many city related activities, where we can portrait our flyers. For example when new civilians of the city are welcomed we have a table and introduce them to our cooperative. But nonetheless we have to consider our resources, since when we are promoting the cooperative, it only concerns us two, and we also have a private life. We were at the point that we had a lot of money and we needed opportunities to invest this money, now we are at the point that we have invested the money that was given to us. And I am convinced that when we look for new members through a public promotion we easily get 10 to 20 extra members, thereby collecting  $\in$  30,000 to  $\in$  40,000. Since the people get low interest rates on their savings account, they are willing to look for alternatives, and to engage themselves somewhere else. It is our idea that the environment goes above high dividends, and we do not really like it when new members come to us only for the dividends. At the start of our cooperative it was my concern that when starting to build our cooperative, we would not have sufficient members. Our cooperative decided to allow members to join our cooperative since there was such a positive vibe around our cooperative, and we were flooded with a lot of money. Other energy cooperatives are saying, that when they have a project of €100,000, they only allow new members up to €100,000, and then do not allow new members to join, and when a new project emerges, they open up again. Our cooperative did not want to disrupt this flow of new members, since we had just started, and we did not want to say stop after a half year. We would damage ourselves if we would say stop every time, because then it would leave the heads of people, but we are not sure how our strategy affects our success compared to others. As a result, it was a challenge to balance the projects and the amount of members. We have kept the information flow outward low, and still people keep on joining our cooperative. Getting the money is not quite the problem, it is investing it. Currently I am happy that we have invested the money, since it brought me stomach aches knowing that our cooperative had so much money which got such a little interest rate on the bank account.

*"What were the responsibilities of the Volksbanken and the Stadtwerke when you work together?"* From the two Volksbanken and the Stadtwerke we were given three start-up investments of each ¤4,000 which we could use for the web page, the flyers and the legislative foundation. Eventually we

did not completely use the foundation capital. Both the involved Volksbanken are linked to our energy cooperative, because for each bank, a member of their managerial board is also a member of our Aufsichtsrat. Because of the close cooperation between the Volksbank and our energy cooperative, it is accepted that I am at this interview during working hours, and this is the support that the Volksbank is providing to the energy cooperative. At the city there is an employee responsible for energy awareness, and sometimes we exchange information, but we would not call it a strong cooperation. When asking for information on laws and energy related subjects, we can go to this employee of the city and we can expand our knowledge and know-how, and in this way we have multiple places where we can nourish ourselves. After the start of our energy cooperative, the Aufsichtsrat allowed us to 'jump', they trusted us that we would propel the developments, and they would not dictate the way we had to act. The success of initiatives such as ours is dependent on the people that act upon it. When the Vorstand of the Volksbank says the energy cooperative is important to them, an initiative will start to go, and when there is a change of people, there is a chance that these people think differently. We do not worry about such things, since our project runs for 20 years. You need to have cooperation and tolerance from your employer, when people call our energy cooperative, they are directed to the Volksbank, and the Volksbank agrees with it when I make phone calls during my work for the energy cooperative.

*"...it is very hard to participate in wind power projects, since the preparation time can take two to five years..."* 

# *"How much are the members involved in the cooperative?"*

It is important that they get the feeling that they are an important part of the cooperative and that they can participate when decisions have to be made. For example, during the last general assembly, we discussed a loan into a wind park, and this resulted in fierce discussion. We discussed why our cooperative should provide a loan when a member could straight away provide a business loan, and the security of the loan was discussed. Eventually, with 3 votes against, we decided to invest the €250,000 through a loan, which would get its interest through the EEG for wind energy.

## "Are there many windmills in this region?"

Within the region Ostfildern, there are no opportunities for wind power, since there is no sufficient wind, and the proximity to the airport does not allow it. Therefore we looked for opportunities in the region, in a wooded area there exist priority areas and around these locations a discussion emerges whether we should build windmills or not, with wind speed measurements being performed at these locations. Before the wind park takes off, requires two to three years. It is important to note that we have money now, and we have to invest now. We are currently member of the Verband für Bürgerenergiegenossenschaften, which has been in existence for a year. This Verband is discussing plans with the EnBW, since it bundles the interest of the energy cooperatives, and thereby it provided us with an investment into the wind park. Through the start of this Verband we came into contact with many other cooperatives, which is very valuable, since it allows us have direct contact with the other energy cooperatives. An example on how this Verband provides value, together with the EnBW they provide membership administrative software. This software enables us to pay dividends to our members. For me this software is a relieve, since it makes the job easier to calculate dividends, and perform calculations, instead of doing everything in excel. Another example is the participation in the wind park. On our own, we would not have been able to do it, but through the Verband we can. When discussing the participation in the wind park, multiple other energy cooperatives had their critics on the fact that the EnBW was involved, other cooperatives found the risk too high. For normal energy cooperatives, it is very hard to participate in wind power projects, since the preparation time can take two to five years up onto the moment that you might get allowance to realize the wind mills. Before all this has been done, a million Euros could already have been spent, with risks involved that no one can really indicate. There could be chances of 50% the wind mills will be developed or not, and therefore we cannot stand for such investments in front of our members. Therefore we looked for possibilities to find a second Standbein (pillar), where the risk has been 'Ausgeklammert' (factored out). The risk for our wind park has been taken by the EnBW, and therefore our loan is getting a minimum of 3.2% and a maximum of 4.7%, and dependent on the amount of energy the wind park generates, we get a lower or higher interest rate. We communicated to our members, that we would provide an interest rate of 3% + X.

#### "Have you started cooperating with the other cooperatives?"

We were invited to informative meetings and once at an existing windmill, which have been built in 2012 and were erected in 2012, and are located in the Schwäbische Alp and another in Schopfluch, and at these windmills risks are not present anymore, since these wind mills already provided energy in the past. In the surrounding area, multiple other wind mills were already present, and therefore we had good data on the local wind performance. The loan for the wind mills will be for 15 years, after which it is being repaid.

#### "Why has the EnBW allowed you to invest?"

The arguments of the EnBW to allow energy cooperatives to invest in their wind mills has to do with their image, since they want to take the civilians with them on their travel with the renewable energy. They have chosen the platform of the energy cooperatives as a partner which represents a large amount of members. The EnBW is currently looking for a re-orientation, together with a green oriented government; I believe they had their influence on the EnBW. For us, it is a chance, with no large risks, and from the beginning on we have said that wind is for us an important theme.

*"How do you compare yourself with other cooperatives that have grown faster?"* These energy cooperatives have started one year earlier, they would have had better EEG prices for their PV-systems and they probably would have been bigger.

#### "What is this BürgerEnergiegenossenschaftverband providing?"

Apart from the previous examples, the BürgerEnergiegenossenschatfsverband also provides seminars regarding the cooperative law, since not everybody involved in energy cooperative have experience with cooperative organizations. Through these seminars, the board members are supporting their members.

#### "What motivates you to become active in the cooperative?"

I (Mister Fahraender) ave become active because I was involved with local construction and I have always been strongly interested in renewable energy. After finishing my work, my Leidenschaft (passion) for the subject has stayed, and during the phone call that was meant to ask me for my position I said that the one asking me should stop talking since I would join right away. I (Mister Schnabel) am living and working in Ostfildern for the Volksbank, and when my boss asked me to become part of the Vorstand, I initially said no. I was already locally rooted, by supporting the local fire department with financial services, but he did not want to do more voluntary work since he was also strongly engaged with his professional work. When his boss came asking a second time, he let himself being convinced. It must be noted, we have been successful, and our projects are being well received by the public. As long as our projects keep on running successfully and the public keeps on liking it, the cooperative brings lots of joy. But when this would not be the case, and it would drag on, then I would not enjoy it. Due to our cooperative all new kinds of networks have emerged, new contacts, and partnerships such as the BürgerEnergiegenossenschaftverband or our colleagues among surrounding energy cooperatives, and as a result different kinds of communities emerge. Therefore I enjoy it, but without the support from the Volksbank that I can work during their working hours, it would not go for me. In the evening I am already working for the energy cooperative, and the constructer cannot come to a meeting in the evening, this should be done during the day. At the same time, my normal work at the bank also has to continue, but until now it is okay.

#### "Why have you decided to set the maximum on €10,000 per person?"

When deciding on the maximum amount a member can invest into our energy cooperative, we decided on a maximum of  $\in 10,000$  because we did not want to lose too much money when a member would take back his money. Also we wanted many people with small investments, compared to several people with large investments. On average, members are participating with around  $\in 3,500$ . The costs that we incurred originated from our webpage, promotional material, but also costs related to the destruction of each energy production sources at the end of their lifecycle. Risks related to our PV-systems are insured from calamities such as lightning strikes, fire, or when the system mall performs. The risk that one of us may not be able to perform his job is always there, when this happens, we have to find ourselves another Vorstand member.

#### "Which developments do you see and how will you respond to them?"

When looking at current and future developments we see that PV becomes harder and you have to look very carefully, you cannot make any mistakes, and costs are not allowed to increase. You have to

look at the returns of each project, and to realize these is our goal. The EEG becomes increasingly worse, and currently provides under €0.15/kWh, which has been €0.27/kWh two years ago. Products are getting cheaper but not at the same speed as the EEG prices decrease. We also have to consider that by 2014 10% of the produced electricity has to be used locally, and therefore this 10% drops out. For us this change is a major subject, since we see opportunities to come to agreements with the people living under the roof holding our PV-system, and selling them the electricity that has been being produced. The electricity used by the owner should at least be the 10%, but possibly could become more, therefore there are opportunities for a higher price when selling the electricity right away compared to selling it to the grid for EEG prices. The person buying the electricity from us will pay less than its current electricity price. Almost all energy cooperatives are looking at this previous model, for which a good practical example would be the company mentioned earlier. This company has a significant energy demand, but we are selling the electricity completely to the grid and are provided an EEG compensation for it. When we want to sell our electricity directly, we need partners who require our electricity, and who can pay us for 20 years. We need this long term security. I am not worrying when we are working together with the city Ostfildern, but when we are cooperating with a smaller firm, we are not able to tell whether they will exist in 10 to 15 years, and that means a risk. Relating to this issue we do not really know what the correct model should be. When considering selling the electricity straight to the city grid, there are currently talks to sell the electricity of one of our PV-systems on the roof of a school to the nearby swimming pool. When considering this, it should be possible to sell our electricity to the EnBW grid when local power demand lowers in the weekend. With these new developments, some energy cooperatives are already further, and therefore we should reinforce each other. Another theme is the production of warmth and its distribution through a local distribution grid, but related to this subject are larger technical challenges and such grids require more supervision compared to PV. When discussing other cooperatives which already have such distribution grids, the difference between such cooperatives and the energy cooperative Ostfildern comes back to the fact that they are located in the rural areas, and that Osterfildern is somewhat a sub-urb of Stuttgart. Our city is currently developing such a warmth distribution grid in one of our older neighborhoods, but this is a lot of work and requires a lot of convincing. When looking into earth warmth, this subject has made a lot of negative headlines, because developers have been unwary of the deeper layers that absorb water and expand their volume, resulting in heighted earth levels and destroyed houses. These accidents happened at multiple locations, with large damage to property.

## "Following these developments costs a lot of time."

We have to attentively follow the developments. There exists the Baden-Württembergerisches Genossenschaftverband has an employee who is supporting the energy cooperatives and develops energy projects which allow the energy cooperatives to participate. With respect to our statutes, we have not limited ourselves only to solar, or wind, but everything that has to do with renewable energy has our interest, and we consider all opportunities where our members are able to participate in a financially attractive way.

## B.10 BürgerEnergiegenossenschaft Voralb eG

Dieter Nemec (Vorstand), Haus in der Breite (Heiningen), July 19<sup>th</sup> 2013

## "Can you tell me something about yourself and your background?"

I am currently enjoying my retirement, I worked for Bosch, and I am currently at home for three years. I work for an university, educating electro technical basics. A half year before I stopped working for Bosch the local municipality wanted to put a PV-system on the roof of a school, but the question arose which organizational form should be used. Initiators for this PV-system were the city councils, the mayor, which started a GBR (Geselschaft Bürgerlichen Rechts). Then the local energy utility company EnBW from Karlsruhe came by, which was founding energy cooperatives. Luckily not only one municipality was involved but nine, with each municipality providing the amount of inhabitants it had in Euros to the energy cooperative Voralb, with each municipality becoming a member of the energy cooperative. At the moment I started in the Vorstand of my cooperative, I expected to work 1 day/week for the cooperative, but this expectation was wrong, and currently I work 2 to 3 days per week on average. But it is a lot of fun to do it. I went to a meeting of energy cooperatives in Stuttgart and there we discussed the subject of compensation for the managerial boards of cooperatives.

#### "Can you tell the story behind the start of your cooperative?"

I have always been engaged with the subject of renewable energies, and at a certain moment, the roof of the school house in Heiningen was being repaired, and then there was the possibility to put a PV-system on top of it. This was in the year 2001. I then talked to the parent council, describing that they could start protesting against nuclear tomorrow, and get a news item in the local paper, and that's that. But they could also invest into a PV-system, and then, at a certain time, there will be so much PV in Germany that we could power down one nuclear power station. And now, 12 years later, 8 have been shut down and the electricity is still being produced. I have been telling this story to many people, and it brought me so called bruises and got me my gray hairs. After this first PV-system I decided it was enough and I continued with my normal work. Several years later, when the energy cooperative came, I decided to join. You could say that currently I myself am the energy cooperative. I am the forward motion in the cooperative, since I am working on the financial, technical and taxation subjects. We have another Vorstand member who provides the marketing, internet articles, and has contact with the local news. We had a third board member who was responsible for the membership administration, but we had to part ways, since he was not performing accordingly. He then did not want to hand over the membership shares documents, and from 80 of our members he still had the documents at home, now I have brought him before court.

#### "I learned yesterday that cooperatives exist that have a database from the EnBW"

The energy cooperatives started by the EnBW currently count for 60 to 70 cooperatives, which are assembled in a Verband (Federation). The EnBW has been developing software for the database together with a member of a Volksbank here from Baden-Württemberg, with the software itself being developed by a software company. This software was provided to us for  $\leq 160$  per year, but then the EnBW found out that software is a very critical story and requires maintenance, and dropped this software like a hot potato. The EnBW then sold the software package to the Vostand of the VBBW (Verband Bürgerenergiegenossenschaften Baden-Württemberg), Miss Strobel, which increased the pay to  $\leq 405$  per year.

## "What is your vision for the region?"

Our vision as an energy cooperative is that we as civilians want to get away from fossil fuels as fast as possible, and we as civilians should contribute our part. When looking at the share of PV and wind, a major part belongs to private people, and the energy utilities play a small role. I know people, at least two of my friends, that did not look at the cost of the PV-system, but only wanted to do it, since it was good to do it, and they wanted to support the development of such a technology, and the technology can be developed when there are buyers. But for us as an energy cooperative, it is important to also look at the financial story. Our first year we provided 3.8% and the two consecutive years we had 5% dividends. We continuously get mails and request of people who want to participate. A single share is  $\in 100$  and our highest is  $\in 10,000$ , and I continuously have to say 'no' to such people, I cannot take your money, because when I would, I would have to bring it to the bank, and there I would get interest rates of 0.5% to 0.7%. At the end of the year 2012 we had five PV-systems, and this May we installed our sixth PV-system, thereby growing our financial balance up to  $\in 387,000$ . It is my expectation to set up one PV-system per year, but it is a large undertaking, and it takes a lot of time. For our last PV-system I started January and it was finished in May. For now I am not sure whether I

will start a new project since we currently cannot find sufficient roofs. One of the municipalities that started the energy cooperative decided to pay for the PV-system themselves, using the arguments that it would be cheaper and they would earn more when they would do it themselves. From a technical standpoint not all PV-systems are performing accordingly.

From my working desk I can observe each of the PV-systems through the internet, and I got a mail that an inverter had stopped functioning, after which we swapped the inverter for a new one because of the 5 year warrantee. After 4 weeks I compared the performance of the different PV-systems and I found out that the individual PV-systems showed different performance. After looking into it, I found out that the new inverter complied with the new requirements from the VDE (Verband Deutschen Elektroingenieure), which requires them to insert 10% idle current. Then I asked the electro-engineer to shut off this parameter, since our PV-system was installed before this specific law, he then swiftly changed the parameter back. Another example comes from the fire department. When starting a PVsystem, I first simulated its potential performance, and I found out I needed a specific inverter of SMA which was able to handle shade. During the planning, I made the mistake not to check whether this parameter was applied. After installation, I made my calculations with respect to the other PV-systems, and found a performance decrease of 8%, instead of the expected 3% to 4%. I found out that one parameter related to shade was not engaged, and after turning it on, the PV system functioned as expected. Another example comes from a befriended roof PV owner, which wanted his PV checked after two years, but his installer did not want to come by for a period of 4 months, because the electrical installer had sold his customer a low quality product. Our first PV-system, we bought from the EnBW is our worst, since an employee of the company quickly assesses the system and makes his decision, which I believe is bad. You should look at the variations, when you add two or three extra modules, you might get a better voltage. An inverter of SMA has a maximum efficiency of 98%, which can be reached with the right construction, but almost nobody is doing this.

When looking for funding, there is sufficient money available. Michael Diestel of the Agrokraft GmbH told in Stuttgart: give me the proper preparation with the local municipality and its council, provide me with a filled sports hall, and I will leave it with  $\in 1$  million. Money is no problem. Energy cooperative Ingersheim is the first cooperative within Baden-Württemberg to have constructed a wind mill, which took them 10 years, and they have an equity ratio of 80%. The wind mill has cost them  $\in 5.5$  million, and they collected  $\notin 4.5$  million. The Vorstand member of this energy cooperative said that he wanted to sleep quietly, even when there are low wind production years, he did not want the energy cooperative to get into trouble, because the interest on the loans could not be paid.

# At our general assembly, we thought of a pathway in which we would first do PV,

## "Money is no problem."

then, when we would have sufficient fat on our bones, we would switch to hydro power, and then we would go for wind power. I then found out, 1.5 years ago, that we would not have any hydro power potential in this region. Of the 60 documented locations for hydro power,30 are already in use, and the other 30 are not economical feasible for hydro power. I am confident that we will reach our goal to grow and expand our cooperative in the future. One problem is that a cooperative should have a certain minimal size, and I look with crying eyes how currently in each village an energy cooperative is being founded, following from the motto: we are building a PV-system, so we found a cooperative. The fixed costs for our cooperative are  $\in$ 4,000, without even paying any dividends to our members. This amount is too much when only owning one PV-system. Therefore I am in favor of combining cooperatives into larger communities of 2 of 3 villages, or as in our case 10 villages, and then it pays off. We have to pay  $\in$ 120 per year for the Genossenschaftsverband, we have to pay  $\in$ 160 to be registered as a company. We have to be audited every two years, which costs  $\in$ 2,000 per audit.

#### "Which actors were involved with the initiation of the cooperative?"

When looking for support each of the mayors from the local municipalities did not want to take on the role as member of the Aufsichtsrat, since they argued that the cooperative is a civilian energy cooperative. But luckily I get support from the owners of the building we are currently having the interview, since I can invite people here. When I have specific questions, I can send a mail to the mayors, so cooperation is pretty good. When looking for new opportunities, we are currently talking with multiple consumer's cooperatives, providing goods to members, that we would provide their roofs with PV-systems. Currently also a 10% self consumption is required of the electricity produced by new PV-systems. We are applying the new laws for the EEG with a PV-system on the roof of a municipality. They are using 56% of their solar electricity themselves, and they are supplying 44% to the grid. We are currently developing a construct that the municipality will pay us a certain price for

the electricity supplied to them, which probably ends up between the market price of electricity and a minimum price. For this construct to work, we assume that the German electricity prices will rise. When someone uses the electricity from its own roof, you do not have to pay anything, when you have an external electricity supplier on your roof and supply the electricity straight into the building, then the supplier has to pay the EEG. When the electricity is fed into the grid, also the grid use has to be paid. Our goal has to be, to start producing electricity at such locations that allow for immediate consumption of it in its region. The German law defines this as the immediate region, but this is still somewhat vague.

## *"When discussing cooperations, you mentioned the municipality. Which other actors do you work with?"*

When cooperating with new partners, I have started contacting the local Kreisbau Filstal. They own many buildings, and provide a good opportunity to install more PV-systems. There are many places where there are ample opportunities, where you have to apply constant gentle diplomatic pressure. We are also working together with the banks, of which the Raiffeisenbank should be on front, but locally the Raiffeisenbank is not that strong. Because of that, we didn't link ourselves to the Raiffeisenbank but to the Kreis Sparkasse. The Sparkasse has become a member with  $\in 10,000$ , just like the Kreis, and just like the EnBW, whom also became a member with  $\in 10,000$ .

#### "2 to 3 years after your start, what development do you currently have?"

When new inquiries for investments are being done by future members, I note their contact information and their likely investment, which resulted in  $\in 100,000$  of promised investments. When our cooperative has a new project, I will call each of these investors and ask them how much they are expecting to invest, with the project on the table. Such interactions with people are not automated, and takes time, but it also brings joy, since I have the time to do it. Our cooperation with the Kreis Sparkasse is getting shaped because we have a bank account at their bank, we have a reduced cost for this account, we only have to pay  $\in 6$ /month instead of  $\in 12$ /month. We do not have any bank loans, but having them would not be bad. When discussing the market conditions of the last years, I have been calculating the expected repayment time of the PV-systems and showed that it has been growing the last year from 8 years to 10 years. When using bank loans, we could increase our return. We want our members to tell about our cooperative, and how well it has been helping them.

## "Except your general assemblies, do you also have other activities?"

Our cooperative has been thinking about setting up extra activities aside from the general assembly, activities such as trips to a hydro power plant of the EnBW, with the EnBW sponsoring the bus and the catering. But our cooperative fails the capacity to set up such activities. Our Vorstand meets once every 4 to 6 weeks. Another activity we have been setting up has been looking into high efficiency pumps for home warm water heating systems. Originally the pumps used by Germans were cheaply produced, and had certain energy consumption. When renovating a church house of the evangelical church, I (not the cooperative) swapped its current 11 pumps with high efficiency pumps, resulting into a 20 year cost reduction of  $\in$ 57,000. A member has taken up this theme and concluded it required 10 different types of pumps, because there were differences between houses and heating systems. When we would provide our members this pump, maybe 25 members would buy them, resulting in around 2 pumps of each type. This does not pay itself, therefore we did not continue with this subject.

Our statutes say that the cooperative has to serve its members, and I have still not found anything with which I could serve my members, only the financial dividends. Apart from the financial benefit to our members, we may generate awareness, and that is a good road to go. We could generate this awareness by being active during political elections, but these are soft-facts, and these do not allow for quantifications easily.

#### "Who are the other members of your Vorstand?"

Our Vorstand knows two members, and we have two active members that do not want a formal position, but want to help out because they like it, with none of them getting paid. Our both Vorstand members are retired, and one of the active members is also retired. One woman is active, but she has a job, so I try to reduce her workload whenever necessary. Throughout the years, I have taught myself the experience required for the financial and legislative themes attached to our cooperative. I have a good cooperation with the local financial department of the village that helps me out when I do not understand something, I would call it "learning by doing".

"How do you perceive the commitment of the different actors and your members?"

The EnBW is currently not doing anything anymore; they have stepped to the background. The VBBW (Verband der Bürgerenergiegenossenschaften Baden-Württemberg) writes newsletters to the energy cooperatives warning them for things happened to some other cooperatives. Also cooperatives that have not been founded by the EnBW can become member of this Verband for  $\in$ 60/year, since we have been founded by the EnBW we do not have to pay. We currently have 250 members, and during the general assembly around 50 were present, and all our decisions tend to go unanimously. Our cooperative has a dividend of 5%, and this can be realized because we do not have a tax advisor. I have been asking members who are tax advisors, how things are done, and I have been working my way through it, and now I am doing all the tax related subjects myself, saving the cooperative  $\in$ 1,000/year. Some cooperatives let an accounting firm do the numbers, but I am doing it myself. When I would stop my work, then others had to take over the work, and probably require money, thereby lowering the dividends of our membership shares. It is my goal, that at the moment that I depart from the cooperative, that the cooperative can stand on its own legs, and has a full-time employee involved with the cooperative.

#### "Do you have any other cooperation?"

At the Genossenschaftsverband Baden-Württemberg, currently an employee has a full-time responsibility for its energy cooperatives members. In the past the GVBW represented wine farmers, consumption cooperatives, cooperative banks, and now the energy cooperatives have been added. This member is currently working for the energy cooperative, to develop things that benefit all energy cooperatives. Last Saturday I was given a brochure regarding electricity sale, and all its ins and outs. I have gained this knowledge through own research, but many energy cooperatives have not yet started selling electricity. During the meeting in Stuttgart, a cooperative from Pforzheim has been presenting how they have planned to construct 3 windmills in their area. They instructed the energy cooperative at the meeting which cooperation has to be realized, how to act to reach your goal, the social engagement, the social structures, and the position of the cooperative with regard to neighboring municipalities.

#### "What has been your revenues and costs?"

Our revenue has been €65,000, with €6,000 costs and €9,000 taxes. I get €1,000 for travel costs and the roof rent represents €2,012, since only one municipality required a rent for its roof. For our last PV-project, the roof-owner also wants a rent, and we decided on 3% of the PV energy production. Also we are making costs for the check by the GVBW, which represents €2,000 per two years. This year we could have provided a higher dividend, but we wanted to provide stability, and also when we provide higher dividends, more people may come to us which we cannot serve. We have decided that our energy cooperative only recruits new members from this Kreis and from surrounding Kreise. I guess the total population of this area is around 200,000.

### "What is your goal for the energy cooperative?"

I want our cooperative to grow past its break-even point, that when there might be a weakness in our cooperative, since when it stays too small, it might fall apart. A very important theme is the wind power in Baden-Württemberg. I am keeping an eye on the developments of wind power generation. Around the Stuttgart region, there have been assigned 80 locations which would allow for 3 to 5 wind mills. In our Kreis Göppingen, I have started talks with a mayor in February relating to wind mills on the Schwäbischen Alb. There are some very windy areas, with speeds up to 6.25 m/s. This area has already been leased by a project developer, and after talks with the developer he decided to give one of the wind mills to our energy cooperative. The project developer wants to keep most of the wind mills, since they generate income, but the developer argues that when a cooperative is involved, it has positive side effects. The cooperative buffers much of the antipathy, since the people can participate in the wind mills. The project developer has an investor, but we gather the money locally. In my opinion the distance to the windmill is too large, and I would rather have the wind mill somewhat closer so I can cycle to it. Investing into one wind mill as a cooperative has many risks, but when something goes wrong with one of the wind mills we still have insurance. Another risk is that we could get a lower producing wind mill, compared to the others. Another option is to become shareholder of the entire wind park, thereby not having the risk choosing the weakest performing wind mill. When you want to participate at an EnBW wind park, you have to become a member of the Bürgerenergie Aktiengeselschaft, within which Miss Strobel of the VBBW is active. This Bürgerenergie Aktiengeselschaft then owns a GmbH & Co KG, which invests into the wind parks. This represents four layers, with each layer providing its hand and is sticky, and earnings are sticking at each level. So I say, keep it simple. Keep structures as simple as possible, keep it small and clear. Because of the previous
description, I am happy that this project developer is simply working with my cooperative. When providing loans to the EnBW, we would only get 3.2%.

When looking at the developments of selling electricity, we anticipate that the electricity prices will continue to rise. I hope that with this new win-win situation we might get access to new roofs. I once talked with a roof owner at an industry area, allowing for 25 kWp, and the owner asked which rent it would give him. And I calculated  $\in$ 250. "Per month" he asked, "No, per year" I replied, and he quit our conversation. For  $\in$ 250/year I am not letting anyone on my roof. This  $\in$ 250/year is such a low price for such a load that having an external PV-system on your roof provides. Therefore I go to roof owners and propose that I am taking all their worries out of their hands, they should lean back, and we are doing everything, it should be a good feeling business proposition.

## "What other developments do you see?"

There are also possibilities with energy contracting. In the region Baden-Baden there is a cooperative with 5 to 6 heating units, which run on gas and provide heat and electricity. But such engines require frequent supervision and maintenance. And now this cooperative has started a GmbH that has as its goal to run/maintain these heat/electricity units. Such undertakings are labor intensive, just like hydro power plants. I am only making a trip once a month, and check all of our PV-systems, I go to the inverter and write down the data, and check for irregularities. With hydro power, in some situations you have to show up daily, when some logs have been swept down which might block the entrance.

## "What are your expectations for the future?"

It is my expectation that of the 70 energy cooperatives founded by the EnBW only 50 will remain active within now and 10 years. Since there are energy cooperatives that only have one or two PV-systems, I expect there to be mergers, since these will not survive."

*"Since there are energy cooperatives that only have one or two PV-systems, I expect there to be mergers, since these will not* 

survive."

## B.11 BürgerEnergiegenossenschaft E-Werk Mittelbaden eG

## Brigitta Schrempp & Frank Kunzelmann (Vorstand), Schrempp edv Gmbh (Lahr), July 19th 2013

There has been a strong boom of energy cooperatives in Germany, with currently between 600 and 700 cooperatives Germany wide and 120 in Baden-Württemberg, with a strong growth the last two or three years. Our cooperative was founded in October 2012, and during its first assembly the Vorstand and the Aufsichtsrat have been elected. We wanted to save us the administrative tasks related to becoming active in 2012, so our cooperative became operational the first of January 2013. We currently have 850 members, and we have 100 members waiting until we open up our cooperative again for new members, since we have too much money and we cannot invest the money.

## "What has been your vision for this region?"

The start vision for our cooperative was to let civilians participate in the exit from nuclear. The large energy firms should not be the ones that take on the Energiewende, it should be initiated from below, and the civilians should be taken into the boat. The politicians will have a much easier job completing the Energiewende in this way. With wind mills, there is a classical resistance. People think that wind power is okay, as long as it is not in their backyard, or not on a nice mountain in their neighborhood, because it ruins their view. To get a grip on this resistance, we should start a cooperative to get civilians in the boat, and provide information to the civilians to enlarge the understanding regarding such projects. Because of the nuclear accident in Japan, a lot of members became engaged with energy. Another reason why there was much interest into our cooperative comes from the low interest rates that are currently being provided by the banks. People want to invest into projects with decent returns, do something for the environment and also for sustainability. Interest rates on safe investments are pretty low, and people who do not want to invest in higher risk shares, are therefore looking for investments like our cooperative.

## "Who has initiated the energy cooperative?"

The cooperative was started by the E-werk Mittelbaden, which is the local utility company, which also provided several information gatherings. The name E-werk Mittelbaden has a very solid name in the region, with solid financial performance since they are not doing any crazy financial things. The strong growth of members came from the trust the people had in this institution. At the first meeting around 400 people signed up as a member by signing their member shares. Around  $\in$  1,600,000 of equity was gathered. At this same meeting, the gathered people were asked who was interested to become a member of the Vorstand and the Aufsichtsrat, and then people could shortly promote themselves, resulting in five Vorstand members and 13 Aufsichtsrat members. The local Stadtwerke desired to start the energy cooperative in its beginning, but then allow the cooperative to stand on its own legs. Before the meeting, there were already talks on who should get into the Vorstand, because it would not be good when at the evening itself someone would be elected that did not have the competence for the job. For the Aufsichtsrat the people were asked on the evening itself. This group is a mixture of all kinds of people, representing backgrounds such as environmental activist and bankers. The people of the Aufsichtsrat did not know each other before the meeting, and getting these people on one line is a challenge by itself. Every member has its ideals with respect to the Energiewende. The Vorstand is responsible for the operational activities of the cooperative, and the Aufsichtsrat is only a controlling entity. When we want to engage into larger projects, we have to get the 'go' from this Aufsichtsrat. Today we have signed for €500,000 relating to a wind project an hour's drive from here, in the Schwarzwald region. Within the Aufsichtsrat, there can be discussion, since some are in favor of hydro power, the other in favor of wind power and another has no preference. We are strongly working together with the E-werk, since they already have know-how and are engaged with preparations for new projects. Another wind project is 40 minutes away by car, and here we are looking into potential project.

We currently have already developed a project called the PV-system Mattenhof, costing around  $\in$ 520,000, and we have participated at a wind park as mentioned earlier, and now we are looking for new projects. We have looked into providing PV-systems on the roofs of members, churches and public buildings, but the returns did not pay off since the EEG compensation reduction is so strong. Last year the compensation from the EEG has gone down significantly, with  $\in$ 0.11/kWh for >40 kWp systems and around  $\in$ 0.15/kWh for <40 kWp systems. The model that has been used often in the past, in which a roof was leased by the cooperative and then covered by a PV-system, does not provide sufficient returns anymore. It makes sense when you consume the electricity yourself.

"Your growth does not look straightforward, which are the developments you see for the future?" When working for this energy cooperative, you have to be very flexible, and should be able to switch quickly. When we were looking into developing our own hydro power plant, we encountered a lot of

bureaucracy. For wind power, as for hydro power, you need many building rights from different organizations. When building a hydro power plant, you have to build fish stairs, thereby growing the investment prices, resulting in non-feasible projects without subsidies. But the government of Baden-Württemberg is promoting smaller hydro power plants, and you can get some reasonable returns based on their funding. Currently we are trying to get access to these funds, but we have to be on time to make sure that still sufficient capital is present.

*"Without the E-werk, this cooperative and its size, would not have existed."* 

"When the E-werk prompted for civilian participation, was the PV-system already built?" At our start, our first project was the PV-system Mattenhof, which had already been built by the Stadtwerke and has been sold to us. When starting an energy cooperative, you need a starting project, but all this had been planned by the E-werk Mittelbaden, to simplify things for us. Without the E-werk, this cooperative and its size, would not have existed. There are many energy cooperatives that only have 20 or 100 members. When creating awareness for the start of the energy cooperative, the Stadtwerke used the local newspapers and press, to invite the people for the information evening from a region of a total of over 300,000 people. Looking at the smaller energy cooperatives, we expect that many of them will stop operations or merge with other energy cooperatives. Our energy cooperative is bigger and has the financial abilities to invest into larger projects. Until the 14<sup>th</sup> November 2012 people were able to invest, and by then we had 846 members. This strong influx of members was not expected, since the utility company was counting on 250 members. From a capital standpoint, it was expected that €1,000,000 was going to be gathered, but we ended up with €3,500,000. Currently we only have equity on our balance sheet, and no bank loans. So far, we have invested €1,000,000. We are planning a wind park and can only get connected to the grid by 2015. In the meantime we are looking for other projects. Hydro and wind power are very time intensive. When you want to co-invest into existing parks, then that can be done rather quickly. But our Aufsichtsrat does not really want this, and prefers investments in the region. Our Vorstand has been looking into wind parks across Germany through Windpool, a wind corporation, allowing Stadtwerke from Germany to invest into wind parks across Germany, especially in the middle and eastern regions, but in our southern regions, nothing is constructed yet. We wanted to participate, but our Aufsichtsrat did not approve, arguing investments should be done regionally. Our cooperative has the challenge that there are many projects, but that these projects take time to develop. And now, with a Green-Red government the procedures even take longer, since now each fishing society, honey maker or bird society should be heard. Building the wind mill requires a half year, but its preparations require two years. Developing a wind park is very intensive, and costs a lot of time and money, up to €400,000. Looking for endangered species around the wind park requires a half year, measuring the wind speeds requires a half year, which is also being done by the E-werk. The E-werk can be labeled as project developer, and our cooperative links itself to these projects. One reason, because we do not have the know-how, and second, we would have been 'pulled over the table', because others would think our cooperative has much money, but with E-werk we know that nothing strange will happen. And this makes sense, since we are all electricity consumers from them. The E-werk is currently planning 3 wind mills, and this could be extended up to 7. The E-werk will set up a GmbH for the wind mills and allows the cooperative to partially participate in the wind mills. The cooperative can only provide a portion of the entire investment sum. One wind mill requires €3,500,000, and when we would invest we would put all our investment on one windmill, which is not acceptable. Therefore we have to spread the risk, since when this one windmill is not spinning it will only give us losses. Therefore we are spreading our capital, with a certain percentage into wind, a certain percentage in PV, hydro and possibly biomass. These percentages are not fixed, but we have a certain segmentation. With respect to our long-term strategy, we are not working together and completely autonomous. From the E-werk, we have got the assurance that we can participate in the new wind mills as soon as when the E-werk has the green light, then we will sit together with them and work out our cooperation. The municipality in which the wind mills are being built is also being provided with participation into the project, and possibly also someone else from the region, but the E-werk will always keep its 25% share. With 25.1% of the shares, there will be no sale of the windmills without the agreement of the E-werk. When we eventually need the capital to invest into our part of the wind project and we do no have sufficient capital, all we have to do is open up the

cooperative again, and then it will take off. When the interest rates of savings are rising again, and people can get better returns elsewhere, then our cooperative might have a problem. The main reason people invest into our cooperative is surely the return, I would say 80% of the people invest for this reason. During the first meeting, there were statements that members would get 4% up to 6% returns.

"With which parties have you started cooperating after the initial start of your cooperative?" When looking for new projects for investments, some are handed to us externally, like the Bürgerenergie AG, which is a cooperation of multiple energy cooperatives. And the Bürgerenergie AG itself is also looking for projects. We have a rather active Aufsichtsrat member who goes to multiple meetings to look for projects for our cooperative, and many potential projects came from them. The hydro power that we might want to build has been initiated by our Vorstand. Also the Genossenschaftsverband Baden-Württemberg is setting up meetings in Stuttgart that allow energy cooperatives to meet each other. But energy cooperatives are not quite exchanging projects, since every cooperative is happy when they have a project.

## "How was the composition of the Aufsichtsrat decided?"

When assembling the Aufsichtsrat during the first information meeting, there were 13 people who wanted to become involved, this group has somewhat become a debating club. From the initial 5 people involved with the Vorstand, three are left, since two of them could not combine the work of the energy cooperative together with their own work. Since January 2013, our Vorstand had over 22 Vorstand meetings, and over 18 meetings with other organizations/people, requiring an average time investment per week of 4 to 5 hours. Also, a high degree of flexibility is required from the Vorstand members, since sometimes you have to work at 8:00 and sometimes at 21:00. A Vorstand member should have the possibility to leave his workplace for the cooperative. The Aufsichtsrat does not really have anything to do with the operations of the cooperative.

#### "So what if you could advice the E-werk one year back on how to structure the Aufsichtsrat?"

When we would have the ability to redesign the energy cooperative, we would have reduced the amount of places in the advisory board, and would choose the people in advance, before the start of the energy cooperative. People should have solicited for the position in advance, and therefore it can be labeled as a strategic failure. At the start of our cooperative, it decided to choose the maximum amount of Vorstand members (5), and the maximum possible amount of Aufsichtsrat members (13). With these large groups, the efficiency is not as high. With our Vorstand of three people, I would say our efficiency is rather high. In the Aufsichtsrat, there are people who have never taken a position in an Aufsichtsrat, and therefore have little experience. The experience in the Vorstand is present. Mister Kunzelmann is working for the E-werk as an industrial engineer, Miss Demeusy is active in the renewable energies, and Miss Schrempp is active as company president, so a certain business expertise is at hand. In contrast, it required two meetings from the Aufsichtsrat to decide what would be defined as the 'region' of the energy cooperative. In our Aufsichtsrat are pensioned teachers, a pensioned police man, an entrepreneur, a gardener, a tax advisor, an organization advisor, two younger people, and two members of the E-werk. But only 30% of them understand the role of the Aufsichtsrat and what it should and should not do.

#### "How have you invested the €3.5 million that you collected?"

We have invested €500,000 into PV and €500,000 into wind. We have €3,500,000 in signed membership shares, but we only collected €1,000,000. We only take in capital when needed for new projects. We rather have our members to possess the money, as long as we do not need it. A private person mostly gets a better interest rate on its savings, then when we would invest it in a savings account. The maximum investment of each member is limited at €10,000. For our first investment into the PV-project, we collected the capital related to one or two membership shares, being €500 per share, resulting into the €500,000 investment, with investments of almost all 850 members. Of all members who we asked to invest into our cooperative almost all provided us with their money, 10 did not. For the administration of the collection of these investments, the Stadtwerke have supported us. Now we have 700 e-mail addresses of our 850 members, and the rest is getting it through mail. The members that did not respond to this inquiry were then called by the Vorstand.

## "So you have 100% equity, and no talks with the bank for loans?"

You are right. Allthough today, we were contacted with respect to a large PV-system of 1.7 MWp close to Stuttgart. The goal of this project was the involvement of multiple energy cooperatives. There will be a 'Gesellschaft' (company) that will develop this PV-grid, and its investment will be done through

30% equity and 70% bank loans. This Geselschaft still needs several €100,000's and therefore they approached us.

## "Which costs does your cooperative have?"

When looking at our costs, we have outsourced our financial administration to a local tax advisors company. We have an insurance which has to do with us as a Vorstand. If anything happens with the cooperative, which is our accidental fault, our private equity will not be touched. As a cooperative we do not want to have a high risk, and therefore we are spreading our investments into different projects. When we would try to make high risk investments, our Aufsichtsrat would not allow them to be made.

## "Which skills are present within the Vorstand?"

As an employee of the Stadtwerke E-werk Mittelbaden (Mister Kunzelmann I learn new things every day. I am close to the know-how and therefore close to the source. For us, each of us has said that they would work for the cooperative, and we believe that you either do it, or you don't. We enjoy ourselves when we come together, and we look forward to our meetings. Our joy and desire for the work would quickly fade when we would not be able to start new projects and when our Aufsichtsrat would say 'no' to each new project. When we want to start a project, we have to get the approval of the Aufsichtsrat, which represents the return expectations, risk management, which are communicated through a presentation of 20 to 30 pages. The Aufsichtsrat then has to study the

presentation and provide us with questions, and then they have to decide whether they approve the new project. The problem is that many people in the Aufsichtsrat base their response on their 'stomach', instead of on economic viability. Members pose their opinion, and say "no!". This can be frustrating when there has been a lot of preparation by the Vorstand for a certain project. Therefore we ask the Aufsichtsrat before considering investing time into a project, whether they agree with a certain project. It is our free time that we are investing into all of these projects.

"What will be your goal for the future?"

*"An energy cooperative is less seen as a social thing, and more as an economical one."* 

Expansion and a large amount of members is important for our energy cooperative, since when you have a large amount of members it is easier to get quick appointments with higher placed individuals, since you represent 800 members instead of 20.

## "To which extent do you use the database software provided by the EnBW?"

This package costs €6,000, so we said that we did not need it. When we would need such a software, we could use the software of my (Miss Schrempp) software development firm. Currently we are keeping track of our member data with Excel, and that fits us fine. We have looked at the EnBW program, but we did not like it very much.

## "To which extent do you allow members to become active through work groups?"

When looking at the activity among members, there is no involvement, it is only the Vorstand which is involved with the operations, and members just get the dividends. When a member wants to become a part of the Vorstand, he has to apply at the Aufsichtsrat, but this will not be many people when they realize how much time it costs to run our cooperative. During our meeting in Stuttgart with many other energy cooperatives, many energy cooperatives have issues finding enough people for the Vorstand. There are Vorstanden of other cooperatives who do not have sufficient members, but there are no new people willing to do it, since such a position costs much time and are without compensation. There are Vorstanden where one by one, board members quit and step out of their function and insufficient engagement is present among members to supply new board members. An energy cooperative is less seen as a social thing, and more as an economical one. The theme environmental protection exist more at the edge of our cooperative.

## B.12 Windkraft Dillinger Land eG

Alexander Jall (Vorstand), Volksbank Dillingen eG (Dillingen a.d. Donau), July 23<sup>rd</sup> 2013

## "What has been your role in the energy cooperative?"

Our bank has been financing PV projects multiple times in the past, of sometimes large PV-plants up to 4 MWp and bigger located here in the region. Then we saw that the investors for such projects come from all over Germany (Hamburg, Frankfurt) and from outer Germany. So consequential we thought the investors for new renewable energy projects should come from here. In one of these wind parks, the Stadwerke of Münden has been investing, which is a bad thing since the wealth creation should stay within our region. People should be able to invest into our energy cooperative, which do not have sufficient amounts for large investments. Since our bank has many customers who only have €5,000, we wanted them to be given a chance to also invest. Therefore we started a Bürgersolarpark in 2009, and since we are a cooperative bank, it lies close to us to start such a project. The people that invested into the park preferred the cooperative, since it is democratic, with every investor having one vote. The cooperative was preferred over the GmbH & Co KG, with the cooperative realizing a high acceptance. Because of this democratic element, we as a cooperative bank entered this area. We did not do any project development or planning, we only invested and bought. So we have bought a solar park and then last year allowed the civilians to invest. We started one cooperative for the solar park and one cooperative for a wind park.

## "So then you made the next step towards wind?"

At a certain moment the theme wind power came by in our region and local civilians contacted us for opportunities to allow them to invest into wind mills and then we decided to set up a wind project, resulting into 455 members that joined the wind cooperative. The idea for the wind park came from a project developer from Ulm, who wanted that civilians were able to invest into the wind park. This project developer is a family company, they knew that we had been involved with PV in the region, and through this, the contact emerged. The project developer then secured himself the areas to be built, owned by the Staatswald (National Forests), and took care of the building permit, the grid connection, wind measurements, and we looked for the investors. The wind park should have been 10 wind mills large, but it eventually turned out to be 8. The project developer had multiple investors to choose from and he preferred the civilians over other large investors such as the Stadtwerke. He then provided us with the opportunity to jump in.

## "The result of this opportunity was that you built two windmills?"

Initially it was planned that we would only invest in 1 out of 8 wind mills, but we ended up investing in three, with the other five wind mills represent 5 individual GmbH's. The three wind mills in total required €12,000,000 investment, which was too big for our cooperative bank, and therefore we worked together with other cooperative banks to finance the project. These wind mills were bought plug & play.

## "How did you assemble 455 members?"

This wind project was started by two public information meeting at the February 2012, with 800 people in total showing up. We invited these people through the newspaper and through our Volksbank webpage and we put up some posters in our buildings. During the presentation, the building rights from the government were not yet given, because the municipality Zöschingen did not approve the wind park. They started a lawsuit against the building plans, since there was opposition in the local municipality council. Therefore it was not sure, during the presentation to the local people, whether the building plans were to continue. It would have been far too risky when we would have invested money for the project and it would not be built. We had to wait for the decision of the court in May 2012, and after the approval things went fast. We founded the cooperative with 30 people, we made the arrangements with the bank, and since we had experience with the solar cooperative, the process went pretty fast, resulting in the foundation here at the bank. In four meetings, the interested people could then participate into our cooperative. All 800 people were invited to come and invest, together with a certain deadline until what time these people could provide us their investments. We lowered the maximum participation height from €50,000 to €25,000, to allow for more people to invest. When these people had participated, our bank invested their part, and then our cooperative was able to pay for the wind mills. The project developers that were involved with the project were too small to make the investment during the project. So our cooperative had to invest into the project on June 2012. Then the project developer and the cooperative started a project development GmbH

which was then funded by the cooperative. Our cooperative gathered 42% equity, with the other 58% covered by loans from the Volksbanken. Our cooperative had to pay 90% of the total cost of our wind mills to the wind mill developer Nordex, but we required a guarantee on this money, for when something would happen with Nordex. When there would be large project developers, then our cooperative would have bought the wind mills as plug and play. When working on this project, it was important to the Volksbank that we would work together with smaller firms, since these are usually our customers.

"So you contacted the 800 interested people and eventually ended up with 460?" When we wanted, we could have taken more people than the final 455, but the investment has to provide certain returns, and a too high investments would not allow this. The investments by the members are a 1:1 share of members and a sub-ordinate loan, each representing  $\in$  2,658,000 in total. The dividends on the shares are 0% and the interest on the loans are 9%, resulting into an average return on investment of 4.5%.

## "With which other actors/businesses did you work together?"

Actually no other actors. The two project developers, our Volksbank and the Genossenschaftsverband providing support.

*"So the wind park was within your Landkreis, with the municipality against the placement?"* Yes, there existed proponents and opponents, but now everything is okay, since the judge said 8 windmills instead of 10.

"Why have you decided for a 1:1 financial structure equity : loans, together with a 9% interest rate?" We do not have 9% interest rate, we have 5% when you bring the two together. We decided for this model because of tax related reasons. We can only provide our members with profits when our cooperative makes profits. Wind mills have an amortization period of 16 years, which result into losses for the first years, and we have to compensate the losses with profits, and only after, we can provide our share holding members with their dividends. In this case, the model of the cooperative would be completely uninteresting, since the dividends would be provided at the end, and no one would be interested in such a project. Therefore we decided to insert membership loans into the balance and locate it under the liabilities. The interest rates on these loans can be provided to our members, even when the cooperative is loss-making, and in this way I can extract liquidity from the cooperative to my members. This way of financing is also being used by GmbH & Co KG's. In our model, after 21 years, the cooperative could be terminated and the liquidity can be returned to our members, with a total of 206% being returned to our members after this period. There are multiple scenarios that could happen after the 21 years, like repowering, but we assume that after the 21 years, the wind mills will be destroyed, costing us €30,000 per wind mill.

## "How did you decide your equity ratio?"

In the north of Germany, you can make wind mill investments with far lower equity ratios compared to here (Bavaria). When they were being built, they were still somewhat expensive, but we bought each of our wind mills for  $\in$ 3,900,000, representing 2.4 MW Nordex wind mills. The bank is getting 3.35% for 10 years, and afterwards, a new interest rate has to be set, and they could be higher. We have created  $\in$ 1,300,000 of free liquidity for the year 2023, in the case that the interest rates end up too high. With the liquidity we could then partially repay the bank loan, this 1.3 million euro lies dormant on a bank account and functions as security. At the start of our wind project, we want to have a higher liquidity, so we only start loan repayments in 2014 to create a buffer since wind speeds vary.

#### "What where your reasons when deciding the composition of your Vorstand?"

The people active in the Vorstand of the wind energy cooperative are Mister Jall, also active as Vorstand of the Volksbank Dillingerland eG, with the second Vorstand member being the president of the local Stadtwerke, and the third person acquired knowledge with regard to renewable because of his opposition towards nuclear energy. People active in the Aufsichtsrat came from our members, representing business consultants, entrepreneurs, a former manager of the Bauernverband (Farmers Union), and the second mayor of Dillingen. We wanted to have people from a wide range of skills and backgrounds. Then we selected the Aufsichtsrat members, and allowed our members to vote, resulting in the selection of all those proposed by the Vorstand. During the procedure, no extra proposals came of people wanting to join the Aufsichtsrat, which is probably caused by their trust in us.

## "What is the EEG payment for your windmills?"

Our three wind mills get  $\leq 0.0927$ /kWh resulting into  $\leq 1,335,593$  revenue per year. The operations of the wind mills are being done by Honold Windenergie GmbH ( $\leq 17,077$ /year), and the maintenance is taken care of through a full maintenance concept by Nordex for  $\leq 50,000$  per year per windmill. We decided to outsource these activities since the civilians cannot do it, and we as a cooperative cannot do it, since we require a professional for such work. The bank is given a compensation for the commercial representation and the member administration of  $\leq 17,077$ /year. The Vorstand of the energy cooperative are voluntary, and are not given anything, just as the Aufsichtsrat.

## "What is your motivation to become involved in the energy cooperative?"

My motivation to become active as Vorstand of the energy cooperative comes from the fact that I'm professionally occupied here at the Volksbank. The people investing in the wind cooperative are also our members. We have an employee here in the bank that does the annual financial statements, the financial performance, and he and I keep in contact with the Honold Windenergie GmbH, allowing me to do this work during the day.

## "What activities do you set up to engage your members?"

When looking into the future, we are not planning to buy more wind mills, but it might occur. When new projects emerge in this region, the cooperative might decide to take up a new project. One of the Vorstand members, the 'nuclear opposer', is actively looking to acquire new wind park locations for our cooperative. When he succeeds, it is possible that our cooperative will be involved from the start of the project. When this time comes, we did not think yet with which parties to work together, but it could be our current partners. Another option is the BayWa AG, which is a large corporation, which is partially owned by the Volksbanken. The BayWa also has a renewable energy group, which could do a new wind project. A current challenge is that we will have a new vote, both for Bayern and Germany, with the theme wind power being controversial in Bavaria, resulting in no movement from our side until the election. A huge discussion point is the issue of distance: how far should a wind mill be away from the built environment? Currently this is 800 meter, but there are confirmations that this could be 10 times the height of a wind mill, resulting into 2 km when using 200 meter wind mills, blocking any new wind mills in this region.

## "How active are your members?"

Members are not really active within the cooperative. They are given information once, maybe twice a year. They can go to the internet and look at the performance, and then once a year we organize the general assembly, and apart from that, nothing else happens.

"How are you cooperating with the Genossenschaftsverband?"

We cooperated with the Genossenschaftsverband during the foundation of our cooperative, and our cooperative is being checked by them every two years. But apart from that, we do not have much contact with them. The Genossenschaftverband supports the cooperatives with questions relating taxation and entrepreneurial issues. But we actually did not really need the Genossenschaftsverband, since our Volksbank also is a cooperative and we now its features.

## "Are you members only civilians or also businesses?"

Our members represent primarily civilians, but also several companies and municipalities such as the Stadtwerke Dillingen and the Stadt Dillingen. These actors want to participate in our cooperative since they also want to take part in the Energiewende and take action. Since there is the maximum of €25,000, these actors participate primarily out of symbolic reasons.

## "What was your motivation to become involved with the Vorstand?"

My motivation to become active originates from my enthusiasm for the cooperative model. I believe it to be a very good model that allows civilians to join and allow them to participate with larger investments. I used to work for the Genossenschaftsverband, and I have seen much of them, and you could say that I am a 'fan' of the cooperative, and that's why I started with the solar cooperative and made the step to the wind cooperative. In the future, there could be more cooperatives, not only in the field of energy, but also other fields. The cooperatives could take over the place where the municipality is retreating from the social area and public areas like swimming pools. The cooperative is a very good expression for a freedom, and civilian oriented society. It allows civilians to be active and

*"...you could say that I am a 'fan' of the cooperative..."*  to participate, since they are currently all so passive. This is a chance to allow them to get out of their sunken position and activate them.

## "With respect to your future, you said that you wait for the election?"

In this Kreis there are not that many good locations, therefore it is the question whether there can be more wind energy at all. We are here in a valley, so there is not much wind, and it also has to be feasible. That was our start, we as bank provide the civilians with something that works.

## "What is your goal for the future?"

Our long term goal is to take the electricity that we generate and use it ourselves, but for now this is not possible. We have to bring producer and consumer together, and this might be possible in the future. If this would be possible, we would not need the RWE, Vattenfall, E-on and EnBW anymore. They have a lot of power and do not want to give it away. That is the problem of the German Energiewende. The interest of large utilities and the interests of a civilian led Energiewende collide, and here in Germany the result is a wide destruction.

> *"The interest of large utilities and the interests of a civilian led Energiewende collide, and here in Germany this results in a wide destruction."*

## B.13 Bürgerenergie BodenSee eG

Andreas Klatt & Markus Töpfer (Vorstand & member), DesignConnection (Wahlwies), July 22<sup>nd</sup> 2013

## "Can you tell me something about yourself and your background?"

I (Mister Töpfer) am professionally engaged as a city planner in the city Radolfzell next to the BodenSee: I have been involved with integrated environmental protection concepts, and since my master for city planning in 2004 I have been involved with the theme energy and environmental protection, which caused my interest. In 2011 the question arose, whether an energy cooperative should be founded, and people were needed for the Vorstand. Currently I have quit the position from the Vorstand since I'm responsible for planning wind power in Radolfzell, and this would create a conflict of interests. Here on the mountain, there are opportunities to have a concentrated zone for wind power. And because of the conflict, I stepped out of the Vorstand this June. I (Mister Klatt) am a father of four children, I have multiple responsibilities, and I'm the owner of this marketing bureau. Throughout my life, I have been focusing on thinking in a regenerative way, with respect to my style of life and my energy use. Also the exit out of nuclear has got my interest, and then it became clear to me: we can only do this from the bottom-up, originating from the civilians, and I'm enjoyed to be active in this Energiewende. Outside this building is my electro fueling station, which I recently opened up, together with a solar roof, that provides the electricity when needed for charging my electric car.

#### "What was the vision for the region when you started?"

At the start of our energy cooperative we envisioned that the energy cooperative would allow civilians to participate in the energy production themselves, because such participation has been limited in Germany until recently. There are the large energy utility companies, with here in Baden-Württemberg the EnBW, and the Stadtwerke which are owned primarily by the municipalities. But civilians were unable to influence the way they would like to have their energy produced. It is our vision to allow for more influence on the local sustainability of renewable energy production. Also it is our vision that it becomes clear to the Stadtwerke what the civilians want with respect to renewable energies. Stadtwerke are currently located in a rather stressed position. At one side you have the large utilities like EnBW, and because the Stadtwerke are smaller than these larger utility companies, they tend to have difficulties adjusting to market developments. At the other hand, there is the expansion of energy cooperatives, and its movement from the bottom-up that want to generate energy themselves, and now the Stadtwerke have to decide in which direction they want to go. Whether they will make a business model like the big utilities, that generate a certain level of dividends and which focus less on sustainability and the amount of renewable. Therefore it is important to get the desires of the people into the Stadtwerke, and that the Stadtwerke develop renewable energy projects together with the cooperatives. We see now that Stadtwerke make the shift towards renewables, and they have finished several projects in this area. Now the big question arises, into which direction the larger player EnBW will develop, since the energy cooperatives and the Stadtwerke are starting to move.

## "Into which direction are the Stadtwerke currently heading?"

The pressure of the people on the Stadtwerke has been rather effective. Nowadays, there are almost no more Stadtwerke that sell nuclear energy to residential houses. Just two years ago, almost every Stadtwerke provided Naturstrom (Nature electricity) and Atomstrom (Nuclear electricity), and now only only Naturstrom is left. Only the industry is being provided nuclear energy.

## "What would be another source of value creation?"

Another source of value creation for members originates from the fact that not everybody has the ability to invest into a PV-system due to the absence of an owned roof. Using a community PV-system is a perfect way to allow for such investments. You create value when you allow someone who has capital and thinks regenerative, to invest his capital into an energy producing technology. Mister Töpfer says that he lives in downtown Radolfzell, and this does not allow him to invest into a PV-system since the roof is too small. Therefore we wanted to invest that amount into PV, which would be equivalent to what we consume with our household. It was not enough for us just to buy non-nuclear electricity, generated far away, but to generate the electricity locally and from renewable sources, resulting into our investment of  $\in$ 5,000, representing my own energy consumption. This investment went into the solar park from which our energy cooperative bought  $1/10^{th}$  representing 500 kWp."

*"How has the founding story of your cooperative developed and which initiators were involved?"* When addressing the start of our energy cooperative, the start relates to the Solarpark Mooshof. There came a desire from the civilian population to let a part of the Solarpark be owned by a cooperative.

The project planner, Solarcomplex AG, heard this desire and told the population that when they would start a cooperative, then a part of the Solarpark would be given to this cooperative. There were also other interested parties that wanted this last part of the Solarpark Mooshof but we got the reservation. When the people were able to gather sufficient people, then this part would be sold to them. Solarcomplex AG started as a civilian initiative, was transformed into a GmbH and then became an AG. This is not a stock noted AG, but a regional AG, with many civilians that have shares in the company. In 2011 the Solarpark Mooshof was being built after the company built several others, which they owned themselves. Since this Solarpark was too big for Solarcomplex, they sold parts of it to the Stadtwerke from Stockach, Engen, and Konstanz, allowing them to buy either one or two parts of the total of 10 parts. There were also private investors that bought a part for €1,200,000 each, and this would also have happened with part 10, but the surrounding villages wanted their inhabitants to be able to invest, since these people had to look at the 4.5 MWp solar plant. The surrounding civilians did not want to buy shares of the Solarcomplex AG, investing in the Solarpark, but the local civilians wanted to invest directly in the park. At the start of the cooperative, there was a critical discussion whether our cooperative would only invest in this solar park, or whether we would have a vision and would develop further projects relating renewable energy. During this start phase we decided to go further, since we knew that wind power might come to this region. And since these wind mills were going to be up to 200 meters high, we knew that it would become a major issue to fit these wind mills in the landscape, and that the local civilians really need a possibility to participate, because otherwise there would really be no acceptance.

## "What is role that the Solarcomplex AG had during the foundation of the cooperative?"

During the start of the Solarpark Mooshof, there were information meetings which allowed people from the surrounding area to let their names to be inserted on a list of names, which would function as a basis for the energy cooperative. Solarcomplex then called the 30 to 40 people on this list, and every person was asked whether they were interested to start an energy cooperative and to become actively involved. From the initial list, only a handful of people were left and with these people the energy cooperative was started. The entrepreneur of Solarcomplex has taken a membership within the cooperative to make sure that the promise for an energy cooperative would be held. Since 1999, this Mister Müller is the driving force with respect to projects like this in the region.

## "After the initial push by Solarcomplex AG, how was the cooperative started?"

On the 22<sup>nd</sup> July 2011 we started our cooperative, we set up a Vorstand, an Aufsichtsrat, the Statutes etc. Then the cooperative had to be inserted into the official cooperative list, and when you have never done this before, it is a long and hard road. We planned to buy a part of the Solarpark at the start of 2012, so our cooperative had little time to get founded. Eventually we succeeded to found the cooperative in five months, which is somewhat of a performance. The intention of purchase had to be supported by members and capital, and since we were still involved with founding our cooperative, this became rather challenging, since we are no commercial people. We decided to communicate our plans relatively early that we were starting a cooperative for the Solarpark, which resulted into an avalanche of phone calls the two days after the announcement. Out of the hundreds of phone calls the first day, currently 50 people are members. At that time, it was hard to predict how much of the promised money would actually be provided to us. We were only allowed to collect our member's money at the point that we were an official cooperative. We let our future members underwrite a member's form, which did not hold any legal value. They provided us with capital promises, but these amounts were already so high on the first day, that we had to limit the entries of the next day. We stopped allowing investments over €50,000, and desired smaller investments to allow a larger group of investors. A discussion arose whether we should have many small investors, resulting in larger administrative effort, or several large investors which would ease the effort. Since we are working on this voluntary, this is an issue. We also discussed the minimum investment by members, where we said that it could be  $\in$  5,000, but then we would not have such a large group of people and no large representation of the local population. Therefore we decided to go for a minimum investment of €1,000. The minimum investment should not be too small, like €100 or €500, but also not to large. Currently the membership administration is being done free of charge by my company (DesignConnection). When we would grow to a 1000 members, the administrative costs eventually have to be paid by the cooperative, thereby lowering the dividends. When asking civilians to participate in the cooperative, it was very easy. The civilians were not opposing the Solarpark, but were very positive towards it. 75% of all members of the cooperative originate from a radius of 10 km, which is a rather enjoying number, since you could also invest into an offshore wind park in the North Sea, but that is not what the civilian population wanted. They wanted to see the production facility, and be able to touch it.

For the local population, it is very hard to invest in renewable projects, especially when these projects are local. I cannot buy shares of the Stadtwerke since they are owned by the city. Our success came from the fact that our project was regional and renewable and realized an immediate growth of 100 members.

## "How did all the people know how to find you?"

The large amount of responses relating to our project originated from the press article showing our telephone number. I will never forget our first caller, who was a tourist at the BodenSee who saw the article. When he found out that the people that live near his holiday destination wanted to generate electricity in a cooperative way, he wanted to participate. He was our first member, and he invested a large sum right away, he shows up every year at our general assembly, and every year he spends his holidays here. It is nice to see that our PV-system does not annoy people but also benefits people. Since this is a touristic place, there are discussions that the large PV plants and wind mills ruin the landscape and would keep out tourists.

# "You have invested €1.2 million with around 110 members, which allowed you to buy a part of the Solarpark?"

By now we have 108 members, and a total of  $\in 1.2$  million was invested. We originally counted on  $\in 400,000$  but were able to gather  $\in 683,000$ , we hit the brake too late. The equity ratio was still under discussion with the bank, but in the meantime we collected much more money than we actually needed. We currently do not take up new members, only when new projects emerge. We currently have a waiting list of existing members that want to invest more, and a list for new members and these lists represent  $\in 100,000$  of future investment, which is growing slowly since we are not promoting it. When we might get a new project through wind, we would need a lot of money. Our new members are also dependent on where these wind parks are going to be built. When this is clear, we can start drawing circles, allowing the surrounding villages to participate first.

## *"I found out that you take part in an Interessen Gesellschaft (interest society) that looks at wind energy in the region"*

In our region, our cooperative is highly regarded accepted by the people. The Stadtwerke know this, all parties involved with energy know this. Now it comes to a project idea to have wind in our Landkreis, and then it is completely logical that the decision makers want to take the civilian population into the boat. The local decision makers said that *"We originally counted on €400,000 but were able to gather €683,000, we hit the brake too late."* 

they did not want to decide against the people, but wanted to decide with the people, and therefore invited us into this society. The Bundesland Baden-Württemberg has been neglecting the potential for wind power for decades and now wanted to make a change. Political pressure against wind power had stopped it a long time, but due to a new green-red Bundesland parliament, the wind power expansion will be pressed. This pressure is also felt in this region. We do not have the strongest winds, we have 1B wind locations instead of 1A, and we also do not have the higher wind speeds that are being found at the top of the mountains in the Schwarzwald, representing windspeeds of 6.5 m/s to 7 m/s, since we only have 6 m/s. Although locations with these wind speeds are limited, they are highly desired, therefore it is important that we are going to get access to these areas. Our cooperative wants to prevent that external investors are coming to our region and start building wind mills, allowing the entire value creation to flow to these investors. We want to keep the value creation in this region, and this is the motivation to cooperate, since one organization by itself cannot realize this. It does not occur often that cooperation emerges between government, Stadtwerke and a cooperative which work together. As far as I know there are only two or three of these cooperations.

At the North Sea coast, there are an extreme amount of wind mills, because of the good wind conditions, and this development has been going on for 15 to 20 years, resulting in locals suggesting that it is becoming somewhat much when the 51<sup>st</sup> or 52<sup>nd</sup> wind mill is being added. But here, not a single wind mill has been built yet, and there is much resistance, with a discussion 15 years behind that of northern Germany whether to allow more wind power in Baden-Württemberg. It is clear though that we will never produce as much wind power as done at the North Sea coast. In Germany there exists a huge discussion whether to keep southern Germany free of wind power, and then build large electricity highways from north to south, requiring billions of investments and changes in the

landscape. The German minister of environmental affairs now allows civilians to invest into these grid expansions. At first interest rates of 9% were mentioned, but now when the population is allowed to participate, only a 5% interest rate is provided, with the four large utilities getting the 9% dividends. Here you see which game is being played with the civilian population. We think it is smarter to build less power lines towards the south, and instead invest into regional production. You have to consider that it is the goal of Germany not only to get away from nuclear, but eventually also to get away from brown coals, and to reach this goal, we need every type of renewable energy, at every potential location. We still have a lot of potential, and we should not forget the possibility of saving energy, and all this together might realize our complete Energiewende. Shutting down the power plants is just a small part of the total problem.

#### "To which extent do different opinions exist within the interest society?"

Within the interest society, our goal is unanimous, we want to promote wind mills, and when these are built, we share the investments, and we want to prevent that unknown investors enter our region. This society does not have higher or lower partners, everybody has the same rights. We are a smaller partner, representing a humble size of capital, and there are rich Stadtwerke like the one from Konstanz, which are able to invest more. The Stadtwerke may be allowed to invest into more wind mills and our cooperative maybe only one. The interest society was started by the project developer Solarcomplex, since they were looking for a new business field, since their business sector of PV is impacted by the changes in the EEG, resulting in the non-feasibility of new PV projects on roofs. Because of these developments, Solarcomplex is the project developer for the interest society. It was challenging to get the Stadtwerke to join, and to convince them to see Solarcomplex not as a competitor, but as a fellow fighter. Since Solarcomplex already worked together with the Stadtwerke for the Solarpark, the road has been laid out for future cooperation. This cooperation even expands to such extent, that we have partners in Switzerland, which is not normal.

## "What is the goal of this society for now?"

Our interest society is currently working on two projects, with two wind measuring towers, at the western boarder of our Landkreis near Stetten and the Schiehner Berg. For one year we will observe whether the wind speeds are sufficient on a height of 100 meter, for the eventual hub height of 140 meters. The plans for the wind park will start, when the wind measurements have been completed. The risk is just too high without the wind measurements, the data from the wind atlas is not sufficient for a business case, and the banks require a measurement supported confirmation of the wind speeds, thereby lowering the risks. The wind measurements of the last 10 years were structurally too high, which is known by the banks, and therefore you have to provide sufficient evidence that you are going to produce sufficient electricity for the coming 20 years.

## "How do members invest into your cooperative?"

One membership share costs €1,000, and you can add 49 extra shares, up to €50,000. There was a great discussion whether we should use a sub-ordinate loan or not, and for us it is very simple, everyone can invest starting with €1,000, and this money will be used as investment, and every year the cooperative decides what the dividends will be, with this year 2.47%. And each year we decide whether we are going to give the profits to our members or invest them into our cooperative. Our model is a classic cooperative model, you have cooperative shares, and each year you will share in the profits. We do not use the word 'return' and rather talk about dividend distribution. We do not have a profit quarantee, and each assembly the Vorstand proposes to give the profit to the members, reinvest it, or partially reinvest it. This subject is a large struggle at the moment, since we estimated an average annual 5% return over 20 years, and some members have fixed their thoughts on getting 5% every year. These members are a small part of the total group, and we had to disappoint them, resulting in several members leaving the cooperative. The majority of the members see it differently, we are a new company, and the profits have to grow slowly, since the first 5 to 7 are the hard years, because we did not amortized our assets yet. Last two years we did not have any dividends for our members, which caused questions, but did not result into membership withdrawals. Most people see their investment as a sustainable investment into a regional renewable energy sector.

#### "How did you end up with the composition of the Vorstand?"

We started with 3 members for the Vorstand and 3 members for the Aufsichtsrat, but then expanded the latter with two more members, to allow for spreading of the work pressure. Since I wanted to leave the Vorstand, following from my work at the government with the wind park, we currently have two members.

The role of Mister Klatt in the Vorstand is clear. I provide the infrastructure for the cooperative through my company, which is free of charge, so I'm providing the communication. The second member of the Vorstand has a commercial background, is a pensioner, and can handle all commercial subjects. All other things, like project development, we have to buy, since we are not technicians, and no planners, therefore we are dependent on external help. The Aufsichtsrat is a controlling medium, and is not actively involved with shaping the cooperative. It contains a pensioned banker of the Volksbank, an entrepreneur focusing on wind project development, a former KFZ mechanic who checks our PV park, a ceramics maker who was involved with a former cooperative, and we have a pensioned business analyst. In essence, all these people are idealists, and for tax and accounting related issues, we ask help from a tax-advisor.

#### "How will you organize the influx of new board members?"

For the next years, we will have a challenge to gather new members for the Vorstand and Aufsichtsrat, and when the maximum age of 75 for board members is reached, we have to find new people. When we expanded the Aufsichtsrat with two people for two years ago, two members spontaneously raised their hands. This subject will also be the theme of the next general assembly, and to motivate enough people to apply for a position.

"How do you know that the actors that you are engaged with will keep their focus on renewables?" The reason for the Stadtwerke to focus on renewable energy comes from the fact that we are shutting down nuclear and want to do the same with coal in the near future. The Stadtwerke need their own electricity production, since they do not want to re-sell the electricity of the four-large utilities, because each kWh they produce themselves, increases their profit. The Stadtwerke are under large pressure, since they are relatively small, compared to the four large utilities, that have a monopoly and split up the German market, with the Stadtwerke having a hard time. Because of the pressure, the Stadtwerke have to go the renewable path. Renewable energy, together with biomass heating, combined heat and power, will provide a large business field for the Stadtwerke.

## "Are there financial compensations for the work of the Vorstand?"

Currently our board members are not given any financial compensation, and all the work done by the Vorstand is voluntary.

*"It is the most democratic type of all companies."* 

## "What type of members do you have?"

When looking at our members, we have a rather good representation of the population, not only the farmers, but also the young and old, man and woman. Elder people tend to invest more than younger ones, since the younger usually have a young family or are still studying, and therefore do not have the money to invest right away.

## "How large is the EEG payment that you receive for you solar park?"

On average, our PV-park generates  $\in 120,000$  per year, which we use to pay for the bank loan, the land lease, and the maintenance costs. The bank provided 45% of the total investment, for an interest rate of 3.7%, which could be 1% lower, with current interest rates, but for the years 2011 and 2012, the interest rate was rather good. The local Sparkasse provided us the loan at these interest rates, since we had a low risk. The bank did not have any experience with investor like us, so I expected higher interest rates, but we were able to properly describe the risks to the bank, resulting into a lower interest rate. Another reason that the bank wanted us as a client could be that they wanted us as a client for future projects, and also because we demanded a significant amount of capital. With respect to the audit by the Genossenschaftverband, we decided to allow the Verband to check us annually for the first three years, instead of once per two years. When something goes wrong, we are informed of it earlier, but will cost us  $\in 800$  per year. The average investment per member lies between the  $\in 6,000$  and  $\in 7,000$ . There are not many members that give large amounts, with most of them providing  $\in 1,000$ .

## "Which risks do you see for the cooperative?"

We only see the risk that the government might retroactively cancel the EEG, which is quite improbable. As long as the government is providing reliability, we can get the compensation that we want to generate our revenue. Maybe in the meantime, it might be possible to sell our electricity directly, since household electricity costs around  $\in 0.26$ /kWh. So we actually see only one risk, which is the fluctuation of the sun. Our project developer has been building several other large ground

mounted PV parks, and the PV modules originated from the American First Solar. The risk related to damage, production outage and theft is covered by insurance. If the park stops producing, we have a 90% assured production. Whatever may happen to the park, we are at the safe side, since no one of us is able to maintain the park ourselves.

"To which extent did you realize your vision that you had at the start and where do stand in 10 years?" For the future, it is our goal as a cooperative, to successfully operate the Solarpark, and it is my personal goal, not only to invest into this single Solarpark, but to extend our investments, and annually develop or buy one project, allowing us to become independent of one type of energy, and independent of one production plant. We want to have a multitude of energy sources, and want to become a regional player for energy production. There might be differences between personal goals and the goal of the cooperative, suggesting that the cooperative was founded rather quickly, and still has no long term strategy. We were originated from a project, and now we have to fill our backpack with goals and visions, but it became clear quickly that this backpack had to be carried, and that we should not only invest into the Solarpark. At the start of our cooperative, it became clear quickly, that our cooperative did not want to only be a cooperative for the Solarpark, we want to go towards a 100% renewable region, with support from parties like Solarcomplex. It is my personal hope, that there will be a strong network between the local actors, thereby providing the civilian population more and more opportunities to engage themselves into the renewable energies, with the goal of 100% renewable energy. It must be noted that it was the general assembly that wanted to look further into wind, and not necessarily our personal wish. Therefore I feel that my vision is being reinforced by my members.

I was at an energy cooperative development workshop in Freiburg, with the cooperative development strategy being discussed together with the step towards more professionalism. Will all this continue voluntary? I personally think it will not. You have to hire people that lead the cooperative and who take care of things. A structure has to be built. The cooperative has to be led, since the cooperative does provide another value than a GmbH or AG, since it allows the members to decide the direction, because independent on investment, every member has one vote. It is the most democratic type of all companies.

## B.14 Deutsche BürgerEnergie eG

## Mario Fürst (Vorstand), La Vigne Capital AG (Nürnberg), July 24<sup>th</sup> 2013

## "What was the reason why you started the energy cooperative?"

We have started our cooperative based on a certain consideration. This idea emerged from a past history which I have to clarify. Our cooperative is completely different than many of the cooperatives that exist nowadays, different from the core of being and because of our conviction. Initially we were with four persons, which work for a company that focused on the project management and construction related to renewable energy. Our core competences are structured work in the shape of contracts, planning, and structured processes through management. We own these core competences, and we buy other competences. You have to do what you can do 100% right, and make others with their 100% part of your connections.

## "And this is the opinion of your project development company?"

That is right. In our project management company, we found out the following: there are many project ideas, with different stadiums of the projects. But there are also many Germans that are confused, and when they see a roof, they think you can put PV modules on top of it. They see a free patch of land and think you can put a PV park there. They come up with many ideas, but they have no clue what they are doing, and these people tend to be the worst. They want to earn a high provision by providing a project, but they do not know whether it is possible from a technical and legislative standpoint. This is the hardest part of projects. You have to find projects and screen them in such a way that it becomes clear rather quickly within which time frame these projects can be realized. Currently, with the EEG, the project has to fit, since the financial elements are important. When working on project management, independent on PV, wind, or biomass, you continuously have to look on this. This does not mean that some projects are non-feasible, but maybe later. Sometimes projects fall from the table, and several months later they re-emerge from another source. These people are mostly 'artists' and not professionals. We have focused on finding out which projects can be developed relatively quickly, based on the contract, based on the financial feasibility, and based on the physical construction. It brings nothing when you have a wonderful roof, you have a FIT, but when the owner does not want to change his land registry with regard to the ownership of the PV on his roof, the mortgage provider of the house might take my PV-system. So this has to be settled, and many people do not know this. So this is a mere legislative subject. Out of the 100 projects, 3 are being realized, and therefore you need a structure to filter projects, and that's something we have. It's a core competence of us to assure the papers and the access. Most people don't have money, and want to earn money with their projects. But you can't make money out of nothing, you need starting capital. So we have taught ourselves the core competence to screen new projects for feasibility, because when a project is feasible, building it proves no problem. When at the front side everything fits and all contracts have been made, then it is rather easy, but the hard part is to get the entire contract and all agreements into one hat. So those are core competences of ours, project development, planning and constructing, next to checking and financing.

When the projects were ready to be realized, we could not keep all the projects ourselves, so we had to sell them to investors, preferably asset managers of family offices, and private placement. An asset manager has a strategy, he takes care of the equity of a family, and a certain percentage can be invested into shares, a certain percentage in renewable energy, and a certain percentage in PV. When he is filled up, he will not do anything anymore, and with every new contact I have to go through a learning curve. The investor is also looking to buy projects on other locations, and he also has to decide whom to trust and whom not. This process takes 6 months, and sometimes it is too slow. The investors can see when you have been preparing your project properly. Investors sometimes get 10 offers of different quality, but our proposal is clean, clear, structured with respect to data and electronics. Then there already is a basic contract, and with others, things are unclear and things are missing. We would call these also our core competences.

## "But eventually you have to continuously find yourself new investors."

This requires a lot of effort since investors come and go, and therefore it would be better to have a more sustainable business. So we decided, we are going to do the value creation of project development, the value creation of project construction, and the value creation project sale. But the value creation of being the investors, and keeping the project, we are not yet doing this. So we asked ourselves, how are we going to do this? Are we going to use bonds or a Genussrecht (participation right), but I decided that we were not going to do this. These are not transparent enough, they are

not arousing trust, so then I proposed using the cooperative. With this cooperative, it was our goal to develop projects ourselves, finance them with banks and keep the projects ourselves, to become an energy producer on the long term. We wondered, in which model could we do this transparently, which became the cooperative. We chose the cooperative since she is secure, transparent and fits itself perfect for cooperation businesses, since the firms that we cooperate with are also members. This is not the model, that when something is being built somewhere over there, then a cooperative might buy it far too expensive. This occurs, since project developers only want to make a lot of money. Nowadays there exist project developers that start cooperatives to allow them to make more money. You could say the same about our project development firm, but the Genossenschaftsverband has checked our prices and concluded that we provided competitive prices. We do this, because we have a long-term vision and not a short-term vision. We might have the harder road, but we have a better basic clue of what we are doing. We have visions and ideas, but we also act. When we wanted to start a cooperative, we went looking for the strengths and weaknesses of others and wanted to find out what would differentiate us from them. We chose a cooperative, because it was transparent, it provides trust, but also the law for the cooperative is rather old and the Genossenschaftsverband Bayern is rather powerful, since all cooperative banks are part of it, and also is the oldest Verband in Germany and its existence is rooted in German law. So here we were doing things right, and for the law all energy cooperatives are the same, but then you can change things in the statutes and in the business model. When you newly enter a market, you need to provide a highlight to lift yourself up, otherwise you die. We asked ourselves, how we could position ourselves so we can become a brand, become a player. This was our goal, to become a Coca-Cola. The strength is the cooperative, but the strength also is to be a brand. People have to be proud that they get their money from the electricity

*"...many have visions and ideas, but have no clue of project development and financing..."* 

projects in which they invested themselves and get a dividend for their membership. Some people are a shareholder at RWE, get their dividends, but have nothing to say. Turn this around, he can say that the cooperative belongs to him, he is a member, he can talk, he gets a dividend and he is a proud member of a cooperative related to renewable energy. So we looked at it, where are the drawbacks, where are the benefits, and therefore we decided we would go Germany wide.

## "Why did you decide for a Germany wide energy cooperative?"

With the energy cooperatives which we investigated, there continuously existed this problem: there is a cooperative that only invested into PV, and only regional, and at a certain time you cannot build anymore PV in the region, since all the roofs are filled. Second, most have started a cooperative because of an idea. They wanted 100% PV, and then after a year they realized one PV-system of 100 kWp, and nothing more. We have built 10 MWp in one year with our cooperative. So many have visions and ideas, but have no clue of project development and financing, since most cooperatives have started at the pub. The cooperative that owns the 100 kWp, generates a certain income from it, but from this, they have to pay for costs to be checked by the Genossenschaftsverband. So it makes a difference when you have to pay to be checked by the Verband when you have 100 kWp or 10 MWp. So of total revenue in the first case it might represent 15%, but in the other zero point zero something percent. But when you limit yourselves to a region through your statutes, how do you expect to grow, and the idea that all regions should be provided electricity autonomously, will not be realized by the local cooperatives in 20 years, since they lose their enthusiasms. For example in municipality Hinterdupfing with 800 inhabitants they start an energy cooperative with a 30 kWp roof PV, financed by 30 people. But where is the Energiewende? Most cooperatives have stopped developing PV, but it is still feasible, since we have developed 10 MWp in 2013. We have decided to go Germany wide, since there we had sufficient projects and enough possibilities to initiate projects, and not only in PV, but in all sectors like wind, biogas, warmth contracting with pellets or biomass, and in essence we can do hydropower, since our statutes allow us to do everything. We have also started with PV, since we originated from it, but for now we are working on a wind park with four wind mills of 3 MW, and we are developing several other wind mills.

## "How is your project development company called?"

Currenlty all firms are called LVC, or LaVigne Capital AG, but this will all be changed into Deutsche BürgerEnergie, and the cooperative will be a shareholder in the project development GmbH. Through this, the linkage between the cooperative and the project development GmbH is closer. In the cooperative and the project development firm, we are all the same people, and in the cooperative we all work voluntarily. Many people do not understand that we do this voluntarily. We chose to do multiple types of renewable energy, since some cooperatives only do PV, some only do wind or warmth, but we have a portfolio philosophy. Investors in our project portfolio are companies, but also energy cooperatives. Two cooperatives invested in our cooperative. They had the similar problem that they collected funds for one project, and afterwards could not find any new projects. At the start, we thought it would be a drawback when we would be a non-local investor, since we are located in Nürnberg. So we focused on being as transparent as possible and communicate that we would pay our taxed locally, and that we would, when possible, cooperate with local companies. So we have to wrap the idea in such a way that it will taste right. So then local people can invest in their local project, but since I believe that people a greedy, they will think it is nice that they also get money from other projects. Having multiple theories also allows for a spread of risks. There is the portfolio theory of Markowitz, who said that you should not put all your eggs in one basket. Different projects can have different returns, but each project should have a minimal return as defined in our statutes regarding the economic viability. We have members which are pure investors, but we also have members that are regional investors, and when we would couple this to our own electricity tariff on the long term, we can generate our own 100% eco-electricity with our current production of 11 GWh per year. We could sell the electricity locally, and provide people with their own regional electricity, and the more capacity we have, the less we have to buy extra from the trading market in the future. In Germany we have to provide a service guarantee, demanding that every electricity connection should have electricity at any time. In Germany we had three power outages, totaling 7 minutes. You can be electricity trader, or you can be electricity producer, and the latter is where we want to go. We have started the DB Strom GmbH, and they will start selling the electricity. It is our vision to become an energy supplier off the people by the people, with our own energy production, away from these large and anonymous utility companies. We want to provide our members an attractive dividend, since then

our members are motivated. Our core vision is this: When you have a product that every person needs and uses every day, and when you own that source, than you have a gigantic source of income. For mobile phones, companies create a synthetic demand through marketing, but for electricity, you don't need this marketing, you need it. Electricity is the constant factor, you need to make warmth, to make cold, to operate things, and in the future with

*"...I am not selling a company, I am selling a philosophy."* 

electro-mobility, we will need even more electricity. It is the art to own a certain good and to share it with people, and to get this good through an eternal source, the renewable source, but now, I own it. Warmth is a basic, just as electricity, food and water, but a mobile phone is not a basic need.

## "With which actors are you working together?"

When working together, there are multiple actors. We work together with land owners, from which we lease their land. We work together with municipalities, and now we have a Stadtwerke which is a member. We have acquired an article within the magazine of all German Stadtwerke. I met the editor during a conference, and I informed him of our vision, and after a while we were given a place in the magazine. I am the sales man in the company, but I am not selling a company, I am selling a philosophy. No seeds will turn up on the ground, when you not put them there yourself first. Then you have to wait till it has grown and then you can take the seeds to plant once more. So at the start you have to add and at a certain moment you have to multiply. Now we are adding, and we show that we can do it, and later we will multiply. When you have reached your goal, people will say that they always knew.

## "What is your eventual goal with the cooperative?"

To set up a Geselschaft (company) that creates value for everyone, in the shape of electricity, warmth, dividends and of course many others, since they allow to be expanded.

#### "You said that a municipality became a member, is this the municipality itself?"

This was the municipality itself. Most members of our cooperative are private people from a municipality, but the municipality itself can also become a member. We have structured our cooperative in such a way that we finance our projects with 80% bank loans and 20% membership investment. But this ratio is dependent on the individual projects and possibilities. Sometimes a bank will decide for 25%, because of internal ratings. There has been little electricity from PV during the last spring, so banks are afraid. Up until now we have financed with four Volksbanken and one Sparkasse. Our home bank in Nürnberg has invested, but the other banks do not originate from the location of

our projects. This spread originates from the fact that some banks never invested into a Solarpark before, and then we need 2.3 million euro's. These banks will not say that they have no clue, they will say that they will look into it, and for three weeks you hear nothing, and then they decided against this business model. But nonetheless, having the contacts is important, because they might decide in favor in the future. I have a lot of contacts through previous jobs, we are looking for new contacts through the Verband during its conferences, for example together with the BayWa. But these contacts only emerge because I am getting on people's nerve.

#### "Do Volksbanken or Sparkassen also become members?"

Banks do not tend to become members, but the Vorstand member of one bank has become a member in private, and now he has solicited for a membership in the Aufsichtsrat. Because I have a Volksbank member being part of the Aufsichtsrat, new banks may trust us quicker. Even when I know that we are trustworthy, you need figures, you need chess pieces. Apart from the previous organizations, the rest of the members of our cooperative are all private people.

## "How do you organize a new project, for example your last project?"

When we start a new project somewhere, I will start calling the mayor of the place, and invite him for a meeting to discuss a future Bürgersolarpark in his municipality. Since the municipality is involved with the Solarpark with respect to the admission, the mayor will know of the project. During such a meeting, I introduce myself and our model, and rather quickly they become enthusiastic. Thereafter we set a moment for the press, resulting into news items in the local newspapers, and then we set up a local meeting with 100 to 120 people, there we propose our concept with the specific project. In general such activities tend to go better in rural areas than in the cities, since in the rural areas, people know each other and they have direct contact to the mayor and the local council. In the country side, it tends to be politically hard, but in the city areas it is even worse. Setting up information meetings tends to be equally easy in both regions, but there tends to be more trust in the rural areas among people. But when the brand of the DBE becomes big enough, it will also work in the big cities. In the cities we have the Stadtwerke, and the director of a Stadtwerke has now also solicited for a place in our Aufsichtsrat.

## "How can you assure that your quality is sufficient enough?"

We have a company that checks our projects and this company is an official TÜV tester. When we started, we worked with ourselves, allowing us to learn, and then we allowed partners to join us, since it is not possible to give everything at the start. You are always sure about things when you do it yourselves, you can control it, but when you give away, you have to control the things you give away. We are not doing the wind park ourselves, the structure tends to be the same, whether you are building a wind park or something else, but for specialized things you have to cooperate with other companies. Currently we have acquired a project, and now we are choosing the right partners. We chose the BayWa AG, because they have capital strength, are strongly connected with cooperatives, and now we are going to see whether it will succeed.

## "Can you give an example of one of your projects?"

Our latest project provides us with around 11% return. It has 2100 kWp, and the PV costs reflect €1,100/kWp for the complete project, including transformers and grid connection. The total investment represents  $\in 2,310,000$ , for which we require 20% equity, and the rest is being paid by the bank over a 2.9% interest rate, being repaid over a period of 17 years. We pay €10,000 per year for the land, since someone has bought an old quarry, and nothing grows there, it is just rocks. This is just one project calculation, and for each project there are individual calculations. Our company is called LaVigne Capital (LVC), and our projects are done by LVC project, which is going to be renamed to DB (Deutsche Bürger) project next month. For every Solarpark we start a GmbH & Co KG, and the cooperative is a limited partner at this GmbH. The members give money to the cooperative and the cooperative then becomes the owner of the project. For this project we get €218,000 per year from the EEG, but this income decreases because of degradation. All costs related to the project are paid for by the project GmbH, but then the bank also requires a reserve account for when things might break. When all costs and taxes have been subtracted from the income, we are left with the return. From this return a legislative required reserve of 10% of its income has to be kept, and secondly the administrative costs towards the LVC has to be paid, and only then the dividends can be paid to the cooperative members. The reserves owned by the individual GmbH are owned by the cooperative, since it owns the project GmbH, but these cannot be put into the dividends.

## "Do you have an overview of the entire investments that you have done?"

We currently do not have an up to date financial balance, since we make those at the end of the year. 2012 was our first full year, and in January 2013, we were audited and our future incomes were checked, and it was made sure that everything was correct. Up till now we have invested 2 million euro's equity, out of total investment of 10 millions. And we are developing some new projects with wind, which has a stable EEG, and warmth, which does not need EEG. Most of our projects are around 2 MWp, with each generating around €200,000, times 8 projects results in an average income of €1,600,000. We have decided 8% to be our minimum return on investment, so currently we are at 11%, which is still okay. All our new projects have to stay above this 8%.

## "What will you do when the European tariffs on solar panels are being introduced?"

When PV do not result in sufficient returns, we will stop with PV and start with wind and warmth. We still generate sufficient returns since we do a lot ourselves, compared to other energy cooperatives. Comparing ourselves with the Agrokraft, they have a double cost structure. They have founded 40 cooperatives, but also have the costs of each of these cooperatives. At the Genossenschaftverband you can found yourselves a cooperative for free, and at the Agrokraft you have to pay a fee, so you could safe yourselves the money.

## "When you gather your bank loans, do you prefer the local banks?"

When starting a new project, we always contact the local bank, but in the meantime we have contacts with two other banks who are definitely going to do it. We always have one project that we are building, and two projects that we use as back-up. Always. Safety first. We need investment security. We cannot take money from investors and put it on a bank account, since we only get 0.05% from the bank. When choosing the local bank, we do not prefer the Sparkasse over the Volksbank. For our Solarpark Marktrodach, we provided the bank with the underlying documents, which requires them three weeks to go respond. These banks do not have to be big, but they have experience , with sometimes departments that are labeled 'energy and environment'. The interest rates between different banks tend to be same, and when I prefer one bank over the other, individual banks are willing to go somewhat down with their rates. When financing a local project, we want to finance it with the local bank, but when they are too slow or are not able to do it we cannot work with the local bank.

## "What are the costs for your energy cooperative?"

In the first two year of our cooperative, we had €59,000 costs, representing the rent paid for this building, webpage, flyers, conferences, banners, and the foundation. €59,000 for starting the cooperative is nothing, when you see what we have done. We have won the energy award 2012, and we are everywhere in the press, and we have developed entire projects.

#### "What is the average investment per member?"

The average member invests around  $\in$  14,000, but we also have members investing over  $\in$  100,000. The  $\in$ 100,000 is our maximum, but a member can surpass this amount with approval by the Vorstand. We have a request from a local church related foundation, wanting to invest 1.6 million euro's. When investing, you have to pay €500 membership share, €500 membership loan, and €50 entry money. We ask this €50, since later investors have benefits over earlier investors. This money is being booked into the reserves. When a member joins later, they do not have the risks related investment compared to the first members. So to allow all members to be treated equally, we inserted this entry money. A member cannot regain this money, since it belongs to the entire cooperative. When you want to invest more than this €1,050, then you have to multiply this amount. For example when you want to invest around €8,000, you multiply €1,050, ending up investing €8,400. We provide dividends of around 8% through the membership shares representing €500 each, and provide an interest rate of 4% for the loans representing €500 each, averaging into 6.5%. When we would choose €100 membership shares and €900 loans, then we would be insolvent before we would have started. When a cooperative has 100 members with €10,000 equity and does one project and has to pay the money, then they are already over-indebted. This is a risk, since they will die when something goes wrong with one of their projects. When choosing 50/50, it will be conservative. In the first case, when you invest €100,000, you will have €90,000 in loans. In our case the 4% interest of our loans can be paid by our projects.

## "How do you organize the investment of locals in close by projects?"

When starting a local project, people from the surrounding area can invest, and have a time frame of 4 weeks to decide. Since we currently are large enough we can pre-finance projects, after which the project is being re-financed by the members.

## "How do you shape your new focus on wind energy?"

One wind park, we have acquired the lease ourselves, and at another wind park building starts this August. This wind park has been completely developed and financed. Related to this wind park exist a project company, and we either buy this entire project company, or partially invest in it. We got our contact to this project through one of our projects in Elfershausen. The mayor of this area called me, and said that a wind project was being done 10 km away. He said that he knew the mayor of that village, and he wanted a civilian participation. During a meeting with the local mayor and the project developer I was able to convince them of our added value, since building wind mills when people can participate is easier than when you do not allow them to. I then took the project developer to the cooperative banks, and then he saw how easy it was when a cooperative bank was talking to a cooperative. The project developer has been developing the project on his own cost, since he has been doing this work for already 20 years, and when choosing his investors he decides for the best strategy and not for the best buyer.

## "Do you want to grow into a new Juwi?"

We do not necessarily want to grow big in wind, but prefer warmth-contracting, which is very exciting. For example you own a swimming pool, and you have significant costs to heat the pool, since most swimming pools still work with heating oil. We as DB project will then require an electricity demand profile and the warmth demand profile, then we will make an analysis on what you need. Then we will provide you with a proposition which provides you with an electricity rate, and we will either build you a biomass combined heat and power, or a wooden pellet heating system. You will not have any investment costs, since those will be done by the cooperative, and you will take our predefined warmth delivery price per month. You will have no investment costs, you will get a new heating system, and you will safe money on the long-term, stable electricity prices and stable warmth prices, and local people can participate financially through the energy cooperative. Let's say you are a municipality, then you will have a municipality building, a school, a gymnastic room, and a community building, and in the surrounding area you will have houses, then you can make a small warmth grid, with everyone in the grid paying a certain fixed price.

## "What do you mean with 'participation in warmth grid'?"

Currently we are going to participate into a warmth grid with connecting 50 one-family houses which are energy efficient, and we have provided a proposal to connect all these houses unto our own grid. The houses would not have the investments related to the heating system and thereby have one extra room available. The costs for heating will end up lower for the homeowners relative to heating with gas or oil. Our cooperative would like to invest into this project, and learn from it for future projects.

## "Do you look into geothermal?"

When looking into geothermal, we believe it to be very risky and expensive. The BayWa is doing things with this subject, and when they would like to use a civilian participation, then we would be able to provide such a participation to them. We brought a wind project to the BayWa and now they are trying to acquire it, and they integrated our cooperative in the project proposal.

## *"How many members do you currently have?"* Now we have 128 members, representing €2,000,000 in equity.

## B.15 Jurenenergie eG

## Carsten Borrmann (Vorstand), Home adress (Neumarkt), July 25<sup>th</sup> 2013

## "Can you tell me about the start of the energy cooperative?"

Here we have the Landkreis Neumarkt, with a strongly environment focused department, which focus on waste water, waste disposal, and everything relating to the environment and things that improve it. One of its members has been very active and thought of a way to better position renewable energies for the Landkreis. He then considered that a regional energy cooperative would be perfect within the Landkreis measuring 60 km times 60 km. I am part of the Vorstand of the energy cooperative and I am doing it voluntarily, with my professional life being involved with the telecommunication suppliers. I am doing my work for the cooperative, because I think that the Energiewende is important for Germany. It should not be positioned in the hands of the large utility companies, because in that case the Energiewende will go into the wrong direction, and we will have the same situation as today, we will still have the nuclear power plants and no decentralized structures. The people should take this subject into their own hands and should reap the fruits of it.

## "How was the general public informed about the energy cooperative?"

Through the press it was brought to the general public that a new regional energy cooperative was going to be started, and the people were invited to join the foundation meeting, and I joined. And at that point things went relatively quickly. The goals were clear, the Landkreis wanted the cooperative to build renewable energy systems, and I solicited to become a part of the Vorstand. After the meeting a founding group was started of 20 people and they chose the Vorstand and the Aufsichtsrat. The Landkreis said that they did not want to participate in the cooperative and only support it. In some other Landkreise, the cooperative is being operated by people from the municipalities, mayors, or by consultants, with the civilian population investing in the cooperative. In our cooperative, this is different, since we are doing the operations as cooperative members, we decide what has to be done, and we will include the Landkreis when we encounter hurdles. During the foundation meeting, the head of the environmental department took on the role of moderator, and has presented this match in the model. The Kreis will support the energy cooperative but will not perform any influence unto the cooperative. Then the statutes were set up, which stated that every inhabitant of Neumarkt can become a member for a minimum amount of €500.

## "How was the Vorstand exactly chosen from these 100 people?"

During the meeting the moderator asked who was interested in taking part of the founding team, and then people raised their hands, as did I, and a group was charged with the responsibility to set up the statutes. This group represented 15 people, which is an effective group of people. After this first meeting followed two more meetings, and from these meetings the three Vorstand members and five Aufsichtsrat members emerged. The statutes were then provided to the 100 future members, and was approved. Out of these 100 people at the start of the cooperative, most just wanted to invest and did not want anything else to do with the cooperative. Other people wanted to do more, and therefore joined the founding group. Eventually 79 people joined the cooperative at its start, and collectively gathered €298,000. We started with PV before continuing with wind because PV was narrowly defined and very profitable. At the start in April 2010, we did not have much money and we only realized smaller PV projects. Then came Fukushima, and everybody got interested into alternative energies. In 2011 we had several information meetings, and our capital was growing slowly but by February and March 2011 the member investment started growing strongly. Our share count grew from 2,000 at the start of 2011 up to 11,000 at its end, with 10,000 member shares representing €5,000,000 in equity. The maximum investment was capped at €50,000, but this can be raised up to €1,000,000. Investments for a single person can cap at €100,000 but still represent only one vote, which represents the democracy of the cooperative. Among publicly traded company and among private limited companies your voting power depends on your size of investment.

## "What was the vision of your cooperative when starting?"

The vision of our cooperative was to keep the money inside our region. So civilians invest and the returns of their investments stay within the Landkreis. The acceptance of wind power was very bad, since large investors came and built wind mills, therefore it became our vision to focus on internal money circulation which will enrich the region. Our second vision lies in promoting local alternative energy through development by civilians instead of through large corporations. A third and new vision we worked on last year: we looked into the cooperative history and we therefore we know that cooperatives were erected to trade goods internally among members. Such cooperatives are

interesting because as long as you trade goods within the cooperative, you do not have to pay the value added tax. Within the energy cooperative we therefore want to produce electricity and sell it to our members, to realize this vision, we have to become an energy utility provider. Its advantage lies in the fact that you safe yourselves the entire tax procedures. The value added tax drops, electricity tax drops, and some other costs drop, but for now we are not that far yet. We have to pay transportation costs to the party that own the electricity grid. There exist concessions for the electricity grid, which are owned by the municipalities. These municipalities have concessions with the energy utility companies which lease the grid from the municipalities. In the upcoming years there will be new concessions for municipal grids, and then the municipalities might consider giving the concession to the Stadtwerke Neumarkt or our cooperative, and in these cases we can save ourselves the transportation costs.

## "How do you organize your maintenance regarding the production facilities?"

We have members that have entered retirement, and are given a salary of €400 to check on our PV systems. With respect to our wind projects, we have maintenance deals for our wind mills with external companies that run our mills.

## "Do you currently develop the wind parks yourselves?"

Our actions with respect to wind can be separated into three phases. In the first phase we only participated into limited partnerships, co-investing into wind mills. There we learned that some project developers really earned a lot of money. Another drawback from participating into limited partnerships is that they tend to make losses in their first years so the investors can safe taxes. When you make losses, you can subtract these from your taxes. But this is not our intention as a cooperative since we also have to provide profits, and we want to generate profits early on, and therefore we founded a GmbH. In our second phase we bought ourselves two wind mills from project developers, which provided us with the opportunity to look into the business case and decide the amortization ourselves. Now we are in the third phase, and we make our own wind park, with hopefully 12 wind mills. We are the ones developing this park, and therefore we gather partners. This development is done by a full-time Vorstand member. In September 2012 we decided for this step together with the Aufsichtsrat. Such decisions can be made by the Vorstand and the Aufsichtsrat, since the members are only asked for input regarding the large strategies. During our last assembly we decided to change the statutes and start a GmbH, but in general the Vorstand and the Aufsichtsrat focus on the operations. The Aufsichtsrat is obliged to make a vote on larger decisions initiated by the Vorstand, with the statutes mentioning at which investment size the Aufsichtsrat has a say.

## "How do you pay the person who is responsible for the wind park?"

The 10 wind mills that we are developing require €15,000,000 in equity, so we cannot do this by ourselves. We are getting €200,000 per month from members, which represents €2,000,000 in 10 months, which is insufficient for the 10 windmills. With the current equity growth we can build one windmill per year and therefore we cannot do this wind park ourselves, so we are considering selling these wind mills. We intend to build the wind mills and sell them, and with the profits, we want to provide dividends for our members. And this is our main problem. Growing always equals low profits. At the start it takes a half year before the windmills are producing electricity, and then we make losses, so we end up with problems regarding the dividends. You gain more members when you provide sufficient dividends. Some larger companies can provide immediate dividends to their shareholders, even without profits. But we can only provide dividends when we are making real profits. Because of this issue, we have founded a GmbH that owns all the wind mills, and this GmbH makes losses, because she also becomes a credit from the cooperative for which it has to pay 4%. The advantage lies in the fact that the GmbH can make losses in its first years, but the interest payments from the loans can be used to pay for the dividends of our members. The members decide what the dividends of the cooperative will be. In the year 2010 we provided dividends of 0.5%, in 2011 1.4% and in 2012 2%. These dividends are all right since the dividends on the savings accounts are only 1%.

#### "The location for the wind park has been designated by the Bavarian government?"

The area for our wind park was labeled a priority area by the municipality, but nonetheless wind parks can be built wherever there is room, as long as you stick to the given regulations regarding distance to residential buildings. Before the Bavarian government decided to promote wind power, our cooperative looked at our Landkreis for wind power opportunities, and contacted the municipality. When we saw the amount of profits that project developers are making, we decided that we would do it ourselves in our Landkreis. The Landkreis supported us again by providing maps and regional plans, and then they proposed a certain area. Currently new opposition emerged by a Bavarian politician who wants to introduce new distance requirements between wind mills and buildings. He

proposed that this distance should be minimally 10 times the height of the wind mill. Since currently these windmills tend to be 200 meters high, this distance becomes 2 kilometers, thereby stopping our wind park, leaving us with one or two wind mills. Therefore we are currently setting up a network of the surrounding energy cooperatives and try to stop this new law with the aid of the Genossenschaftsverband Bayern, and our cooperative sent a letter to the minister with regard to his plans.

## "Why are you selling a part of your wind park?"

The wind park that we are developing might be sold partially, since 10 wind mills cost €15,000,000. I do not believe that our cooperative can gather these amounts as long as we are staying inside this Landkreis. We might get half of the funding from our Landkreis, and can get the rest of our funding from external energy cooperatives or investors from inside our Landkreis, but I prefer the energy cooperatives.

## "What have you learned of the projects that you did not realize?"

We have learned a lot, also from non-realized projects. I have tried to acquire PV-roofs among farmers, but not a single farmer eventually cooperated. They listened to your story and in the end they mentioned that they were not interested. As soon as they found out that PV was profitable, they built their own PV-system. We also learned that participating at a wind park is not the best option, since it is better to do it ourselves. Another thing we have learned is that it might be useful to introduce a halt for new members. For over one year we had  $\in$ 3,000,000 in cash, resulting into lower interest rates. We only got 0.9% interest rate on this money. Currently we regained our balance. We paid some of our PV-systems with 100% equity without the use of a bank, since their prices were rather low and since it would not be profitable enough to partially finance these projects with a bank loan. Currently we have a 35% to 40% equity ratio, with  $\in$ 2,000,000 in cash on our bank account. When deciding our equity ratio on the long term, the ratio will depend on the interest rates of the bank loans and it will depend on the returns from the renewable production facilities. Definitely not higher than 50%, and with wind power we are looking for a 25% equity ratio, with banks not willing to go lower than 25%.

## "How did you end up cooperating with the Sparkasse?"

We are strongly cooperating with the Sparkasse, since there was no consensus within the cooperative bank. When deciding for a bank for our bank account we did not prefer the Volksbank since they were a cooperative, but looked at their conditions, and the Sparkasse turned out better. At our Sparkasse we have to pay 2.3% for our bank loans totaling  $\in$ 6.500.000, and the cooperative bank probably thought that we were going to choose them, so they did not treat us like a customer, but like a supplier. It did not work out on an inter-personal level, and the interest rates were also a catastrophe.

## "Could you describe which people are active within the Vorstand?"

Within our Vorstand multiple people are active. I am an engineer, there is an entrepreneur and a lawyer, and the lawyer is currently working for our cooperative. Another group of members is working to acquire the building areas, these members are not working anymore. These people are at the end of their 50's, and have notified us that they wanted to help out. During our member meeting we asked the members who was interested to help out the cooperative with its investments. Then we brought these people together, and so far they are performing rather well. They have prepared the contracts for the building area, and as soon as you have the ground lease you can do almost anything. It is the most important element. We are working together with a project developer who is doing the approval process for us. When you want to build a wind mill you need the approval of the Landkreis, which is extensive work, and therefore this work is being done by an external project developer. There are also two other project developers on the short list, one of them built our two wind mills, and the other is not coming from this Kreis but from a neighboring Kreis. By choosing project developers per subject, we can lower the costs. The choice for the wind mill manufacturer is being done by me, and Enercon, Vestia and NordeX are in the race. But for now we have to wait for the potential change in the Bavarian law, since we cannot sign any contracts when the laws might be changed. Within our Aufsichtsrat five people are active, namely an insurance specialist, a self-employed, a tax advisor, and a technician. The Aufsichtsrat tends to be more conservative, since it has a controlling role.

## "What has your cooperative done, that enables it to grow as fast as it did?"

The reason that we were growing as fast as we did had to do with the fact that we have been promoting ourselves, and the Landkreis stood behind us. The Landkreis has sent letters to the mayors of the individual municipalities asking whether they had available roofs which could be rented to our cooperative, resulting in the PV-systems to be built in 1.5 years time representing 11 systems. The last

system was built at the end of 2011, because the levels of the EEG have gone down to such an extent, that not a single system got a green light, although we had a lot of opportunities. After the PV, we looked for wind opportunities, and we got access to the two wind mills because the project developers wanted to allow for civilian participation, since it allowed them to label the windmill 'Bürger Windkraft Anlage' (civilian windmill / community wind mill). It is in the interest of the project developers to allow for civilian participation, since it allows them for a better chance to acquire new wind projects in the future. Next to our two wind mills we have also invested into two other existing wind mills, which allowed us to take shares of 8% from a wind park limited liability company. The owners of these wind mills, project developer Windpower, cooperated with us during the start of our cooperative, and asked us whether we wanted to participate in their energy parks. They looked forward to our participation, since they were looking for a stronger cooperation with local actors. But when we were looking at proposition from other project developers we saw that this project developer Windpower wanted to keep a large part of the margins of new projects for themselves. They were promising us returns of 5% to 6% on future wind parks, but we are currently calculating with higher than 10% returns which are still somewhat conservative.

Name contact	Organization	Discussion
Anne Marieke Schwencke	ASI Search	Input on research scope
Arie Hobbel	Capgemini	Developments smart grids
Boukje Huijben	Technische Universiteit Eindhoven	PV business models
Brendan de Graaf	TexelEnergie	Input on research questions
Daan Dijk	Rabobank Nederland	Challenges for Dutch RECs
Daan Schipper	Rabobank Nederland	Challenges for Dutch RECs
Dennis Gieselaar	Oskomera Solar Power Solutions	Dutch PV market
Floris van der Veen	Rebel Group	Challenges for Dutch RECs
Geert Verbong	Technische Universiteit Eindhoven	Business model research
Henri Bontenbal	Burobontenbal	Legislative Dutch context
Jan Willem Zwang	GreenSpread	Dutch crowdfunding market
Jurgen van der Heijden	AT Osborne	Challenges for Dutch RECs
Lars Holstenkamp	Universität Lüneburg	German REC research
Leendert Florusse	Rooftop Energy	Dutch PV market
Manuel ten Hollander	Calorie	Challenges for Dutch RECs
Marjan Minnesma	Urgenda	Challenges for Dutch RECs
Martijn Messing	Stichting Energietransitie Nederland	Input on research questions
Robert Hemmen	De Groene Reus	Challenges for Dutch RECs
Rolf Heynen	Good!	Challenges for Dutch RECs

## Appendix C – Overview of preparation contacts & feedback