

The contribution of Local Energy Cooperatives to the Energy Transition in The Netherlands



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Preface

Before you lies the thesis “The contribution of Local Energy Cooperatives to the Energy Transition in The Netherlands”. It has been written to fulfil the graduation requirements of the master’s programme of ‘Spatial Planning’, with the specialization ‘Cities, Water and Climate Change’ at Radboud University.

During the course Cities Water and Climate Change I was first introduced with the expanding movement of local energy cooperatives in The Netherlands. The willingness and preparedness these actors have to voluntarily take matters in their own hands and making efforts to change the energy system in The Netherlands from the bottom upwards, immediately received my full attention. Hopefully my research contributes to the further development of the local energy cooperative’s movement and will their doggedness of making The Netherlands more sustainable with a cooperative way of thinking continue.

First, I want to thank my supervisor Dr L.J. Carton for her pleasant and positive feedback during the past months. Her valuable guidance often led to new insights to continue my research and eventually finalizing my master thesis. Second, I want to thank A.M. Schwencke, M. Swinckels and C. van der Zanden, as their expertise helped me in my understanding of the current cooperative movement. Finally, I want to thank all the respondents of the six local energy cooperatives who took the time to offer me an elaborate insight in their inspiring activities.

I hope you enjoy reading this thesis.

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Summary

The Netherlands are facing the huge challenge of the transition of our energy system. Climate change is increasingly threatening society and the usage of fossil fuels needs to be phased out. To do so, renewable energy sources need to be expanded rapidly. Recently, new actors have stepped in the energy transition: local energy cooperatives. This fast-growing group of community initiatives have taken matter into their own hands and decided to start changing the energy system in The Netherlands bottom-up.

Noticed is the rapid development of local energy cooperatives in The Netherlands, raising the question of what their influence is, or can be, on the energy transition. This study investigates this relatively new phenomenon at the hand of the research question: *'How can local energy cooperatives contribute to the energy transition in The Netherlands?'* For receiving a thorough understanding of the theoretical background of this research question, transition theories will be combined with the latest ideas of scholars on local energy cooperatives. The vast body of literature on factors determining the success of community initiatives is explained for an understanding of what influences the development of local energy cooperatives.

First results, obtained by expert interviews and desk research, show the current state of energy cooperatives in The Netherlands. It shows that the number of local energy cooperatives has grown exponentially the past five years and explains the influence local energy cooperatives have together on a national level. It can be obtained that, on a national level, the energy cooperatives have in relatively short time received significant influence on the political, economical, legal and socio-cultural domain, as they are involved in policy making, adding value to the 'local' aspect of energy, address legal obstacles and open new dialogues about sustainability.

The research continues with an in-depth multiple case study of six local energy cooperatives located across The Netherlands. These are Leudal Energie, Reindonk Energie, WIndpowerNijmegen, Energiefabriek013, Alkmaar Energie and De Groene Reus. This has resulted in a very thorough insight in each local energy cooperative's horizontal and vertical development. Horizontally, the vision, the projects, the organization and (optional) the process of wind park realization are researched. Vertically, the relation of local energy cooperatives with the existing regime is investigated at the hand of the aforementioned domains.

The main conclusions of this research are that local energy cooperatives are either organized via Gradual Growth or by Project Orientation. The most significant influence they have on the energy transition is their vision on energy production (sustainable, local and participation). This new idea of energy is also influencing the current regime, especially the political and economical domain. Regarding the resistance to wind parks, local energy cooperatives can use both communication as compensation options.

Types of referencing

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Chapter 1: Introduction

1.1 Research problem statement

The Netherlands are at this moment in a transition from conventional fossil fuel-based energy towards a renewable energy system. This is necessary to minimize the negative impacts of climate change and no longer being dependent on finite energy sources. Although the knowledge on the technological part of the energy system as the knowledge of which behavioral changes society must make, have been available for years, the speed in which changes are made to fulfill a renewable energy mix, remain rather low (Van der Heijden, 2015). Therefore, Van der Heijden (2015) states that 'getting the governance right' is the missing part of the sustainability-puzzle. Communities are getting more and more influence within the governance system and their involvement in the energy transition is strongly advocated (Goldthau, 2014; Hajer, 2015) as top down steering by the state alone is not sufficient. Problematic is however that community initiatives face many aspects which determine their success (Oteman et al., 2014; Van der Schoor & Scholtens, 2015). As community initiatives are often very case specific there is a problem in generalizing towards nation-wide 'good' conditions for community initiatives (Hufen & Koppenjan, 2015). In addition to that, there is a problem in the upscaling of community initiatives, due to their high rate of uniqueness, to enhance their contribution to the energy transition (ibid., 2015).

1.2 Research aim and research questions

The aim of this research is to generate more insight in the obstacles and incentives of local energy cooperatives regarding the contribution to the energy transition. It is also aimed at to find out what the potential of community initiatives can be when they will be upscaled and which characteristics have the highest possibility for a community initiative to be upscaled.

1.2.1 Research questions

Research question:

How can local energy cooperatives contribute to the energy transition in The Netherlands?

Sub questions:

1. What is the current state of energy cooperatives in The Netherlands?
2. How have local energy cooperatives horizontally developed in The Netherlands?
3. How have local energy cooperatives vertically developed in The Netherlands?
4. What is the horizontal and vertical up-scaling potential of local energy cooperatives?

1.3 Relevance

1.3.1 Societal relevance

Climate change is one of the largest and most complex problems of this time. The global climate is changing due to human activities and causes different problems all over the world (IPCC, 2014). Some areas will suffer from an abundance of water, in the form of sea level rising and heavy precipitations, while other areas will suffer from the shortcoming of water because of long and intense draught periods or suffer from the urban heat island effect (Goudie, 2014). Cities will be even more vulnerable, because of the high density of people living there the fact that they are often located in coastal areas (Reckien et al., 2014). The Netherlands are facing problems as well, among which: sea level rise, heavy precipitation periods, draught periods and fiercer storms (PBL, 2015). Because of these threats of climate change it is important to switch from fossil fuels to renewable fuels, to reduce the emission of greenhouse gases. Energy cooperatives are concerned with the production of renewable energy, so stimulating this concept and getting an idea about the potential of these initiatives is highly relevant regarding the safety of The Netherlands due to climate change related problems.

A second relevant aspect of this research to society is the contribution to the *Energieke Samenleving* (=energetic society) (PBL, 2011). The PBL (2011) explains that the citizens of The Netherlands are not passive at all. Citizens want to contribute to modern society by undertaking actions themselves and unite in all kinds of organized initiatives. The amount of energy cooperatives is growing every year and currently there exists over 300 energy cooperatives (HIER opgewekt, 2017). This research gives insight in how energy cooperatives are organized and what their potential is. Lessons learnt can be used by existing energy cooperatives and citizens thinking about starting an initiative to stimulate their activities.

Third, the national government of The Netherlands has set goals concerning sustainability. In 2050 The Netherlands want to be almost energy neutral (Rijksoverheid, 2016). This because of limiting the negative effects of climate change, but also to honor the international agreements made in the Paris Agreement. Energy cooperatives are contributing to this goal. Seyfang et al. (2013) expect that in the United Kingdom energy cooperatives will continue to grow and achieve their potential as key players in the transition towards renewable energy. Researching the potential of energy cooperatives in The Netherlands will give new insights in how energy cooperatives can contribute to the energy transition in The Netherlands and thereby contribute to the realization of the sustainability goals set by the national government.

1.3.2 Scientific relevance

The scientific relevance of this research lays within its contribution to several main discussions in the social academic world. First, it contributes to the literature about governance. According to Van der Heijden (2015), the missing piece in sustainability puzzles is 'getting the governance right'. In most cases the technology is available and the behavioral changes which must be made are known, it is the governance aspect which needs to be sorted out. The shift from government to governance (Rhodes, 1997) includes communities who 'steer' as well. Local energy cooperatives are a relatively new phenomenon, and more insight in how these community initiatives are organized may for instance contribute to the ideas of polycentric governance by Ostrom (2010).

Second, this research contributes to the literature about community initiatives and what the main barriers and opportunities are for the developing of these initiatives (Oteman et al., 2014; Walker, 2008, 2009; Schoor and Scholtens, 2015) Testing the current literature and maybe finding new barriers and incentives will make the literature more complete and stronger.

Third, the relatively new idea of upscaling local energy cooperatives will be researched (Van Doren, 2016). As it is advocated to stimulate community initiatives for their contribution to the energy tradition (Hajer et al., 2015), there has not yet been written much about how to enlarge their contribution by upscaling them. Hufen and Koppenjan (2015) state that due to the uniqueness of energy cooperatives it is hard to find structural ways of scaling-up. By using the framework by Van Doren (2016) a contribution to the knowledge on up-scaling local energy initiatives will be done.

Fourth, this research contributes to the literature about wind power resistance, often referred to as NIMBYism (Wolsink, 2000). Local energy cooperatives who are involved in wind energy projects need to deal with wind power resistance. Researching the strategy of these new, bottom-up actors for the coping with resistance, adds insights o the existing literature on this matter.

Chapter 2: Theoretical framework

2.1 Need for change

2.1.1 Climate change

Climatic changes have occurred throughout the entire history of planet Earth. The fluctuations of the global climate over millions of years were caused by phenomena such as solar activity, interstellar matters, volcanic eruptions, mountain creation and the changing pattern of landmass and oceans (Goudie, 2013). At this moment a different sort of climate change is being cognized, named anthropogenic climate change (IPCC, 2014). Anthropogenic climate change refers to changes in the global climate due to human activities, such as the emissions of greenhouse gases (GHGs) and clearing of large areas of tropical rainforests (Van Boxel, 2001). Although there are still climate sceptics who deny the influence of humans on the global climate, the overall majority of scientist agree upon the fact that today's climate change, and the problems related to it, are because of human activities (Carlton et al., 2015; IPCC, 2014; Oreskes, 2004, 2018). As a result of anthropogenic climate change sea levels are rising, ecosystems disturbances occur and there will be more often extreme weather events, such as draught periods, heavy precipitation and tropical storms (Goudie, 2013; IPCC, 2014). As all the aforementioned results are potentially harmful to human society, it is necessary that action against anthropogenic climate change will be taken.

There are two different ways the effects of climate change on human society are tried to be minimalized. These are adaptation and mitigation (Laukkonen et al., 2009). Adaptation is the act of changing society in a way that the effects of climate change have a lower impact. Mitigation on the other hand is the act of lowering the amount of GHGs in the atmosphere and thereby trying to decrease the future impacts of climate change (Ibid., 2009). Especially for urban areas adaptation and mitigation are of high importance. Because of the high density of people, assets and infrastructure they are most vulnerable for the impacts of climate change and on the other hand have many opportunities for significantly decreasing their GHG emissions (Reckien et al., 2014). McKibbin and Wilcoxon (2004) stress the importance of both adaptation and mitigation, using a car metaphor:

“The anti-lock breaks help to reduce the likelihood of an accident (mitigation) whereas the seat belts help to prevent catastrophe if there is an accident (adaptation). With both options available few sensible people would choose only one or the other since they both act to minimize the risk of serious injury.” (Mckibbin & Wilcoxon, 2004, p. 1)

2.1.2 Energy transition

A significant part of mitigation measures is to switch from fossil fuel-based energy sources, towards renewable energy sources. This results in less CO₂ emissions because of less fossil fuels are then being burned for energy. However, there are more reasons for stop making use of fossil fuels and increase the usage of renewable energy sources (Morris & Pehnt, 2016):

- Reducing energy imports;
- Stimulating innovation and the green economy;
- Reducing and eliminating the risks of nuclear power;
- Energy security;
- Strengthening local economies and providing social justice.

2.1.3 (De)centralized energy systems

In recent years, many scholars have written about how the infrastructure of energy systems should be organized and the shift from centralized energy systems to more decentralized energy systems (Goldthau, 2014; Morris & Pehnt, 2016; Wolsink, 2012). Traditionally, energy systems are in most cases driven by one large energy power plant running on fossil fuels such as gas, oil or coals. This form of commercial energy-oriented systems, has brought along problems such as inequities, external debt and environmental degradation (Hiremath, Shikha & Ravindranath, 2007). However, with the introducing of renewable energy sources, the energy system has become more decentralized (Wolsink, 2012). Goldthau (2014) explains the advantages of decentralized energy systems over centralized energy systems as follows:

“In fact, decentralized systems are believed to offer numerous advantages over centralized ones. According to the IPCC, this includes reduced costs for transmission systems, efficiency gains and lower grid loss, enhanced reliance on distributed generation involving local small scale providers, and a larger share of renewables in the local energy mix. Decentralized energy systems are also believed to be more innovative, because of the need for producers and operators to specialize, the necessity to find solutions tailored to local contexts and the opportunity of mutual learning. This may prove particularly important in the context of rural areas with differing local endowments of wind, solar or fossil fuels. In addition, decentralized systems may come with the benefit of enhanced resilience, not the least because they are less exposed to grand or cascading failures of centralized networks. In short, decentralizing energy systems, infrastructure and networks can be regarded as an essential element of low carbon transition.” (Goldthau, 2014, p. 136)

As it is clear among scholars that the energy transition should lead to renewable energy sources instead of conventional fossil fuel energy sources, it is not yet clear if the structure of future energy systems will become decentralized or will stay rather centralized. Centralized renewable energy systems can for instance be fueled by giant solar arrays or wind farms (Morris & Pehnt, 2016).

2.2 Theories of change

2.2.1 Transition Theory

The energy transition means in its essence that there must be changes made from conventional ways of creating energy towards more sustainable sources of energy. To have a better understanding of how the energy transition works, theories about societal change will be discussed. According to Kemp (1994) societal change is the result of a transition period, existing of a series of changes developing on each other. Rotmans, Kemp & Van Asselt (2001) explain social that such a transition consists of four phases (Figure 2.2.1). The first phase is the 'pre-development phase' where there are not yet any visible changes, but individuals have started with experimentations. The second phase is the 'take-off phase' where there are the first indicators of the process of societal change and the present system starts to shift due to innovations or surprises. The third phase is the 'acceleration phase' in which structural changes are occurring in a visible way. This phase consists of accumulation and implementation of socio-cultural, economic, ecological and institutional changes. The fourth phase is the 'stabilization phase' where the speed of societal change is decreasing and eventually a new equilibrium will be reached.

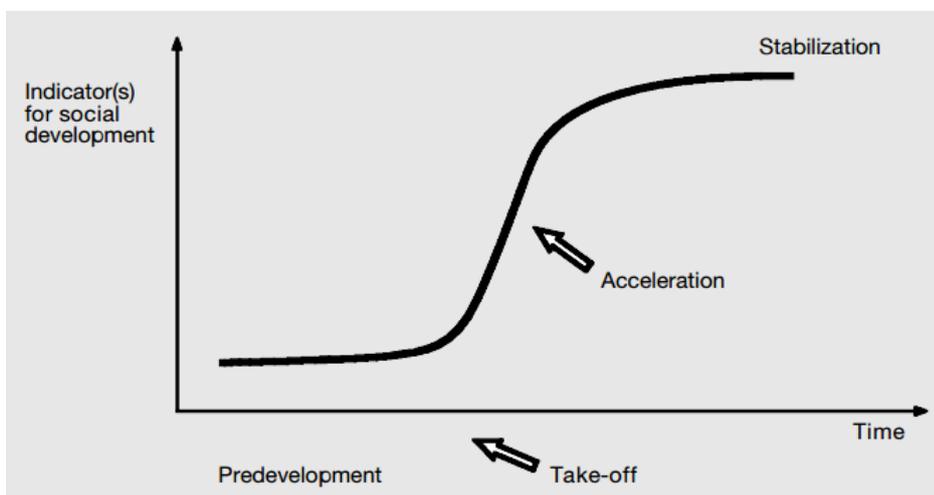


Figure 2.2.1 Four phases of a transition (Rotmans, Kemp & Van Asselt, 2001)

2.2.2 Multi-Level Perspective

Geels (2002) introduced the Multi-Level Perspective (MLP) as a method to study transitions. The MLP consists out of three levels. These are the micro-, meso- and macro-level. First, the micro-level consists out of actors in precarious networks, working on technological innovations. These innovations are called *niches* and because of experimenting there is a high variety of niches. Second, the meso-level consists out of the socio-technical regime. This regime is a heuristic set of dimensions, which are: technology, user practices and application domains (markets), symbolic meaning of technology, infrastructure, industry structure, policy and techno-scientific knowledge (Geels, 2002). The third level, the macro-level, is the socio-technological landscape the transition has to take place in. This landscape contains factors such as economic growth, cultural and normative values, environmental problems and wars (Geels, 2002). This landscape is able to change over time but very slow and incremental, meaning that changes will occur shallowly and step-by step without any large interruptions, also referred to as 'creeping change' (Streeck & Thelen, 2009).

Interactions between these levels can lead to a transition, as Geels (2010, p.1) describes:

“The MLP proposes that transitions, which are defined as regime shifts, come about through interacting processes within and between these levels. Transitions do not come about easily, because existing regimes are characterized by lock-in and path dependence, and oriented towards incremental innovation along predictable trajectories. Radical innovations emerge in niches, where dedicated actors nurture alignment and development on multiple dimensions to create ‘configurations that work’. These niche-innovations may break through more widely if external landscape developments create pressures on the regime that lead to cracks, tensions and windows of opportunity. Subsequent struggles between niches and regimes, and possible replacement, take place on multiple dimensions (e.g. markets, regulations, cultural meanings, infrastructure) and are enacted by interpretive actors that fight, negotiate, search, learn, and build coalitions as they navigate transitions.”

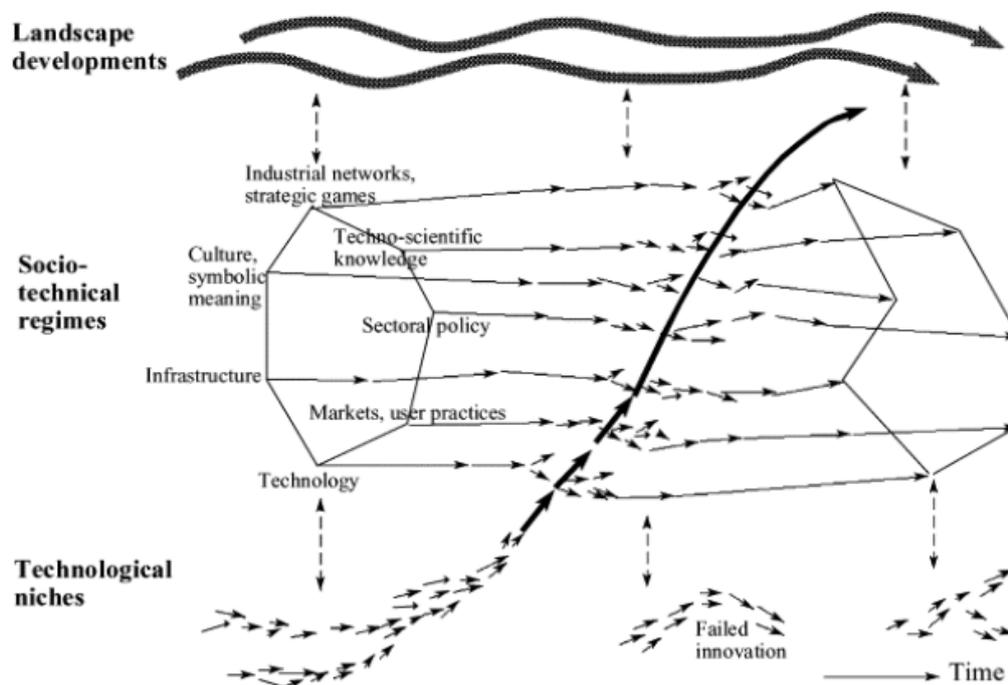


Figure 1 The Multi-Level Perspective (Geels, 2002)

The MLP has widely been adopted as a suitable approach to study transitions (De Haan & Rotmans, 2018). However, there are also criticisms. According to Smith et al. (2005) the MLP is focused too much on structures and lacks the influence of agency characteristics. Governing socio-technical transitions is largely a political issue in which agency plays a large role (Kern & Smith, 2008). These political difficulties are also stressed by Meadowcroft (2009), as he states that the long-term vision of transition management theories (such as the MLP) neglect the fact that policy agendas are typically dominated by short-term problems. This means that a transition is most likely messy and conflictual, rather than a smooth process. The socio-technological transition in the energy system endures these political issues too (Kern & Smith 2008). Finally, the specific focus on the niche as the driver of a transition is criticized, as change could also be initiated by actors within a dimension of the regime who are trying to achieve changes from the inside (Berkhout et al., 2004).

2.3 New agents of change: Local Energy Cooperatives

In the past decades a lot has been written about the shift from government to governance (Rhodes, 1997, 2012). The idea that solely the government can 'steer', has been replaced by the idea that also non-state actors can conduct various forms of steering (Steurer, 2013). Besides the traditional regulation of the government, also the market and the civil society can perform many sorts of regulation (ibid., 2013). According to Hajer et al. (2015) there is a need for 'new agents of change'. Hajer et al. (2015) state that it is an illusion that top-down regulations by governments and intergovernmental organizations alone can address global (environmental) problems, which is a phenomenon referred to as 'cockpit-ism'. This idea of mobilizing new agents than solely the government is in line with the polycentric governance theory of Ostrom (2010). Rather than one monocentric governing unit, multiple governing units at different scales can exercise a considerable independence to set up rules and norms within a certain area. The biggest advantage of a polycentric governance systems is the ability of using local knowledge (Ostrom, 2010). Furthermore, polycentric governance systems have positive effects on innovation, learning, adaptation, trustworthiness, levels of cooperation of participants, and are more likely to achieve more effective, equitable, and sustainable outcomes at multiple scales (ibid., 2010). Regarding the governance of the energy transition, Wolsink (2012) and Goldthau (2014) argue that polycentric governance is especially useful in the management of renewable energies.

Potential agents of change who are in addition contributing to a polycentric governance system, are communities. Community initiatives are increasingly taking part in the governance of the energy transition, but there is no clear consensus about what the concept 'community initiative' exactly means (Walker & Devine-Wright, 2008). Therefore, Walker and Devine-Wright (2008) created a diagram (figure 2.3.) in which different viewpoints on community initiatives are explained at the hand of two dimensions; process and outcome. The process dimension is concerned with whom a project is developed and run by, who is involved and who has influence. The outcome dimension is concerned with how the benefits of the project are both spatially and socially distributed.

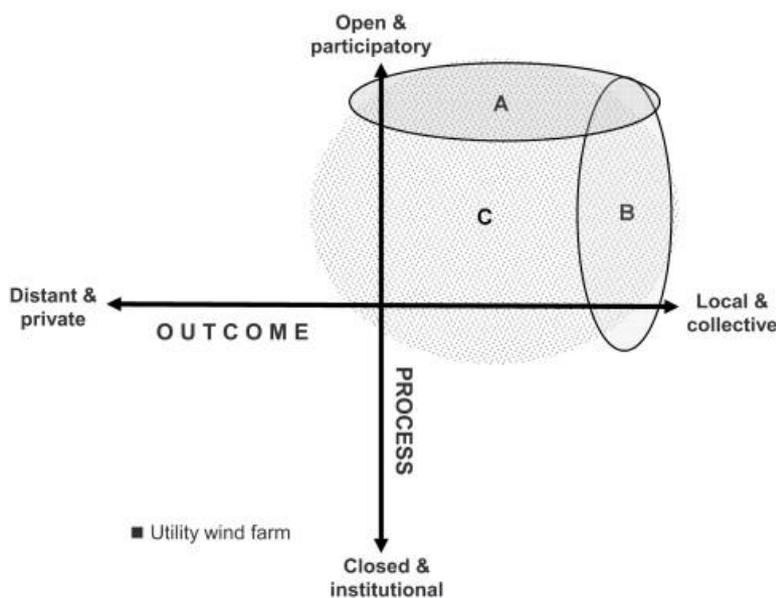


Figure 2.3 Different viewpoints on Community Initiatives (Walker & Devine-Wright, 2008)

The different viewpoints on community initiatives are mostly located in the upper right quadrant of the diagram (Walker & Devine-Wright, 2008). The first viewpoint (A) focuses on the process dimension and sees community projects as necessarily needing a high degree of involvement of local people in the planning, setting up and, potentially, the running of the project. The second viewpoint (B) focuses on outcome and is less concerned with who is participating in the project than with where the benefits of it are distributed. The third viewpoint (C) is a more expansive space, open to many different forms of projects being given a community label.

2.3.1 Local Energy Cooperatives

The way a community initiative is organized can take many forms. Different forms of community initiatives are for instance community charities, development trusts and shares owned by a local community organization (Walker, 2008). However, this research focuses on the 'energy cooperative', which is also the most common way of organizing a community initiative (Walker, 2008; Huybrechts & Mertens, 2014). Cooperatives are organizations that are owned by their members rather than by their investors. Ownership by the members of an energy cooperative has two main characteristics: the profits of the cooperative are usually divided among the members; and members have a vote, which is on a 'one vote per member' basis. This very democratic form of governance by energy cooperatives might also lead to slow decision-making processes or even lead to inefficient outcomes (Huybrechts & Mertens, 2014). To overcome these democratic risks, it is necessary that members share a common interest or have the same ideology (ibid, 2014).

More specific this research is focusing on 'local' energy cooperatives. These differ from the energy cooperatives focusing on all of The Netherlands, mostly wind energy cooperatives (HIERopgewekt, 2017). Focusing on local energy cooperatives as 'agents of change' (Hajer et al., 2015) instead of on nationwide cooperatives matches with the ideas of Goldthau (2014) and Wolsink (2012) of decentralized energy systems and with the polycentric governance theory of Ostrom (2010). Besides, the amount of local energy cooperatives has grown rapidly the past five years to over 300 in The Netherlands (HIERopgewekt, 2017). In the United Kingdom Seyfang et al. (2013) think of local energy cooperatives as potential key players in the energy transition, which makes it interesting to research the contribution of local energy cooperatives in The Netherlands too.

Local energy cooperatives are ideally situated in the upper-right place of the diagram, where there is an overlapping between viewpoint (A) and viewpoint (B) in figure 2.3 (Walker & Devine-Wright, 2008). This means that the local energy cooperative is open for all community members (and may be open for people outside the geographical community) to participate and that the profits of the cooperative are flowing back into the community. These profits are for instance the produced energy or the gained financial profits but may also be aspects such as increased employment rate or educational gains. Yildiz et al. (2015) explain cooperatives as social and economic enterprises who are striving for economic, social and cultural improvements for their members. Members of energy cooperatives join this movement for reasons as: the wish to participate, support for renewable energy, and the support for the decentralization of energy supply (Yildiz et al., 2015).

Besides the advantages local energy cooperatives have for their members (Yildiz et al., 2015) and they have as potential new agents of change (Hajer et al., 2015), local energy cooperatives might also be useful in reducing the resistance against renewable energy facilities (Huybrechts & Mertens, 2014). Well known is the NIMBY (Not In My Backyard) phenomenon, mostly regarding to wind energy. NIMBY means that people are not fundamentally against wind energy, but they are against the negative externalities, such as noise and shadow nuisance and a spoiled scenery, of having a wind mill nearby (Dear, 1992; Wolsink, 2000). Wolsink (2000) argues that resistance to wind energy is often being labeled as NIMBY-ism eagerly, but that this is not necessarily true. Open, participatory

planning practices could overcome a significant part of the resistance (Wolsink, 2000). Huybrechts and Mertens (2014) state that local energy cooperatives are creating some positive externalities of having renewable energy sites (wind mills for example) nearby. Conventionally, market players would build wind parks in which they use public resources (wind) to earn money solely for the market player itself. Leaving the community with only the negative externalities. If a local energy cooperative develops a wind park, citizens have the ability to participate in the decision-making process and are able to participate financially, meaning that the profits will stay in the region as well (Huybrechts & Mertens, 2014). Owning renewable energy appliances as a community instead of anonymous large companies owning them, fosters social acceptance (ibid., 2014).

2.4 Local Energy Cooperatives within the Multi-Level Perspective

To see if local energy cooperative can indeed serve as new agents of change in the energy transition, it is useful to look at local energy cooperatives as a specific niche within the MLP. Although Walker and Devine-Wright (2008) stress the large variety between cooperatives, as they differ in size, organization structures, sources of renewable energy, and forms of participation, Hoppe et al. (2015) state that it is conceptually acceptable to qualify local energy initiatives as one niche as they share the way of thinking about renewable energy. Hielscher et al. (2011) agree that community-led energy initiatives share a common focus on sustainable energy, allowing to think of them as one niche. With the qualification as energy cooperatives as a niche within the energy transition, it is also necessary to have a better understanding of the landscape and regime, energy cooperatives must deal with. As the landscape in the MLP exerts pressure on the regime (Geels, 2010), this level contains in the current energy transition aspects as climate change and its consequences and international covenants such as the Paris Agreement.

The main cause that transitions do not come about easily, is that the regime within the MLP is characterized by 'path dependencies' and 'lock-ins' (Geels, 2010). Pierson (2000) explains that path dependency is a theory about institutions being 'sticky' and actors within an existing regime tend to protect the existing way of working. Past decisions often encourage the continuity of an existing regime (ibid., 2000). Unruh (2000) explains that within the energy system there is a 'carbon lock-in', meaning that there is a pattern of self-organizing in the energy system, which makes it very hard to escape the dependency on fossil fuels.

For the placement of energy cooperatives within the MLP theory, it is useful to apply the regime level specifically on energy cooperatives. Oteman et al. (2014) state that the relevant regime for energy cooperatives contains out of four dimensions. These dimensions influence the success of energy cooperatives and are: (1) the political dimension, (2) the legal dimension, (3) the economic dimension and (4) the socio-cultural dimension.

- (1) *The political dimension* contains aspects as subsidies, political willingness and flexibility, the presence of priorities for sustainability and project support in the form of advice or finance.
- (2) *The legal dimension* contains out of the formal rules and regulations, decision making procedures, degree of discretionary space and control mechanisms.
- (3) *The economic dimension* refers to the division of material resources, availability of investors and the expected profit of an initiative.
- (4) *The socio-cultural dimension* contains the capacity for institutional learning, problem perception and the attitude towards experimentation.

Besides the aspects within four domains of the regime, energy cooperatives are restricted by *the (bio)physical conditions* of the area where the initiative has set up. Characteristics of the (bio)physical conditions are for instance wind speed, solar hours, tidal waves, presence of fossil fuels, urbanization and technological developments (Oteman et al., 2014).

2.4.1 Visualization of Energy Cooperatives within the MLP

The MLP applied to the case of energy cooperatives is visually displayed in figure 2.4.1. It contains the landscape level, which exists pressure on the regime (Geels, 2010). In the case of energy cooperatives this are for example climate change and international agreements. The regime level exists out the political, legal, economical and socio-cultural domains explained by Oteman et al. (2014). The niche level in this research are the different local energy cooperatives in the Netherlands, agreed upon by Hoppe et al. (2015) and Hielscher et al. (2011) to be one niche.

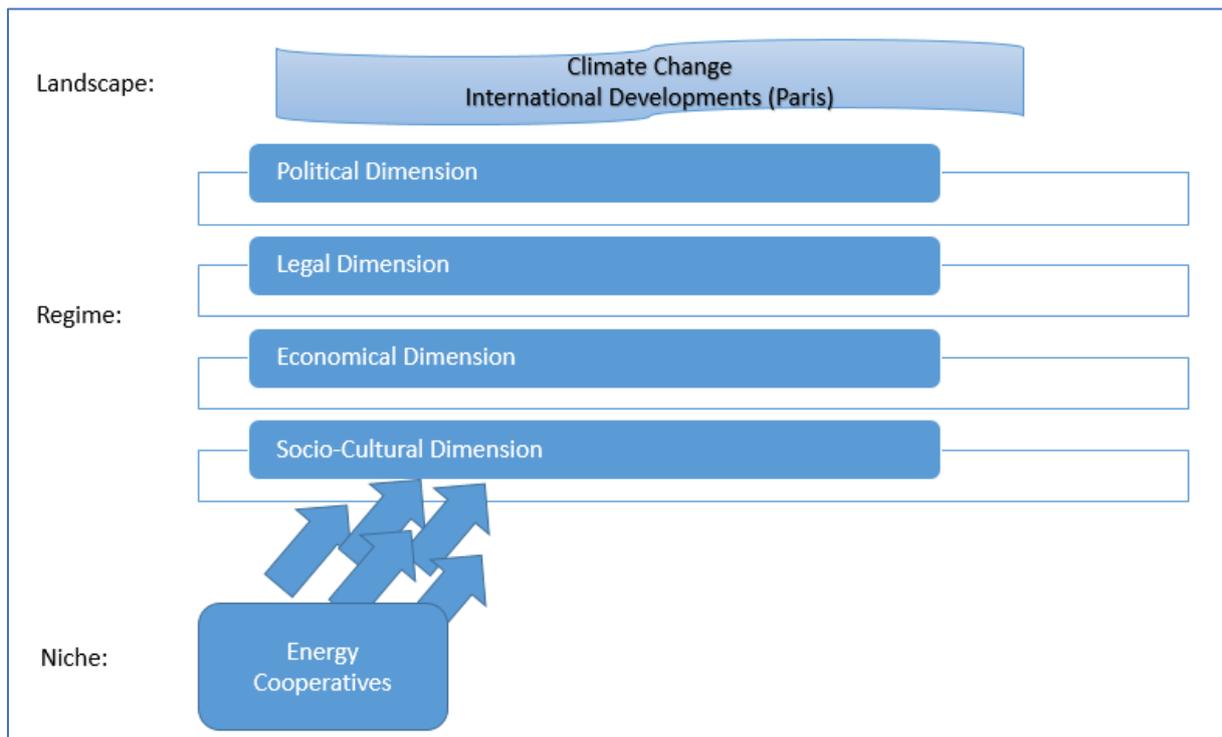


Figure 2.4.1 Visualization MLP for Energy Cooperatives

2.5 Aspects determining the success of Local Energy Cooperatives

With the upcoming of renewable energy and the possibility of producing your own energy it has become easier for communities to contribute to the governance of the energy transition (Van der Schoor & Scholtens, 2015). However, there are many aspects which can influence the effectiveness and success of community initiatives regarding the energy transition. The following paragraphs will elaborate on the literature about different aspects which determine the success of energy cooperatives.

Van der Schoor & Scholtens (2015) explain that two different dimensions play a large role in the success of energy cooperatives: (1) the relation with outside networks and (2) the commitment of members.

- (1) *The outside network* consists of all existing organizations that could be related to the local initiative, such as regional intermediary organizations, national networks, governmental agencies, and incumbent companies (ibid., 2015). Also, the attachments of local actors to the outside network is important.
- (2) *The commitment of members* is divided into 'organization development', 'shared vision' and 'level of activities'. The organization's development can vary between ad hoc working groups to more formal organizations. For the organization development aspects of importance are continuity of membership, the number of active members and the time members have for activities (ibid., 2015). Shared vision is also important, and it is expected that a strong shared vision with concrete practical steps makes the chances of success higher. The level of activities counts as an indicator for the commitment of members. If activities are highly participated, community initiatives tend to have more success (ibid., 2015).

Oteman et al. (2014) explain, besides the different domains of the regime, the factors of success for energy cooperatives also from an agency perspective. According to them there are four capacities; (1) cultural capacity, (2) organizational capacity, (3) Personal capacity and (4) infrastructural capacity (ibid., 2014).

- (1) *The cultural capacity* consists of the legitimacy and socially defined meaning of the sustainability objectives. The intrinsic motivation of members of the initiative is important. When the intrinsic motivation is high enough it is often not necessary that a community initiative must be economically profitable. However, economic interest is becoming more important as well.
- (2) *The organizational capacity* refers to the support for the community initiative from the rest of the community. It also refers to the support of the municipality and other actors. When there is a successful community involvement the NIMBY effect can also be reduced because there is a feeling of ownership by the community.
- (3) *The personal capacity* refers to the resources the initiators of the community initiative have. The resources of individual members are aspects like skills, knowledge, leadership qualities values and enthusiasm. Also, the budget of the initiative and access to technology, knowledge and expertise are necessary.
- (4) *The infrastructural capacity* refers to the grid access of community initiatives and the amount of facilities provided by the government or market actors.

Walker (2008) explains the factors which determine the success of energy cooperatives at the hand of incentives and barriers. The incentives for different actors, including individuals, community organizations, local governments and actors from the private sector, to get involved vary with the context and form of each project. The incentives explained by Walker (2008) are:

- (1) *Local income and regeneration.* Community-owned means of production can generate income locally, through returns on investment, the sale of generated energy, or the creation of employment.
- (2) *Local approval and planning permission.* Projects owned or partly owned by the community will be more locally acceptable and have fewer problems obtaining planning permission than others
- (3) *Local control.* Where it is expected that project development by the private sector is going to take place in the future, actively setting up a community initiative may be seen as a way of maintaining local control. Matters as the scale of the development and external effects can be managed and controlled by the local community.
- (4) *Lower energy costs and reliable supply.*
- (5) *Ethical and environmental commitment.*
- (6) *Load management.* The deployment of large-scale renewables is creating various problems for the electricity network. Smaller-scale projects avoid some of these issues.

Besides these incentives, Walker (2008) also mentions several barriers involved with community initiatives regarding renewable energy. These include the legal conditions under which organizations or projects can operate, establishing an economic and technical feasibility and the need for extensive inter-group communication and collaboration. Walker (2008) therefore states that it is essential for community initiatives to have expert advice and support and the ability to learn from previous projects. Walker et al. (2009) stress the importance of trust within a community initiative. Trust between local people and groups that take projects forward is part of the package of conditions which can help projects work and for local people to feel positive about getting involved and about the process of the project 's development.

Huybrechts & Mertens (2014) have noticed some barriers for local energy cooperatives as well, which they call the 'barriers to entry'. The first barrier to entry is the access to financial capital. Especially in the early phase of a cooperative, the lack of capital in combination with the high costs of renewable energy facilities are a main obstacle. Creating more capital could be realized by gathering a large number of members, making the cooperative harder to run in a fully democratic way. Capital could also be created by involving external investors, who expect returns on their investment and might expect decision-making power (ibid., 2014). Second, the access to suitable locations for renewable energy projects is an obstacle. Both these barriers to entry are easier to overcome for large market players than for energy cooperatives. Third, the access to energy supply is a barrier for energy cooperatives who want to be an energy supplier too. There is a large inertia of energy consumers and institutions which are used to deal with historical providers. Besides these barriers to entry, Huybrechts & Mertens (2014) argue that energy cooperatives suffer from the low knowledge of politicians, financiers, potential partners and the public about the cooperative energy movement. The idea of wind and sun being public good and that the profits of wind and solar energy could also stay within the region instead of going to private investors, has not yet been realized by everyone (ibid., 2014).

2.6 Upscaling of Energy Cooperatives

2.6.1 Innovation theory

To enlarge their influence on the energy transition, energy cooperatives will have to grow. According to Hufen & Koppenjan (2015) energy cooperatives can be seen as an innovation in the energy system. Therefore, they apply the adaption curve of successful innovations to the concept of energy cooperatives. This curve explains the adaption of an innovation by the members of a social system (Rogers, 2002). First the innovators will create the innovation, then the early adopters will adopt the innovation. If the innovation is doing well, the early and late majority will follow and eventually the laggards (ibid., 2002). Hufen and Koppenjan (2015) state that the most important conditions for energy cooperatives to be accepted by the public are:

- (1) *Comparative advantages*: the energy cooperative offers advantages in comparison with other energy suppliers.
- (2) *Lack of complexity*: the energy cooperative is less attractive if significant efforts need to be done to participate.
- (3) *Compatibility*: the fitting of the energy cooperative in the usual habits of citizens.

If these factors are beneficial for the energy cooperative the chances are higher that the early and late majority will accept the innovation (Hufen and Koppenjan, 2015).

2.6.2 The concept of scaling-up

Besides the innovation curve (Rogers, 2002), it is also important to see the potential of ‘scaling up’ of community initiatives. The scaling up of local initiatives is a great opportunity to accelerate the current energy transition (Van Doren et al., 2016). The upscaling of local initiatives can either be vertical, horizontal or a combination of both. Horizontal upscaling refers to the spatial growth of an initiative, or the quantitative scaling up of an initiative. This happens when an initiative expands itself from street to neighborhood to city level for instance but can also happen due to replication or transfers of an initiative to a different area (Van Doren et al., 2016). Vertical scaling up refers to structural learning and changes in the institutional roots of a system, which is in this case the energy system. Vertical scaling up is the process where information, ideas, values, knowledge or other lessons from the initiative inform institutions at higher administrative and organizational level with a wider impact (Van Doren et al., 2016). Figure 2.6.2 shows the process of scaling up. Hufen and Koppejan (2015) argue that it is difficult to find general up-scaling methods for local energy cooperatives, as they tend to be very different from each other. This uniqueness decreases the possibilities of finding an upscaling theory applicable to all local energy cooperatives in The Netherlands (ibid., 2015).

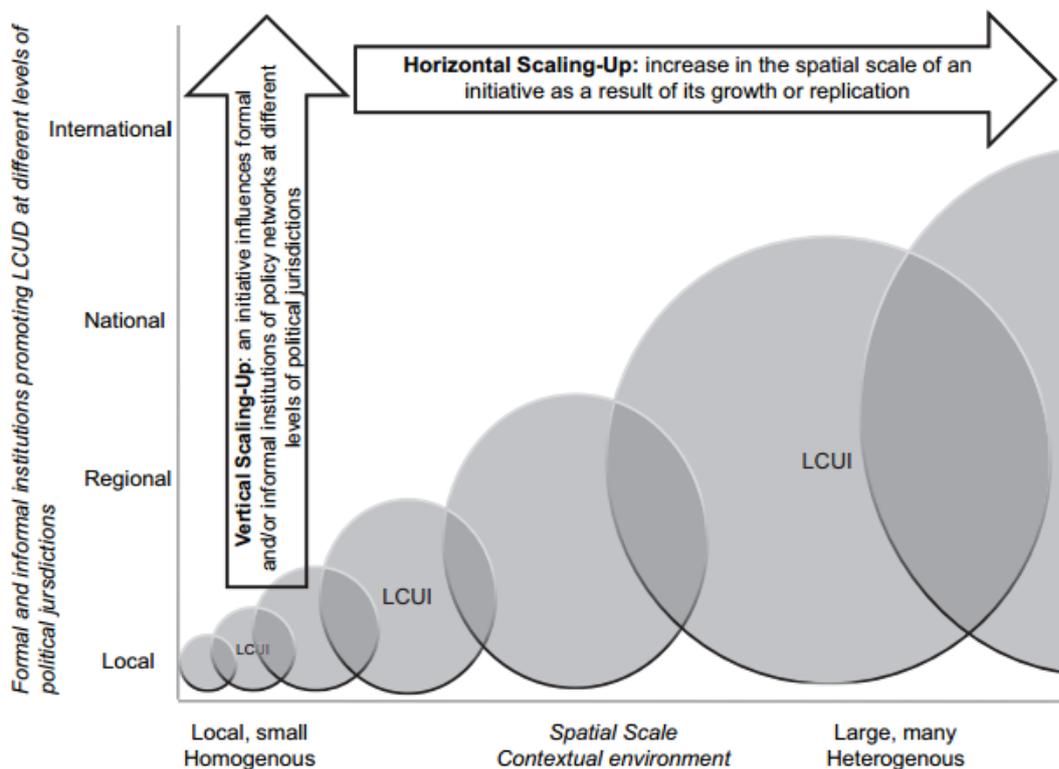


Figure 2.6.2 Horizontal and vertical upscaling (Van Doren et al., 2016)

2.6.3 Factors determining the up-scaling potential

For being able to determine the potential of scaling up a community initiative Van Doren et al. (2016) created a framework with all factors which are expected to contribute to the scaling up process. This large framework is fully displayed in chapter 1 of the annex document belonging to this thesis. Table 2.6.3 however sums up the factors which are explained in the framework.

Measures for development	Operational arrangements	Policy context	Market context	Socio-cultural context	Natural and Built context
Financial advantages	Leadership	Policies in favor of the cooperative.	Low capital and installment costs	Environmental awareness and values	Technical and spatial compatibility
Reliability	Stakeholder involvement	Political leadership	Information and expertise availability		
Low complexity	Resource mobilization	Trust in the policy network	Access to credit		
	Communication				

Table 2.6.3 Factors determining up-scaling potential (Van Doren et al. 2016). Elaborate explanation included in the annex document.

2.7 Conceptual model

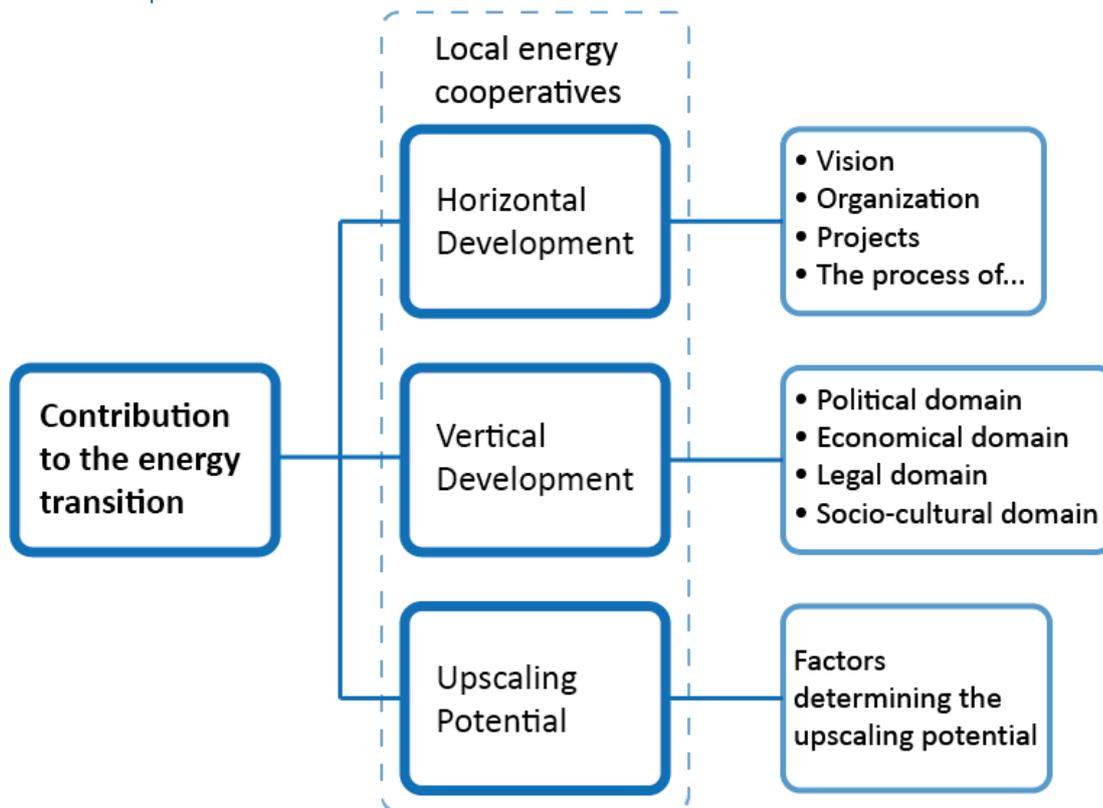


Figure 2.7 Conceptual model

In this thesis an answer to the question ‘*How do local energy cooperatives contribute to the energy transition in The Netherlands*’ is searched for. To find a well-founded answer to this question, this chapter provided in a theoretical basis about the relevant theories about the energy transition and local energy cooperatives. The conceptual model (figure 2.7) gives a visual overview about the different variables eventually retrieved from the theoretical framework. In this paragraph an explanation will follow about how this conceptual model has been constructed.

‘The contribution to the energy transition’ is in this research the dependent variable, which will be determined by three independent variables related to local energy cooperatives, namely ‘horizontal development’, ‘vertical development’ and ‘upscaling potential’. These variables were named regarding the typology of Van Doren et al. (2016). Horizontal development refers to the growth energy cooperatives have made their selves. How they have grown as an organization and the projects they started. These developments stay within the ‘niche’ of the local energy cooperatives (Geels, 2010; Hoppe et al., 2015). Vertical development on the other hand refers to the interaction of the local energy cooperatives with the regime. For a transition to take place, the niche developments need to ‘break through’ into the domains of the current regime (Geels, 2010). Therefore, the interconnectedness of local energy cooperatives with the current regime will be tried to clarify. The upscaling potential tests at the hand of determining factors what the potential is for local energy cooperatives in the contribution to the energy transition. As the movement of energy cooperatives in the Netherlands is still growing (HIER opgewekt, 2017) it is interesting to see what the upscaling potential is of energy cooperatives. The variables will be further explained in the following sections.

2.7.1 Horizontal development.

The first independent variable is horizontal development. As previously explained, this means the the practices of local energy cooperatives within the niche. According to Geels (2010), dedicated actors experiment with innovative new practices within niches. As local energy cooperatives can be seen as such a niche (Hoppe et al., 2015), the developments within the niche of local energy cooperatives will be researched in this first variable. The research of the horizontal development will be conducted at the hand of the factors: 'vision', 'projects', 'organization' and the 'process of ...'.

Vision

The vision of local energy cooperatives is an important factor in the development of this new movement. In the first place because the vision of energy cooperatives is the reason that they can be seen as one niche (Hoppe et al., 2015; Hielscher et al., 2011). Energy cooperatives differ in their vision to conventional players on the energy market as they do not have the objective of profit maximization (Yildiz et al., 2015). Besides, a strong shared vision is essential for local energy cooperatives because it can overcome slowness due to its democratic nature (Schoor and Scholtens, 2015; Huybrechts and Mertens, 2014). To receive a clear picture of what the vision is exactly and the differences and similarities between cooperatives' visions, this is the first factor in the horizontal development.

Projects

As the vision of cooperatives qualifies local energy cooperatives as one niche, it makes no practical contribution to the energy transition. Therefore, it is necessary to have a look at the projects which are being achieved within the niche, because this is the actual contribution the local energy cooperatives want to make their selves. According to Walker and Devine-Wright (2008) it is characteristic for cooperatives that these projects are open for participation of the community.

Organization

The organization is the third factor in the independent variable of horizontal development. Local energy cooperatives are driven by volunteers. Due to this relatively new form of organization on the energy market, conventional actors such as banks, municipalities and consumers might not be eager to work with local energy cooperatives. A recent news article¹ stresses this as the 'cooperative dilemma': cooperatives being a too large risk for banks to invest in due to the high number of volunteers in the organization. A mature organization might overcome these possible barriers to entry, as they are being called by Huybrechts and Mertens (2014). As the organization of local energy cooperatives can variate between ad hoc working groups to formal organizations (Schoor and Scholtens, 2015), this is useful to receive more insight into.

In table 2.7.1 the different aspects of the previous three factors are displayed.

Factors	Aspects of factors
<i>The vision</i>	<ul style="list-style-type: none">- Importance of renewable energy/sustainability;- Local participation/production;- The remaining of profits in the region;- ...
<i>The projects</i>	<ul style="list-style-type: none">- Advising people in sustainable activities;- Energy supply;- Producing solar energy;

¹ <https://www.duurzaambedrijfsleven.nl/finance/29741/hoelokale-energiecooperaties-financieel-van-de-grond-kunnen-komen>

	<ul style="list-style-type: none"> - Producing wind energy; - Educational/raising awareness activities; - ...
<i>The organization</i>	<ul style="list-style-type: none"> - The board members; - Time spending for the cooperative; - The presence of an office; - Working groups; - General member meeting; - Paid employees; - ...

Table 2.7.1 Factors and aspects of Horizontal Development

The process of ...

Resistance to the realization of wind parks is still a significant problem. *De Volkskrant* wrote about the continual growth of resistance against wind parks from people living nearby². Recently, the NOS even spoke about ‘wind mill extremism’ in Drenthe³. Resistance to the proposed wind mills has reached the level that opponents speak about burning the wind mills down when they will be built. As this latter example is rather extreme, the resistance to wind energy is a problem for the energy transition, often addressed to as NIMBY-ism. Wolsink (2000) stated that NIMBY resistance can be declined by open participatory planning. In this, local energy cooperatives can play a role, as they tend to compensate the negative externalities of wind energy for the community with the positive externality of the profits staying within the region (Walker, 2008; Huybrechts and Mertens, 2014; Oteman et al., 2014). Clarification about how local energy cooperatives are involved in processes of wind park realization might provide new insights in this expected opportunity of overcoming NIMBY.

2.7.2 Vertical development

The second independent variable is vertical development. For a transition to take place, it is necessary for niches to break through the current regime (Geels, 2010). Therefore, researching the vertical development will take place on the nexus between niche and regime. Here, niche actors (local energy cooperatives) and regime actors and institutions, might interact with each other by for instance fighting, negotiating, searching, learning or collaborating (Geels, 2010). As regimes tend to be full of path-dependencies (Piersson, 2000) and lock-ins (Unruh, 2000), it can be expected that the regime forms obstacles for local energy cooperatives to develop vertically. To specify the regime for energy cooperatives, the original regime by Geels (2002) has been replaced by the regime-domains by Oteman et al. (2014). These domains are the political domain, legal domain, economical domain and socio-cultural domain. The research of the vertical development will focus on the presence of obstacles due to the regime, but also for collaborations with regime actors. Besides, the influence of local energy cooperatives on the regime and if they have been able to change the regime on certain aspects, will be investigated. Table 2.7.2 on the next page displays the four domains and clarifications.

² <https://www.volkskrant.nl/nieuws-achtergrond/steeds-meer-weerstand-tegen-windmolens~b812d91e/>

³ <https://nos.nl/artikel/2249880-windmolenextremisme-in-drenthe-ik-hoor-dat-de-fik-erin-gaat.html>

Domain	Clarification
<i>Political</i>	The vertical development regarding the political domain contains the interconnectedness of the cooperative and the local authorities (the municipality). Does the municipality support the energy cooperative, by giving financial or organizational support? Or does the cooperative influence the municipality, by lobbying for certain changes or by giving advices?
<i>Economical</i>	The vertical development regarding the economical domain contains the financial aspects, such as how the business case is organized, if it was easy to find investors, competitive advantages and collaborations with market actors.
<i>Legal</i>	The vertical development regarding the legal domain contains the way the cooperative handled the legal procedures, such as permit applications, zoning plan changes and legal protest periods.
<i>Socio-cultural</i>	The vertical development regarding the socio-cultural domain contains the support an energy cooperative gets from the community and the activities the cooperative organizes to enhance the public perception towards renewable energy or the cooperative itself.

Table 2.7.2 Domains and clarification of Vertical Development

2.7.3 Upscaling Potential

The third independent variable determining the contribution of local energy cooperatives to the energy transition is the ‘upscaling potential’. The previous two variables give insight the development of local energy cooperatives until now. However, to reach the sustainability goals of The Netherlands and to mitigate the negative effects of climate change, the energy transition should be realized faster. Therefore, it is interesting to research the potential local energy cooperatives have in scaling up both horizontally and vertically. To determine this potential, numerous factors will be used retrieved from the theoretical framework. Hufen and Koppejan (2015) state that local energy cooperatives are very different from each other, making it rather difficult to find ways of upscaling which work for all local energy cooperatives. For making it able to compare different energy cooperatives, some general important features explained by Oteman et al. (2014) are used: knowledge, leadership, finances, access to expertise/technology and access to the grid. These features were chosen as they are expected to be the most important in the realization of a strong local energy cooperative.

To measure the upscaling potential the framework of Van Doren et al. (2016) has been taken as a starting point. However, as this contains a framework not specifically on local energy cooperatives, but on community initiatives in general, it cannot be used completely in its original form. The factors retrieved from Van Doren et al. (2016) which are relevant for local energy cooperatives are: Involved community and local actors, leadership within the cooperative, communication (intern and extern), someone putting the cooperative on the political agenda, and subsidies. To specify the list more on local energy cooperatives, some factors retrieved from the theoretical framework have been included. These are: strong shared vision, large amount of (active) members, collaboration with other cooperatives.

Factor	Clarification	References
Strong shared vision	<ul style="list-style-type: none"> - Overcomes democratic slowness - Determines identity of cooperative 	<p>Schoor and Scholtens (2015)</p> <p>Huybrechts and Mertens (2014)</p>
Large amount of (active) members	<ul style="list-style-type: none"> - Creates financial capital - Resembles a strong organization 	<p>Schoor and Scholtens (2015)</p> <p>Huybrechts and Mertens (2014)</p>
Involved community and local actors	<ul style="list-style-type: none"> - Can overcome resistance as there is a sense of ownership - Creates a network - Enables parties to exchange ideas and experiences 	<p>Oteman et al. (2014)</p> <p>Schoor and Scholtens (2015)</p> <p>Walker (2008)</p> <p>Van Doren et al. (2016)</p>
Leadership within the cooperative	<ul style="list-style-type: none"> - Motivate and coordinate stakeholders - Promote commitment - Mobilize resources required for the growth and replication of the initiative 	<p>Van Doren et al. (2016)</p> <p>Oteman et al. (2014)</p>
Communication (intern and extern)	<ul style="list-style-type: none"> - Enhances coordination - promotes the energy cooperative 	<p>Van Doren et al. (2016)</p>
Someone putting the cooperative on the political agenda	<ul style="list-style-type: none"> - Creating trust between cooperative and municipality - Enhances the change of political leaders willing to accept the cooperative 	<p>Van Doren et al. (2016)</p>
Subsidies	<ul style="list-style-type: none"> - Creates financial support for cooperatives 	<p>Oteman et al. (2014)</p> <p>Van Doren et al. (2016)</p>
Collaboration with other cooperatives	<ul style="list-style-type: none"> - Not having to re-invent the wheel - Having a stronger say towards the regime together 	<p>Schoor and Scholtens (2015)</p>
Intrinsic motivation	<ul style="list-style-type: none"> - Creates a drive - Can overcome lack of financial profits 	<p>Oteman et al. (2014)</p>
Other, namely...	...	

Table 2.7.3 Factors, clarifications and references of Upscaling Potential

Chapter 3: Research Design

3.1 The Research Onion

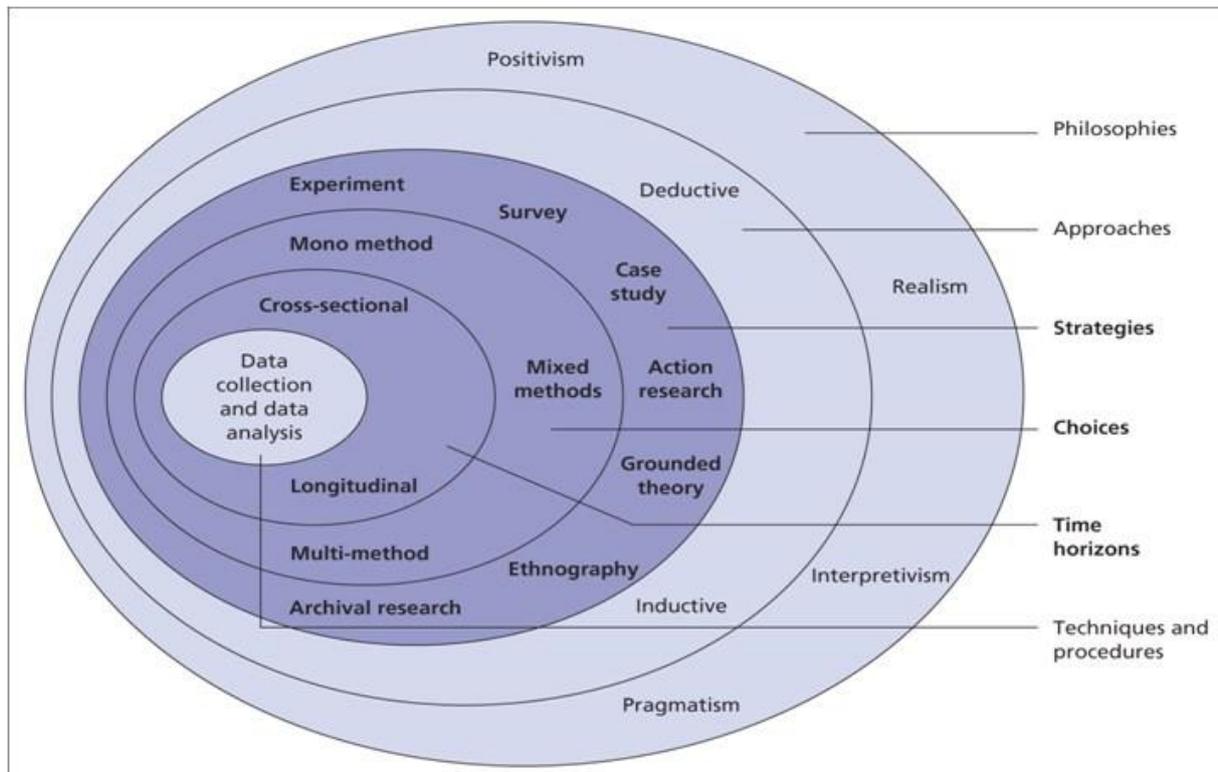


Figure 3.1 The Research Onion by Saunders et al. (2009)

Saunders et al. (2009) have visualized the steps of designing a research as an onion to be peeled, see figure 3.1. Working from the outward layer of the research onion towards the center (similar to peeling an actual onion) creates a well-founded research design. The outer layer of the research onion by Saunders et al. (2009) contains the research philosophy, which can be either positivism, realism, interpretivism and pragmatism. The research philosophy in this thesis is pragmatism, which means that there is a strong focus on the connection of theory with reality. The main research question is the most important and to find an answer to the research question it should be possible to use the most suitable methods. In this thesis the theoretical insights on energy cooperatives are being connected to the actual activities and development of local energy cooperatives in The Netherlands. This pragmatic way of thinking can be seen in the next layer of the research onion: the research approach. To receive a complete picture of how local energy cooperatives contribute to the energy transition both an inductive and deductive approach has been taken. The development of the cooperatives is researched inductively, as the data of this part will be compared to find generalizations and thereby construct new knowledge about how different energy cooperatives are functioning. The potential of the energy cooperatives on the other hand is researched deductively, as the factors explained in the theoretical framework will be used to test the energy cooperatives. The next two layers contain the research strategy and the methodological choices (Saunders et al., 2009). Bryman (2012) states that qualitative research tends to find prove for generalization of arguments instead of statistical prove, which is the case with quantitative research. Yin (2009) on the other hand states that the generalization of case studies is limited, as there are case specific characteristics. However, to gain deep understanding and nuanced insights about 'how' energy cooperatives can contribute to the energy transition, qualitative research is the best option (Bryman, 2010), because it

seeks to understand the deeper structures of social systems. Qualitative research in combination with the multiple case study strategy, makes it possible to obtain a large amount of data, but still being able to ask a *how* question about the contribution of community initiatives to the energy transition. Therefore, this research contains for the larger part a qualitative multiple case study. In addition to this qualitative research a small quantitative aspect will finalize the research, making the methodological choice of using mixed-methods. The final layer which can be peeled off is the time horizon (Saunders et al., 2009). In this research every energy cooperative has been studied at one point in time, making the study cross-sectional.

3.2 Answering the Sub Questions

The main research question of this thesis contains: *How do local energy cooperatives contribute to the energy transition in The Netherlands?* For being able to give a well-grounded conclusion to this research question, four sub questions are developed. In this section the way these sub questions will be researched will be discussed

Sub question 1: What is the current state of energy cooperatives in The Netherlands?

The answering of this sub question will offer a better understanding of the cooperative movement in The Netherlands. First, a brief history of cooperatives in general and energy cooperatives will be given. The data for this part will be contained by a desk research. Second, the horizontal development (growth of energy cooperatives) of energy cooperatives in The Netherlands in general will be explained. This will again be done by conducting a desk research. Lastly, the current regime and the influence energy cooperatives in general have on this regime will be explained. For this section expert interviews have been conducted.

Respondent	Function
<i>A. M. Schwencke</i>	Researcher in the field of energy cooperatives. HIER opgewekt
<i>C. Van der Zanden</i>	Employee SELL: Service Point Local Energy Limburg. (Department of the <i>Natuur en Milieufederatie Limburg</i>).
<i>M. Swinckels</i>	Policy officer Province of Limburg. Working in the field of energy cooperatives.

Table 3.2 Expert interview respondents

Sub question 2: How have local energy cooperatives horizontally developed?

Sub question 3: How have local energy cooperatives vertically developed?

Sub questions 2 and 3 are both researched by doing in-depth interviews with directly involved participants of six different energy cooperatives. For the completion and validation of the data, documents (such as information folders and founding acts) and the cooperative's website were used. By using multiple sources for the data collection, triangulation has been tried to conduct as good as possible. Hereby has to be noticed that the majority of the data is retrieved from the interview, as there often were no other sources with the specific data. The interviews were semi-structured (see the appendix for the interview guide).

As explained in paragraph 3.1, this research contains a qualitative multiple case study design. The cases chosen for this research are six local energy cooperatives. Six seemed a good number of cases for conducting a qualitative multiple case study, as more cases would be too large when trying to obtain in depth information. But less cases would be more difficult for conducting a valid comparison.

To obtain a representative set of results after the analysis has taken place, the cases were chosen at the hand of the following selection criteria:

1. Local energy cooperative (not a national wind cooperative)
2. Geographical distribution
3. Size of the cooperative
4. Age of cooperative
5. Realized projects and projects in development
6. Different activities (energy supply, solar power, wind power)

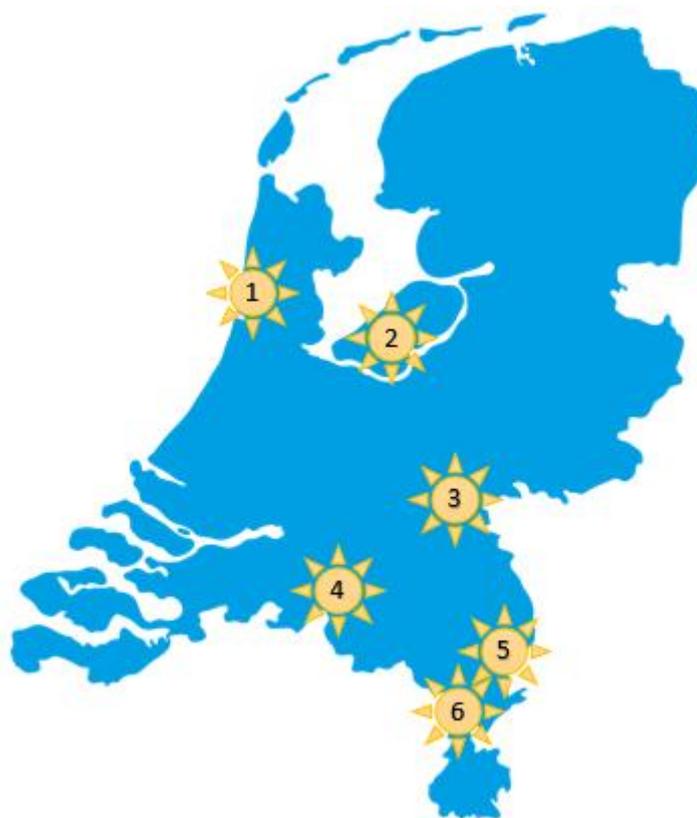


Figure 3.3 Geographical Distribution of Energy Cooperatives

25 different local energy cooperatives located in all provinces of The Netherlands were mailed and eventually the six energy cooperatives in table 3.3. responded that they were willing to participate in my research.

#	Energy Cooperatives	Area of activity	Respondents
1	Alkmaar Energie .U.A.	Municipality of Alkmaar, Noord-Holland	B. Duimel, Chairman
2	De Groene Reus U.A.	Province of Flevoland	J. Haanstra, Chairwoman
3	WindpowerNijmegen U.A.	Municipality of Nijmegen, Gelderland	A. Van Mameren, Active member
4	Energiefabriek013 U.A.	Municipality of Tilburg, Noord-Brabant	A. Van Den Boel, Board member C. Breure, Active member B. Tetteroo, Communication employee Spinderwind BV
5	Reindonk Energie U.A.	Municipality of Horst aan de Maas, Limburg	T. Van de Riet, Board member
6	Leudal Energie U.A.	Municipality of Leudal, Limburg	H. Geenen, Founder and advisor

Table 3.3 The six cases: Cooperatives, areas of activity and respondents

Sub question 4: What is the horizontal and vertical up-scaling potential of energy cooperatives?

To research the upscaling potential of each of the six local energy cooperatives, the factors presented in paragraph 2.7 are used. The answering of this sub question will be done with data retrieved from both the semi-structured interviews and a survey. Making this sub question a quantitative addition to an overall qualitative research. The respondents have filled in a survey in which they filled in how important they think the given factors are for the horizontal and vertical development of the cooperative and if the factor is sufficiently present in the cooperative. The survey is displayed in figure 3.2.

Factoren	Ontwikkeling energiecoöperatie					Invloed op regime					Voldoende aanwezig?	
	Niet	Bijna niet	Redelijk	Sterk	Zeer sterk	Niet	Bijna niet	Redelijk	Sterk	Zeer sterk	Niet	Wel
Sterk gedeelde visie	1	2	3	4	5	1	2	3	4	5	1	2
Groot aantal (actieve) leden	1	2	3	4	5	1	2	3	4	5	1	2
Betrokkenheid gemeenschap en lokale actoren	1	2	3	4	5	1	2	3	4	5	1	2
Leiderschap binnen coöperatie	1	2	3	4	5	1	2	3	4	5	1	2
Communicatie (intern en extern)	1	2	3	4	5	1	2	3	4	5	1	2
Iemand in de politiek die de coöperatie op de agenda zet	1	2	3	4	5	1	2	3	4	5	1	2
Subsidies	1	2	3	4	5	1	2	3	4	5	1	2
Samenwerken met andere coöperaties	1	2	3	4	5	1	2	3	4	5	1	2
Intrinsieke motivatie	1	2	3	4	5	1	2	3	4	5	1	2
Anders:	1	2	3	4	5	1	2	3	4	5	1	2
Anders:	1	2	3	4	5	1	2	3	4	5	1	2
Anders:	1	2	3	4	5	1	2	3	4	5	1	2

Figure 3.2 Survey

3.3 Annex Document

All the data obtained by the interviews with both the experts as the energy cooperative's respondents have been transliterated and clustered in a separate annex document. In this annex document the interview guide for the interviews with the respondents of the energy cooperatives is also present.

Chapter 4: Energy Cooperatives in The Netherlands

4.1 History of Cooperatives in The Netherlands

Cooperatives have a long history in The Netherlands. De Moor (2013) identified with her historical analysis on cooperatives in The Netherlands mainly three waves of cooperative growth. The first wave occurred in the late Middle Ages. During this time merchants united to have more influence on the local rulers and made price agreements to ensure that every member of the cooperative received a minimum income (ibid., 2013). The second wave occurred around 1880. During this period many new cooperatives emerged, aimed at collective production, insurances funds, and worker’s rights in trade unions. Also emerging in this period: *De Boerenleenbank*, the ancestor of the current *Rabobank* (ibid., 2013). Currently, De Moor (2013) observes a third wave, with the occurrence of many (smaller) cooperatives in The Netherlands (figure 4.1).

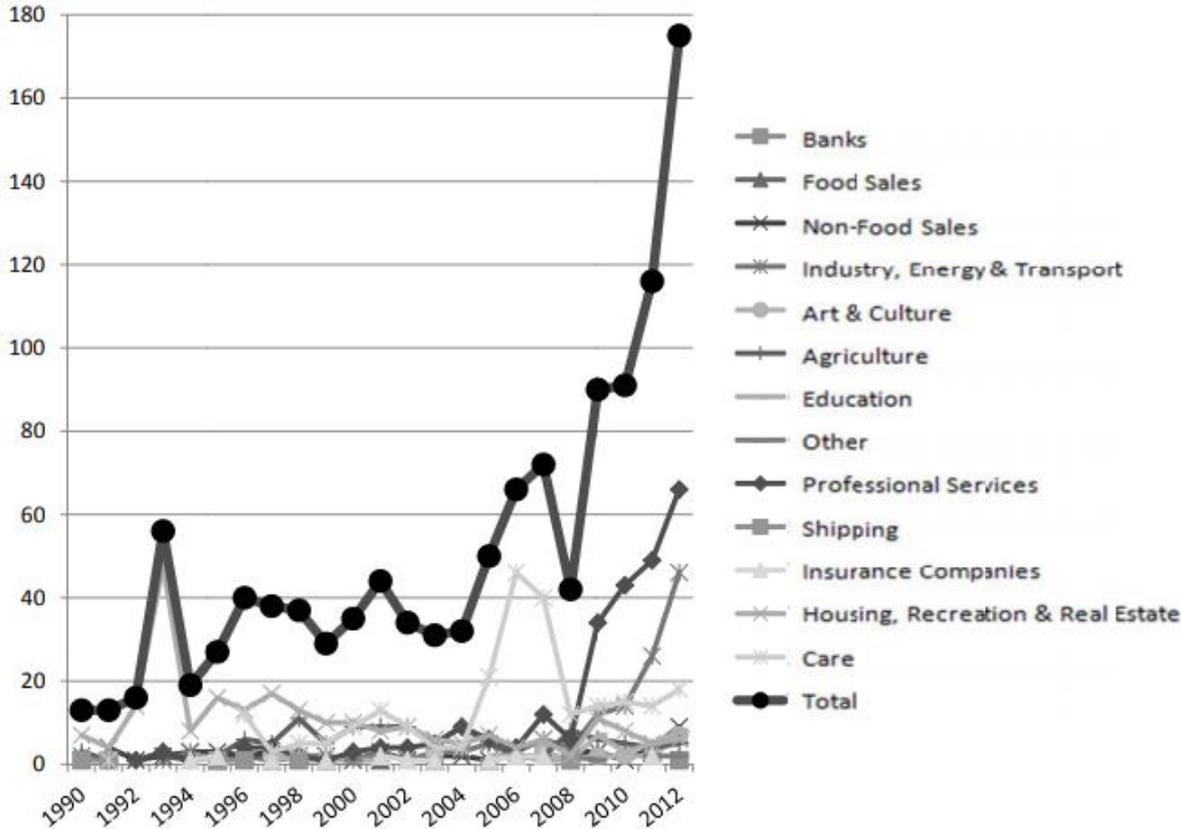


Figure 4.1 Growth of Cooperatives per Sector from 1990 to 2012 (De Moor, 2013).

These cooperatives are very diverse. Not only because of the different sectors they occur in but also because of other aspects, such as: the level of intertwining between cooperative and government; and the level of involvement of members (De Moor, 2013). Van Bekkum (2001) stresses these differences too, as he states: “Some cooperatives are small, while others are huge; some are focused

on commodity markets, while others are much more into value-added activities; some distribute their surpluses through higher prices, others pay market prices and distribute surpluses in the form of dividends; and so on.” (Van Bekkum, 2001, p.2).

For coping with these differences between cooperatives it is necessary to find the characteristics cooperatives do have in common. According to Van Bekkum (2001) these are the three principles: ‘user-owner’, ‘user-control’ and ‘user-benefit’. These principles are further elaborated upon by Nilsson (1999), explaining that the principles mean that members should always obtain the most benefits of the cooperative’s activities; that external ownership is allowed on the condition that this accomplishes more member-benefits and does certainly not hamper member’s benefits.

Nilsson (1999) comments on these principles, stating that the member should have the best possible benefits; that external ownership is permissible as long as this leads to member benefits being increased; and that similarly any control gained by these external investors should not impede member benefits

4.2 Horizontal Developments of Energy Cooperatives in The Netherlands

Energy cooperatives have made a significant growth during the past decades. Since 2005, more than 300 new energy cooperatives were founded in The Netherlands, focused on the collective buying of renewable energy and the self-production of renewable energy (De Moor, 2013). HIER opgewekt, an information platform for energy cooperatives, brings out a yearly report since 2015 to evaluate the scale of the energy cooperatives in The Netherlands. The report is named the ‘*Lokale Energie Monitor*’ (HIER opgewekt, 2017).

4.2.1 Different forms of cooperatives

In *De Lokale Energie Monitor* energy cooperatives are divided into four categories (HIER opgewekt, 2017):

Wind cooperatives:	Cooperatives primarily focused on wind energy production. These are also mostly the oldest energy cooperatives in The Netherlands.
Local energy cooperatives:	Cooperatives who have a specific area where they focus on (neighborhood, village, city or region). They have a broad goal, which can include aspects as: making the area more sustainable and enhancing the local economy and society by organizing activities in the field of energy saving, production and supply. They often realize more than one project.
Project cooperatives:	Cooperatives founded for the development of one specific project. Participants have no other interest in realizing other projects.
Cooperative’s cooperatives:	Collaborations between cooperatives.

4.2.2 Size of Energy Cooperatives in The Netherlands

The following two figures show respectively the growth of the total amount of energy cooperatives in The Netherlands (figure 4.4.2.a) and the amount of energy cooperatives have been newly founded every year (figure 4.4.2.b). Figure 4.4.2.c shows the distribution of energy cooperative over the twelve provinces. All cooperatives together produced enough energy in 2017 for 85.000 households in The Netherlands (HIER opgewekt, 2017).

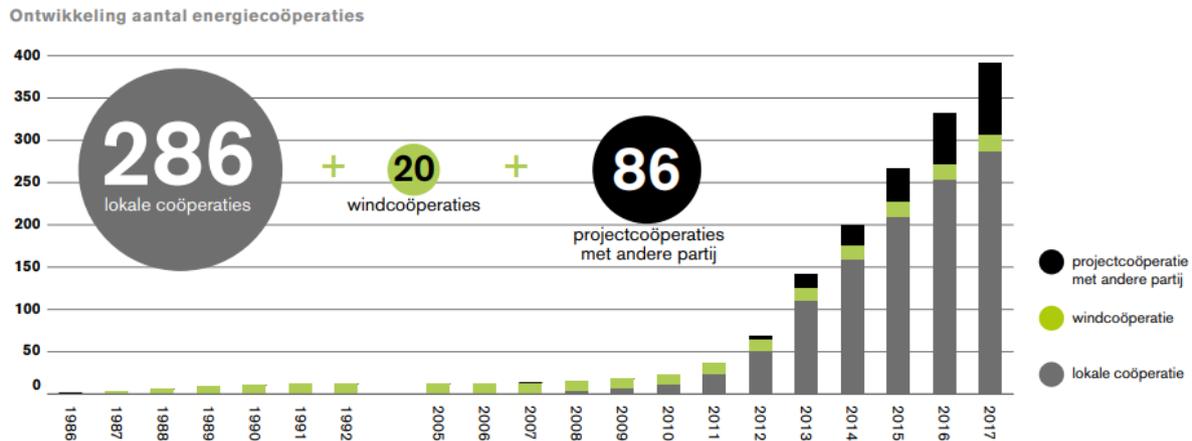


Figure 4.4.2.a: Amount of Energy Cooperatives in NL (Hier opgewekt, 2017)

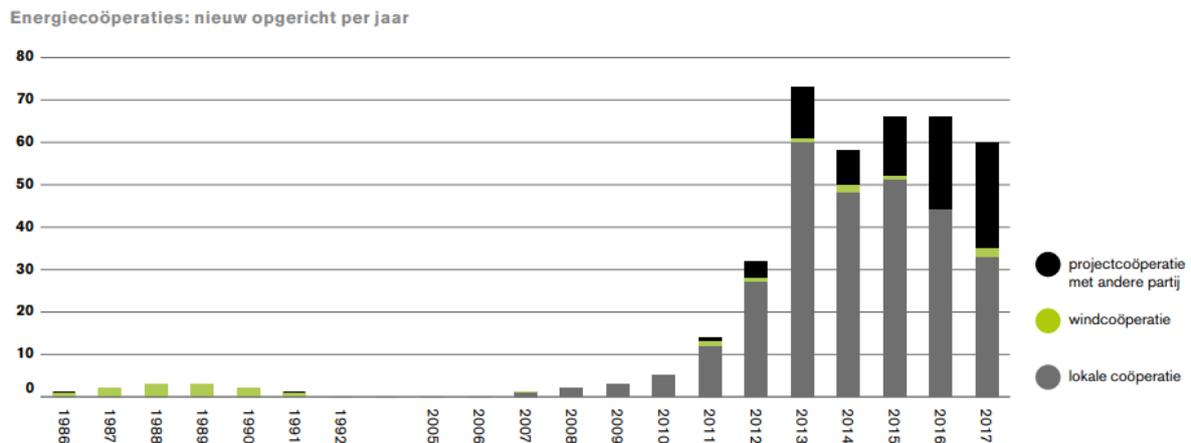


Figure 4.4.2.b: Newly founded Energy Cooperatives in NL every year (HIER opgewekt, 2017)



Figure 4.2.2.c. Geographical distribution of energy cooperatives

4.3 Regime for Energy Cooperatives in The Netherlands and Vertical Developments

In the theoretical framework the regime in which energy cooperatives exist in and are influenced by was explained at the hand of the four domains of Oteman et al. (2014). These domains contain the political domain, economical domain, legal domain and the socio-cultural domain. The following parts will go deeper into these different domains in The Netherlands.

4.3.1 Political domain

The national government of The Netherlands has introduced three regulations which are useful for energy cooperatives to produce energy. These regulations contain the *Salderingsregeling*, the *Regeling Verlaagd Tarief* and the SDE (*Stimuleringsregeling Duurzame Energie*) regulation (RVO, 2018). These regulations are explained in table 4.3.1. RVO states that they are investigating the possibilities of a fund for cooperatives, which in the future can be used for professional support for cooperative projects (RVO, 2018). This fund is not yet operational. Further, provinces and municipalities have often stimulating regulations for renewable energy production as well.

Regulation's name	Explanation
<i>Salderingsregeling</i>	Meant for small energy consumers. Produced renewable energy which will be returned to the grid, can be subtracted from the energy taken from the grid. Consumers will pay for the energy they used from the grid by their energy supplier, minus the energy they produced by themselves.
<i>Regeling Verlaagd Tarief</i> (Also known as the <i>Postcoderoosregeling</i>)	This regulation is meant for energy cooperatives, producing renewable energy. Participants in a <i>Postcoderoos</i> project, are free from energy taxes for the amount of energy they are producing within the project. Only citizens living in the zip code areas surrounding the project's location, are obliged to participate.
<i>Stimuleringsregeling Duurzame Energie (SDE)</i>	This regulation is meant for the stimulation of renewable energy production. Two application periods exist every year, in which everyone planning on producing renewable energy can apply for this subsidy. The subsidy involves a guaranteed base-price that producers receive for the selling of their energy.

Table 4.3.1: Regulations by the national government

According to Schwencke (pers. com., 20-06-18) cooperatives are continually trying to influence the political domain. They have united in ODE Centraal, a collaboration between local energy cooperatives. Currently, with the climate negotiations, ODE Centraal is one of the main actors in this debate. They have a strong claim concerning wind energy on land, which contains: If wind energy is produced on land, ODE Centraal wants this for 50% being produced cooperatively (Schwencke, pers. com., 20-06-18). Schwencke explains that since energy cooperatives started growing (around 2007), they tried to invite themselves to the table of all kind of negotiations on related policies. The

Postcoderoosregeling for instance is also something cooperatives have firmly lobbied for (pers. com., 20-06-18). Nowadays, Schwencke thinks that energy cooperatives are being invited at forehand for relating negotiations. Also, on the local level energy cooperatives are increasingly involved in the making of sustainability policies (pers. com., 20-06-18). Also, more concrete collaborations can be made possible on the municipal level. Swinckels (pers. com., 28-06-18) states that the municipalities could take a supportive role by granting the roof surfaces of municipal buildings, which is a form of collaboration that is currently in development.

4.3.2 Economical domain

Cooperatives main goal is not to make profit; however, they still need to have a robust business case for the realization of their projects. A good business case is essential as the continued existence of the cooperative relies on this. Besides, the cooperative works with other people's investments, so careful and thorough financial plans are required (Schwencke, pers. com., 20-06-18). For making citizens participate in projects it is necessary to offer an acceptable rate of return on their investment. Due to the low rate of interest on savings by the bank, energy cooperatives can use this as an incentive for investing in renewable energy, which offers a higher rate of return. Currently, energy cooperatives rely heavily on the subsidy regulations the national government offers, such as the *postcoderoosregeling* and the SDE regulation (Schwencke, pers. com., 20-06-18).

Besides the internal financial affairs, the cooperative is also influenced by market forces. Especially wind energy is a very hard market, Schwencke states, as there is limited land available and there often comes a lot of protest from people living nearby. The competitive position energy cooperatives have towards large investors, is their localness. When profits flow back into the community, they may overcome protest from the surrounding neighborhoods of a proposed wind park. On the other hand, larger investors have a better competitive competition financially. Swinckels explains that banks are not eager to invest in energy cooperatives in their startup phase (pers. com., 28-06-18). Concerning energy supply, energy cooperatives are not able to do this without collaboration with an existing energy supplier. Often this is only a contract, but relatively new energy suppliers, such as Greenchoice, do also help cooperatives with knowledge and advices (Schwencke, pers. com., 20-06-18).

According to Schwencke, the fact that almost every energy supplier offers green energy these days, is correlated to the growth of energy cooperatives. The 'rumoring' and visibility of energy cooperatives definitely contributed to this, as they proofed that there is a market for green energy (pers. com., 20-06-18).

4.3.3 Legal Domain

In the legal domain there are many obstacles energy cooperatives face, Schwencke states (pers. com., 20-06-18). For instance, with the realization of a *postcoderoos* regulated solar roof. Most of the cases this roof is not owned by the cooperative, therefore it is necessary to have a '*recht van opstal*', meaning that it is contractually arranged that the solar installation will remain the property of the cooperative. Also, the grid owner does not allow for the installation's produced energy to make use of the same connection as the owner of the building. These are all small things of which much jurisprudence is not available, making it difficult to be entirely sure for cooperatives if they are doing it right (Schwencke, pers. com., 20-06-18). Van der Zanden argues that such contracts and fiscal requirements obligate local energy cooperatives to hire experts (pers. com., 27-06-18)

Regarding wind energy, the major part of the process of realizing a project are the legal procedures. Permit applications, zoning plan changes and periods for official protest, take a lot of time. It depends on the willingness of the municipality and the support from the community how long the

legal procedures will take. Having a good relationship with the municipality is favorable for a positive outcome of these procedures (Van der Zanden, pers. com., 27-06-18)

Energy cooperatives are influencing the legal domain by constantly asking questions by the tax department or municipality about the obstacles they face. As energy cooperatives are very practical, they just want to realize projects, they will try to tackle all these obstacles. By doing so the problems will become clearer for the authorities (Schwencke, pers. com., 20-06-18).

4.3.4 Socio cultural domain

According to Schwencke there has not yet been conducted a lot of research on the influence energy cooperatives have on the public perception towards renewable energy (pers. com., 20-06-18). The fact that many (solar) projects can be developed, and many citizens participate in these projects, shows that there is a lot of support for energy cooperatives. On the other hand, there are currently 60.000 members of local energy cooperatives in The Netherlands, which is a relatively small percentage of the total population of The Netherlands (Schwencke, pers. com., 20-06-18). According to Van der Zanden, the amount of people within the area of the energy cooperative who are becoming a member is most often not that high, which is problematic for the cooperative's development (pers. com., 27-06-18). The rate of participation in projects, does also depend on the region. Schwencke explains that in areas with a lower income per household, it is more difficult to realize solar projects for instance. Participating is often able for €300,- but this cannot be missed by everyone (pers. com., 20-06-18).

Regarding wind energy on land, there are cooperative projects which went easily through the legal procedures, but there are also projects cancelled. It is hard to say if energy cooperatives have a significant positive effect on the legal procedure (Schwencke, pers. com., 20-06-18). Besides, when a cooperative has put a lot of effort in organizing meetings and discussions about a proposed wind park, and the community eventually decides to not realize this project, this should also be a good outcome (Schwencke, pers. com., 20-06-18).

Energy cooperatives do have an influence on the socio-cultural regime, Schwencke thinks, as they organize many discussions about renewable energy and talk a lot about the advantages of it. Even if it eventually does not lead to the realization of a project (pers. com., 20-06-18).

Chapter 5: Multiple Case Study: The Story of Six Local Energy Cooperatives

This chapter contains an elaborate analysis on each of the six local energy cooperatives in the multiple case study of this research. The categorization is as follows:

Case 1 – Leudal Energie

Case 2 – Reindonk Energie

Case 3 – Energiefabriek013

Case 4 – WindpowerNijmegen

Case 5 – Alkmaar Energie

Case 6 – De Groene Reus.

5.1 Case 1 – Leudal Energie

How has Leudal Energie horizontally & vertically developed and what is its upscaling potential?

5.1.1 The story of Leudal Energie: *Horizontal development*

The founding act of Leudal Energie was signed on May 27 in 2013 in Neer, municipality of Leudal.



Figure 5.1. Symbolic placement of the first solar panel on an elementary school⁴

⁴ <https://leudalenergie.nl/over-leudal-energie/meest-gestelde-vragen/19-faq-overstappen/83-kan-ik-advies-krijgen-over-het-overstappen>

5.1.1.1 The vision

One of the founders of Leudal Energie had significant experience in producing large-scale renewable energy, as he previously was involved in developing a wind park. This wind park “*Windpark Neer*” was realized in 2012 and initially consisted of 4 wind turbines. At that moment the idea of establishing a local energy cooperative was already on the table, but eventually the wind park was realized with several local investors (Geenen, pers. com., 29-06-18). In 2015 a fifth wind turbine was realized: “*De Coöperwiek*”. This wind turbine was realized by *Zuidenwind*, a regional wind energy cooperative. However, the investors of the four initial wind turbines decided to sell the wind turbines to Japanese investors in 2016, doing exactly the opposite of how the founders of Leudal Energie think wind energy on land should be organized. Since 2016 the profits of *Windpark Neer* are going to Tokyo instead of staying within the local community⁵. This directly opposes with the vision of Leudal Energie, which is:

“Leudal Energie wants to generate and deliver local, renewable energy together with the citizens of Leudal. This energy will stay the property of the citizens, organized via Leudal Energie” (Leudal Energie, 2016, p. 3).

5.1.1.2 The projects

Since the founding of Leudal Energie in 2013 several large projects are noteworthy, which can be divided into four categories: 1) energy coaches, 2) energy supply, 3) solar energy and 4) wind energy. These categories will be further explained in the coming parts.

Energy coaches

The initial activities of Leudal Energie were about energy saving of citizens of Leudal and stimulating citizens to install solar panels on their own roofs. To achieve these desires Leudal Energie makes use of so called energy coaches. In the early days of Leudal Energie, citizens of Leudal were able to become a member of the cooperative by making a single payment of €50,-. Then, every member had the opportunity to get a free energy scan of their house. Nowadays, to become a member of energy cooperative Leudal Energie an annual fee of €10,- is required instead of the single payment at the start of a membership. For members to obtain an energy scan of their house, it is required for them to pay another €50,-. Such an energy scan originally costs €250,-, so members get a significant cost reduce (Geenen, pers. com., 29-06-2018). This energy scan consists of an overview including power consumption, potential of solar power on the roof, payback period and insulation possibilities. The energy coaches of Leudal Energie are volunteers, but they do get compensated for the time (four hours) they are occupied for an energy scan.

Energy supply

Since 2015 Leudal Energie is also a supplier of energy. To do so, they act together with SAMEN OM, an energy supplier consisting out of 35 local energy cooperatives. All their customers are obtained via local energy cooperatives.

⁵ https://www.zuidenwind.org/?page_id=64

Solar energy

Concerning solar energy, Leudal Energie stimulated the citizens of Leudal to install solar panels on their roofs. Leudal Energie selected installers based on the price/quality ratio. When choosing for those installers, Leudal Energie received a small fee.

The first larger solar projects where two solar panel constructions on the two elementary schools in Leudal, realized in 2015. On both the elementary schools a construction of 240 solar panels was created. These projects costed €160.000,- in total, invested by the energy cooperative Leudal Energie. This means that the solar installations are Leudal Energie's properties and the school rents them from the cooperative. The amount of €160.000 was obtained by three types of incomes (Geenen, pers. com., 29-06-2018):

1. Subsidies – The realization was possible because of the national SDE subsidy, provincial and municipal subsidies and contributions of the schools and the Rabobank.
2. A loan – Besides the subsidies Leudal Energie obtained a loan from the Rabobank of €50.000,- for these solar panel constructions on the schools.
3. Investments – Members of Leudal Energie were able to buy certificates of €250,- a piece, with a maximum of €5.000,-. This investment can best be explained as a temporary loan from the members to the cooperative. Members obtain an annual rate of return of 3-4% for five years and at the end of this period members will get their investment back. The cooperative currently sets aside for this reimbursement in 2020

A second solar energy project is currently in pre-development. By making use of the "*regeling verlaagd tarief (=Postcoderoosregeling)*" the roof of the town hall in Heythuysen (one of the villages in municipality of Leudal) will be used for the installation of solar panels. Members of Leudal Energie can buy their own panels, for €325,- a piece, which will be installed on the municipal roof by Leudal Energie. For a period of 15 years, investing members will obtain €0,15 per kWh. Leudal Energie is now looking for investing members and aims for a total of 250 solar panels.

Wind energy

Leudal Energie wants to produce, in contrast to *Windpark Neer*, wind energy of which not only the production will be in Leudal, but also the profits will stay in Leudal (Geenen, pers. com., 29-06-2018). Therefore, the project "*De Kookepan*" is currently being pre-developed. Three wind turbines will be cooperatively developed near Neer, one of the villages of the municipality of Leudal. The expected costs of wind park the *Kookepan* are €14.000.000,-. The regional Rabobank is willing to give a loan, however Leudal Energie needs to invest 15% themselves. To receive this amount (over €2.000.000,-) Leudal Energie is actively campaigning for *De Kookepan* and searching for new members. Their current members already collected €700.000,- to invest. Investing in *De Kookepan* is able from a minimum of €250,-. This investment can best be explained as an obligation. After the wind park is realized, members obtain a rate of return of 4-6%. Within 5, 10 or 15 years, members will get the amount they invested back from the cooperative. In October 2018 an SDE application will be done to receive subsidy on this project too.

5.1.1.3 The organization

The board of Leudal Energie consists out of 5 people. Since the origin of Leudal Energie in 2013 two of the initial board members have made place for two new board members. The board consists out of the chairman, a treasurer, a secretary and two regular board members. Beside the board, there are circa 15 active members who have voluntary functions. These members are divided into several working groups. Each working group has a board member in it and works on a specific project. According to Geenen (pers. com., 29-06-18) board members are occupied by one day a week for Leudal Energie activities. Once a month a board meeting is organized and besides there are several meetings, depending on the activities of the cooperative.

Leudal Energie has an official office in a business center consisting of 20 companies. One member of the board has his own company there and the facilities of this business are now also used for Leudal Energie. This means that the counter assistants of this company also receive visitors for Leudal Energie, make appointments of customers with board members and even answer the phone with "Leudal Energie" if the call is directed to Leudal Energie instead of to the company. Besides, there is a meeting room which is being used by several working groups multiple times a week. For these facilities Leudal Energie pays this company.

The number of members of Leudal Energie is currently expanding fast due to the active search for members for the realization of *De Kookepan* wind park. In June 2018, the first month of the member acquisition, the amount of members has grown from 250 to slightly over 300 members (Geenen, pers. com., 29-06-2018).

Two to three times a year there is a general member meeting. Depending on the subjects of the meeting, there will be circa 40 to 50 members present on the meeting. In the fall of 2018 a special member meeting will be held on the subject of the Kookepan, Geenen (Pers. com., 29-06-2018) expects all the investors will be present, which should result in a total of over 100 members on that particular meeting. As the board members are responsible for the daily decisions, the general member meeting is the highest decision organ of the cooperative when it comes to large decisions and vision-making.

As mentioned earlier, the energy coaches are volunteers who get compensated for the time they spend working on the energy scan. This is circa 4 hours per energy scan and the compensation is €35,-. Besides, two independent contractors (*ZZP'ers*) work for Leudal Energie as project leaders for wind park *De Kookepan*. Both are paid per hour for the work they do for the wind park.

5.1.1.4 The process of *De Kookepan*

One of the objectives of the board of Leudal Energie is the realization of a local, cooperative wind park: *De Kookepan*. The first discussions about a cooperative wind park were held already in 2015. The board of Leudal Energie realized that if they wanted *De Kookepan* to be a success, they should heavily involve the local residents. In 2016 a suitable location was chosen together with the municipality at the hand of the *Provinciaal Omgevingsplan Limburg (POL)*. In this plan several suitable locations for wind energy were included. When the assumed most suitable location was chosen, four meetings were organized with the land owners of this area. The proposed area is delineated in figure 5.1.1.4 and is in possession by several different land owners.



Figure 5.1.1.4 Chosen destination for wind park *De Kookepan*.

After four meetings with all the land owners, every land owner of the opposed area has signed an agreement. At that time, it was not yet certain which landowner would eventually get a turbine on his land. Agreed upon in the agreement was that every landowner would receive a fee and that the landowners eventually ending up with a turbine on their land would receive a higher fee. In total €100.000 is reserved for the land owners. Half of this amount is determined for the landowners who will receive a turbine on their land. The other half will be divided over the other land owners. At the same time all the people living near the proposed area were notified about the plans for the wind park. Leudal Energie tries to compensate the citizens living near by the turbines in three ways. First, a 'surroundings fund' will be created. In this fund €1,- per MWh will be put in, which is an amount of €25.000,- to €30.000,-. The idea of this fund is that the people living nearby can use this for sustainable projects of themselves. Currently a working group, with Leudal Energie members and people living nearby, is thinking about the preconditions of subsidy applications for this fund. Second, Leudal Energie proposed that people within 750 meters from the turbines may have their houses insulated on the cooperative's costs. Third, an annual compensation for people depending on the distance they live from the turbines will be realized. People living within 500 meters will receive €1.000,- per year, gradually declining to a compensation of €250,- per year for people living within 900-1000 meters from the turbines. Besides these compensations for land owners and people living nearby, Leudal Energie is thinking about a €100.000 injection for nature and landscape improvements.

The application for the building permit has been published and it received two *zienswijzen*. One particularly positive from a local environmental association, who asked to pay attention to the bat population in the area. The second *zienswijze* is from three citizens, living within a distance of almost 1000 meters from the turbines. According to Geenen (pers. com., 29-06-2018) they do not have legal rights to claim the blocking of the wind park. He therefore thinks they are only able to slow the process down but are not able to stop it. In July 2018 the municipal council decided that realization of *De Kookepan* will be approved.

In contrast with the two *zienswijzen* against wind park *De Kookepan*, several people living nearby the proposed wind turbines have become members of Leudal Energie. They thought the rates of return were favorable and the 'surroundings fund' offers possibilities for future investments in sustainable improvements of their houses. According to Geenen (Pers. com., 29-06-2018) this took some convincing efforts, but eventually most people saw the benefits of becoming members.

5.1.2 The story of Leudal Energie: *vertical development*

The vertical development of Leudal Energie will be explained at the hand of the four domains presented by Oteman et al. (2014).

Political domain

Since the start of Leudal Energie in 2013, the board members and the municipality of Leudal were heavily involved with each other. In the first year the civil servant '*Duurzaamheid*' attended all the board meetings of Leudal Energie. According to Geenen (Pers. com., 29-06-2018) this was very beneficial in the beginning, as it provided both information as financial resources in the form of small subsidies and the payment for the first information folder of Leudal Energie addressed to citizens of Leudal. Geenen (pers. com., 29-06-2018) states that this was a significant privilege, as many municipalities in Limburg are not on this level and are in his opinion not yet prepared for the near future obligations in the field of sustainability. The cooperation between the municipality and the cooperative comes with mutual advantages, as the cooperative Leudal Energie makes work of providing info to the citizens and aims for the creation of support.

As the support from the municipality was strong from the beginning, the influence from Leudal Energie on the municipality is notable too. The prospect of Geenen (pers. com., 29-06-2018) at the time of the interview was that the chance that the municipal council votes in favor of *De Kookepan* is 99,99% (and he turned out to be right). This shows the influence of the cooperative in Leudal, especially when comparing it to the wind park which has recently being rejected by the municipal council in Venlo (this will be elaborated upon in the chapter of Reindonk Energie).

In 2015 4 local energy cooperatives together, of whom Leudal Energie, founded the regional subdivision of REScoop NL, named REScoop Limburg. This collaboration has resulted in a regional coordination within the field of wind energy. Nowadays REScoop Limburg consists of six local energy cooperatives and two aspirant members. The municipalities where these cooperatives are housed, together with the province of Limburg decided that wind energy needs to be coordinated in Midden-Limburg and more important for the case of cooperatives: a significant part of wind energy on land must be developed cooperatively. This means that for the future wind parks, 50% to 100% must become property of the energy cooperatives in the region.

Economical domain

Characteristic for the exact opposite of the intentions of local energy cooperatives is the selling of *Windpark Neer* to foreign investors, resulting in a cash flow out of the community instead of local profits. This led to the proposed plans for wind park *De Kookepan*, as previously explained. An important aspect of the economical domain for the success of local energy cooperatives is the availability of investors. Besides the 15% of member inputs, the regional Rabobank invests the other 85%. According to Geenen (pers. com., 29-06-2018) wind parks are relatively solid investments so finding a bank for this investment was not hard. However, the cooperative nature of Leudal Energie has resulted in previous collaborations with the regional Rabobank. It was harder to get small loans for small projects, as banks were not eager to invest in many smaller projects (of €50.000,- for solar panels for instance). The cooperative was able to convince the Rabobank of its purpose and because the Rabobank thought it were nice projects they agreed upon helping Leudal Energie several times. It resulted in a partnership agreement in which the Rabobank affirmed to provide for three years a subsidy of €25.000,- per year for concrete projects of Leudal Energie.

A second market player who works together with Leudal Energie is SAMEN OM, a green energy supplier consisting out of 35 local energy cooperatives. By working together with this market player instead of a conventional market player, Leudal Energie lays the focus more on the local and green aspect of the produced energy. Which is a shift which is also nationally observed as a result of the growing of local energy cooperatives (Schwencke, pers. com., 20-06-2018).

A last advantage that cooperatives have in the economical domain opposed to regular investors is the fact that energy cooperatives can aim for less profit that conventional developers aim for (Geenen, pers. com., 29-06-2018). Conventional investors most of the time desire higher initial profits than cooperatives need.

Legal domain

In the legal domain Leudal Energie has not yet experienced mayor obstacles. For the solar energy projects on the elementary schools, no permit was needed. Both the solar project on the municipality's roof and *De Kookepan* have not yet arrived in the permit procedures. For *De Kookepan* there are now two *zienswijzen* but they do not expect this will result in the stopping of the project, as Leudal Energie has taken into consideration the legal aspects they have to abide by. Thereby there have not yet been influences on the legal domain.

Socio-cultural

With the realization of the solar projects on the elementary schools Leudal Energie has set up an educational program too. Lessons on sustainability and the necessity of renewable energy were provided to the apprentices. Also, the visibility of the e-coaches and the growing number of solar panels on the roofs of houses in Leudal help with setting sustainability on the daily agendas of citizens.

Besides these general influences on the problem perception of citizens regarding sustainable energy, the impact on the socio-cultural domain becomes concrete in the amount of rejection towards the wind park *De Kookepan*. This has been limited to the two *zienswijzen*, of which only one is from people living nearby, which are against the wind turbines in the landscape. According to Geenen (pers. com., 29-06-2018) the fact that these wind turbnes are realized by a cooperative generates trust, as the people involved are all living in the same municipality. Larger developers are currently trying to respond to this local aspect of energy, but when people from the *Randstad* would present their 'local' plans here, this would not have the same effect than that the cooperative Leudal Energie has, Geenen states (pers. com. 29-06-2018).

5.2 Case 2 – Reindonk Energie

How has Reindonk Energie horizontally & vertically developed and what is its upscaling potential?

5.2.1 The story of Reindonk Energie: *Horizontal development*

The founding act of Reindonk Energie was signed on November 13 in 2015 in Horst aan de Maas, municipality of Horst aan de Maas.



Figure 5.2 Excursion of Reindonk Energie and Samenstroom to a wind park in Germany⁶

⁶ <https://samen-stroom.nl/wat-betekent-dat-een-windmolen-zo-dichtbij-een-bezoek-2/>

5.2.1.1 The vision

The first steps of the foundation of Reindonk Energie was in 2013, when four socially involved men of 50 years and older sat together for the first time and discussed, while enjoying a beer, the possibilities of enhancing sustainability in Horst aan de Maas. Preferably together with the citizens of Horst aan de Maas (Van de Riet, pers. com., 21-06-18). Two years later the matter became official with the foundation of the energy cooperative Reindonk Energie U.A. The mission of Reindonk Energie contains⁷:

“Creating local solutions for global issues together with citizens and local companies and organizations. Making Horst aan de Maas energy neutral with the belief that energy is a regional product.” (Reindonk Energie, 2018)

According to Van de Riet (pers. com, 21-06-18) this vision of Reindonk Energie comes down to 3 specific aspects:

1. The production of sustainable energy.
2. The idea of energy being a regional product, just like fruit or beer. The idea of *van ós* (= region's dialect for: from us) appeals to people. Furthermore, if energy is produced within the region, the profits should stay within the region too.
3. The saving of energy.

If the local production of sustainable energy and the saving of energy will take place according to the plan, the break-even point will be in 2040. That year is Reindonk Energie's goal of Horst aan de Maas being completely energy neutral⁸.

5.2.1.2 The projects

Energy supply

Reindonk Energie has a contract with Greenchoice for the supply of energy. Via Greenchoice people can obtain energy from Reindonk Energie and the cooperative gets a fee per customer they deliver to Greenchoice. Van de Riet states that Greenchoice acts intelligent by really stressing the local aspect of the energy, as they also have apps to show where the energy comes from and how much energy is produced there (pers. com., 21-06-18).

Solar energy

Regarding the production of solar energy within Horst aan de Maas, Reindonk Energie is still in the exploring phase. At this moment the cooperative is considering four options for the production of solar energy. These options concern the roofs of community buildings and schools. One project is getting more concrete shapes and concerns the roof of a sports hall in Meerlo, a village in Horst aan de Maas. The cooperative wants to use this roof for a *postcoderoos* project. Households and companies located in the surrounding zip code areas of this sports hall are invited to join and an information night was held in November 2017. Van de Riet explains that this is a difficult project and that the *postcoderoosregeling* is hard to explain to people (pers. com., 21-06-18). Moreover, because there are not many examples yet. In Limburg there is only one *postcoderoos* project realized, in Maastricht. Together with Greenchoice, Reindonk Energie is still puzzling about how to achieve a *postcoderoos* project which is both frontrunning and offering a decent profit to the participants (Van de Riet, pers. com., 21-06-18). Besides solar roofs, Reindonk Energie is also open for the

⁷ <http://reindonkenergie.nl/visie/wat-wij-willen/>

⁸ <http://www.hallohorstaandemaas.nl/Energie--201739040>

development of solar fields. Therefore, the cooperative and the municipality are in dialogue about the possibilities of new locations.

Wind energy

Reindonk Energie wants to produce sustainable energy within Horst aan de Maas. To do so, the cooperative would like to realize wind mills themselves. However, the momentum is by far not perfect for the cooperative to think about developing wind mills (Van de Riet, pers. com., 21-06-18). In Venlo, the neighboring municipality of Horst aan de Maas, there are plans for the realization of a wind park parallel to the railway Venlo-Eindhoven with 9 large wind mills. This wind park will be named: Windpark Greenport Venlo. This wind park is however very controversial in the region and caused a lot of debates within the public, the media and the city councils of Horst aan de Maas and Venlo (Van de Riet, pers. com., 21-06-18). The province of Limburg is a large advocator for the wind park as it will immediately take care of 33% of the sustainable energy objectives of the province, which contain 95,5 MW by 2020 (Etriplus, 2017). The developer of this project is Etriplus, a company who helps the companies in Greenport Venlo (a site where agricultural, logistic, trade and food companies are located) with getting their energy needs more sustainable. The proposed wind park consists out of 9 wind mills of which 6 are 140 meters high with blades of 71 meters and 3 wind mills which are also 140 meters high but have blades of 61 meters as these will be placed closer to each other. The wind park will have a minimal power of 30 MW, which produces enough energy for 28.000 households (equal to 60% of the households in Venlo) (Etriplus, 2017).



Figure 5.2.1.2.a Proposed wind park⁹

⁹ <http://www.etriplus.nl/hoe-gaat-het-windpark-eruit-zien/>

For Reindonk Energie to still being able to produce wind energy they decided trying to participate in Windpark Greenport Venlo. The wind mills will be located on the border of Venlo and Horst aan de Maas and will therefore be very visible from both areas too. Together with Samenstroom, the energy cooperative from Venlo, Reindonk Energie went to developer Etriplus. According to Van de Riet, the two cooperatives boldly knocked on the door and said: “*We are the citizens of Horst aan de Maas and Venlo and if your wind park is going to be realized here, we want to buy two of your wind turbines*” (pers. com., 21-06-18). At first Etriplus thought of the energy cooperatives as people who wanted to make some quick money, but eventually they realized that public support is very necessary to realize this project and they decided to collaborate.

This collaboration is mainly focused on the organization of the social and financial participation of the citizens, local organizations and local companies in the wind park. By stimulating local participation Etriplus, Samenstroom and Reindonk Energie want to create local support and acceptance, and for the region to share in the profits of Windpark Greenport¹⁰.

How the participation will be shaped exactly is still under considerations by the three parties and will be ready and made public when the realization of Windpark Greenport Venlo is irrevocable. At this moment it is already determined that the participation will be twofold. The first aspect is a ‘livability fund’ (Etriplus, 2017). This fund will contain €600.000,- which will be divided over the two cooperatives. Both Reindonk Energie and Samenstroom will then be responsible for a suitable and fair use of €300.000 within the neighborhoods directly near the wind park (Etriplus, 2017). These neighborhoods are Zeesweg (and surroundings), Grubbenvorsterweg-Sevenumseweg, Californie and Heierhoeve, all located in Hors aan de Maas. And Boekend and Klingerberg in Venlo¹⁰. Van de Riet thinks it would be most desirable not to set up too many restrictions for this fund. A play ground or a solar roof for the local football club would be perfect ideas, although a street barbecue would be unacceptable (pers. com., 21-06-18). The preconditions of this fund need to be clarified in the coming months.



Figure 5.1.2.1.b Surrounding areas¹⁰

The second aspect of the participation involves the investing in the wind park by citizens and local companies. This aspect is called *Molenaarschap*. The exact plan of how people can participate and what the rate of interest will be has not yet been determined but the draft ideas are completed. One of the wind mills will be divided into 3.000 participation shares of €250,- per piece. Every participant who buys one or more of these participations becomes a *Molenaar* and will be an owner of this wind

¹⁰ <http://www.etriplus.nl/wp-content/uploads/2017/10/Presentatie-Inloopavond-Participatie-Windpark-Greenport-Venlo.pdf>

mill. Anybody who would like to participate is welcome, also people from the rest of The Netherlands. However, it depends on the distance from address to wind park how high the interest on the share of the wind mill will be. Participants who live in Gemeente Horst aan de Maas or Venlo will receive the highest interest rates on their share of €250,-. Participants of the region Noord-Limburg will receive a slightly lower rate of return and participants from the rest of The Netherlands will receive the lowest rate of return. The precise interests on a share of €250,- still has to be decided upon.

5.2.1.3 The organization

The board of Reindonk Energie exists out of 4 people, which were also the founders in 2015. These are all voluntary functions and contain a chairman, a treasurer, a secretary and a general board member. Besides the board there are no specific working groups. There are however some members who would like to help out with activities. According to Van de Riet (pers. com., 21-06-18) this is helpful, but these activities also have to be very strict and concrete tasks. In fact, the board is looking for active members who are willing to spend time in thinking along with the board and be more involved in the development of Reindonk Energie. Van de Riet explains that three of the board members still have a fulltime job and only one is retired (pers. com., 21-06-18). The three board members who are still working spend circa 10 to 12 hours in de week and the retiree might be spending even more. Every Friday morning the board has a meeting in which they work out the strategy of Reindonk Energie and reflect on the progress they made that week. These meetings are held at home as Reindonk Energie does not have an office they can use.

Reindonk Energie has around the 70 members. At this moment these members are for the greater part friends and family. However, Van de Riet explains, the first years of Reindonk Energie were mostly used for obtaining experience in the field of renewable energy and forming the cooperative and its vision and strategy. Now, the cooperative intends to focus more on enlarging its number of members (pers. com., 21-06-18). Up till now, two general meetings were held by Reindonk Energie, of which the first was very well visited and the second time, a number of 30 members attended the meeting. At first the board was a little worried that people with the intention to stop large scale sustainable energy production plans, but this did turn out to be not the case.

To become a member of the energy cooperative Reindonk Energie a yearly contribution of €10,- is required. Besides this income from the members, the cooperative has a second source of income which is they earn by sharing their expertise with other parties, such as the municipality, housing cooperatives or other companies in Horst aan de Maas. The information the cooperative offers is mainly based on energy savings for those parties. For these activities the cooperative at first gained circa €30,- but this has already increased to €90,- by now (Van de Riet, pers. com., 21-06-18).

5.2.1.4 The process of Windpark Greenport Venlo

The province of Limburg must produce 95,5 MW wind energy by 2020, to contribute to the national goals of producing 6.000 MW wind energy on land (Etriplus, 2017). At the end of 2017 Limburg has only 12,3 MW wind energy on land realized (RVO, 2018). For reaching the goal of 95,5 MW, the realization of Windpark Greenport Venlo is an important step. The location of the wind park was already chosen in 2012 by the province of Limburg and the municipalities of Venlo and Horst aan de Maas (Etriplus, 2017). In 2016 the province of Limburg contacted the energy developing company Etriplus for the development of the wind park. An intention agreement to produce wind energy within this area was concluded by the province, both municipalities and Etriplus. Also, a research for the consequences for the surroundings and environment was conducted in a MER. In July 2017 a permit application was submitted to the municipality of Venlo (Etriplus, 2017).

During this period both Reindonk Energie and Samenstroom spent a lot of effort in convincing the city council of the participation aspects of the Windpark Greenport Venlo and the additional benefits this has for the region. They talked to alderman, gave a presentation to the City Council and visited all the different political parties of the City Council (Van de Riet, pers. com., 21-06-18). Despite the efforts of the cooperatives the City Council was still divided about the permit application for the wind park and the decision was postponed. Besides this delay, the cooperatives had the feeling that the City Council understands the local participation aspects of the wind park better after this meeting. Eventually, the City Council of Venlo still decided on March 12, 2018 to not approve the permit application of Etriplus on the ground of lack of support from the surrounding communities and the fear for health issues as a result of noise nuisance^{11,12}.

Because of the importance of this wind park for the goals of the Province of Limburg, the province overruled the municipality of Venlo with a *Provinciaal Inpassingsplan* (PIP) (Van de Riet, pers. com., 12-06-18). In the fall of 2018 *Provinciale Staten* will decide if the wind park can be realized, the PIP is currently following the legal procedure in which opponents can protest. In an open letter from Breukelman, the director of Etriplus, addressed to *Provinciale Staten* he stresses the importance of the wind park and clarifies the fact that the concerns about safety and support are unfounded¹³. Breukelman explains that the safety and nuisance are investigated in the MER and are staying below the national limits. According to Breukelman, every similar case which went to the Council of State in The Netherlands turned out in favor of the realization of that wind park. The opposition is pushing the buttons of a feeling of uncertainty and unsafety Breukelman states. Finally, Breukelman also disagrees with the statement that there would not be enough support for the wind park. According to him, the people living nearby who are protesting are not representative for the local and provincial population. Breukelman even stresses the collaboration between Etriplus and the cooperatives Reindonk Energie and Samenstroom, aiming on the enhancement of participation and support of the wind park's surroundings.

¹¹ <https://venlo.nieuws.nl/nieuws/40353/meerderheid-raad-komst-windpark-greenport/>

¹² <https://samen-stroom.nl/beslissing-windmolenpark-greenport-venlo-uitgesteld/>

¹³ <http://www.greenportvenlo.nl/nieuws/open-brief-windpark-greenport-venlo>

5.2.2 The story of Reindonk Energie: *vertical development*

Political domain

As came forward in the previous part about the process of Windpark Greenport Venlo, Reindonk Energie spent a lot of efforts in convincing the City Council of Venlo about the benefits of the wind park. Eventually the efforts were not enough as the City Council decided to disapprove the wind park due to concerns about nuisance and local support. The efforts of Reindonk Energie and Samenstroom turned out to be not enough for convincing the council of the benefits the wind park has for the region.

On a more national level Van de Riet thinks that the government is only recently becoming more and more a partner of energy cooperatives. Before now, the national government thought that the large energy companies would solve the problems in the energy transition, however this begins to change now (pers. com., 21-06-18). In Horst aan de Maas Reindonk spent a lot of energy in communicating with the municipality and trying to convince them of the importance of sustainable energy and Van de Riet thinks Reindonk Energie has had a significant influence on the political willingness towards sustainable energy (pers. com., 21-06-18). The cooperative has a good relationship with the alderman, who wants to do something regarding sustainability but is still searching for what to do precisely (Van de Riet, pers. com., 21-06-18). The improvement of the perception of Horst aan de Maas regarding renewable energy, can also be concluded from municipal documents. In 2013 the current *Structuurvisie* of Horst aan de Maas was created and there is nothing mentioned about renewable energy in the document (Horst aan de Maas, 2013). Recently the coalition agreement of the new coalition in Horst aan de Maas even mentions that collaboration with energy cooperatives is essential in achieving sustainable goals of the municipality (Coalition parties Horst aan de Maas, 2018).

As an example of the lack of support formerly by the municipality of Horst aan de Maas Van de Riet explains the following (pers. com., 21-06-18). Reindonk Energie was always welcome to discuss projects, then plans were made by expensive consultants and eventually nothing happened. Together with a project developer Reindonk Energie applied for a permit for a solar field, but the municipality stated that they needed more time to investigate this and create policy on solar energy. A half year went by and Reindonk Energie even participated in the development of policies on solar and wind energy. Finally, the municipality did not approve the permit for the solar park. Van de Riet thinks that the municipality of Horst aan de Maas now starts to understand the importance of renewable energy and hopes realizing a solar project soon (pers. com., 21-06-18).

Economical domain

The collaboration of Reindonk Energie together with Greenchoice is in line with the desire of the cooperative of making energy a regional product. Van de Riet states however that it is difficult to make a large impact with being an energy supplier with Greenchoice, because the majority of energy consumer in The Netherlands are buying their energy by the same supplier as they did 20 years ago. Greenchoice is growing, but an important factor will remain the costs of energy. Cheapness will remain an important incentive for people for buying energy by traditional suppliers (Van de Riet, 21-06-18).

A second obstacle of the economic domain is the lack of willingness by banks to invest in renewable energy initiatives, the risks are still too high for them (Van de Riet, pers. com., 21-06-18). Only when the cooperative has a start capital or owns a wind mill banks are willing to invest. Therefore, the province of Limburg has made subsidies available for energy cooperative who want to start a

postcoderegeling project. This subsidy contains 20.000 euros Van de Riet states and has been made available due to the pressure of SELL on the province to be more helpful for cooperatives (pers. com., 21-06-18). SELL (*Servicepunt Energie Lokaal Limburg*) is founded by the *Limburgse Natuur and Milieufederatie* as an organization for stimulating energy cooperatives in Limburg.

Legal domain

The legal procedure of Windpark Greenport Venlo is causing a lot of delay for the realization of the wind park so far. At this moment the overruling of the province of Limburg with a PIP is undergoing the legal procedure for people to submit their protests. This trajectory of obtaining the right permits is also by Van de Riet indicated as the main barrier in the legal domain (pers. com., 21-06-18). According to Breukelman, the director of Etriplus, this will only cause delays, because the Council of State has always approved similar wind park applications¹³. Reindonk Energie has put a lot of effort in convincing opponents, however this turned out to be not enough.

Socio-cultural domain

During the process of the wind park Greenport Venlo, Reindonk Energie spent a lot of efforts in the convincing of opponents. Van de Riet experienced that if people are against the wind park at a certain point, it is almost impossible to change their thoughts, even a bag with money does not help anymore (pers. com., 21-06-18). The only way to create some willingness with the opponents is by saying: *“What if the wind park will not be owned by large investors, but by ourselves?”*, Van de Riet argues (pers. com., 21-06-18). A different example Van de Riet gives, is a farmer who said: *“I’ll build my own wind mills”*, upon which the cooperative replied: *“That’s exactly what we want!”* (pers. com., 21-06-18). It still takes a lot of time to explain people the concept of an energy cooperative and to convince them of the advantages. The advantages of the proposed wind park are visible by the fund of €600.000, meant for improvements of the direct surroundings of the wind park.

To achieve more name recognition Reindonk Energie recently hired a marketing office. They help them with a communication strategy and their website and social media activities. All necessary to reach the public of Horst aan de Maas Van de Riet states (pers. com., 21-06-18). A more concrete aspect of the cooperative’s strategy is the excursion they organized recently, together with Samenstroom. People living in the surroundings of the proposed wind park were invited to join a bus ride to the border of Germany, where a wind park has been realized. There, people living near those wind mills shared their experiences and a health researcher explained the effects of nuisance of wind mills¹⁴.

¹⁴ <https://samen-stroom.nl/wat-betekent-dat-een-windmolen-zo-dichtbij-een-bezoek-2/>

5.3 Case 3 – Energiefabriek013

How has Energiefabriek013 horizontally & vertically developed and what is its upscaling potential?

5.3.1 The story of Energiefabriek013: *Horizontal development*

The founding act of Energiefabriek013 was signed on May 29 in 2013 in Tilburg, municipality of Tilburg. Energiefabriek013 started in 2013 as a cooperative for the inner centrum of Tilburg and from there gradually evolved to a cooperative for the whole city of Tilburg, apart from the neighborhoods with cooperatives for themselves (Van den Boel, pers. com., 19-07-18).



Figure 5.3.1 Volunteers Energiefabriek013 at a stand to promote the cooperative¹⁵

¹⁵ <http://www.energiefabriek013.nl/nieuws/>

5.3.1.1. Vision

The energy cooperative Energiefabriek013 argues in its business plan that Tilburg faces problems regarding the energy needs within the municipality (Energiefabriek013, 2016). The prognosed energy consumption and the prognosed production of local, sustainable energy in the year 2045 do not yet match up. To reach the municipality's goal to be energy neutral in 2045, both energy reduction and sustainable energy production are necessary (Municipality of Tilburg, 2017). Energiefabriek013 wants to play a significant role in reaching this goal, by producing local, sustainable energy (Energiefabriek013, 2016).

The vision of Energiefabriek013 is intertwined with its mission. This mission contains:

“Energiefabriek013 wants to contribute effectively to a better world today and in the future by making sure that all citizens of Tilburg are able to provide sustainably in their energy needs and are able to contain their living standards without making use of fossil fuels.”

(Energiefabriek013, 2016, p. 7).

The vision of Energiefabriek013 relates to the way the cooperative wants to fulfill their mission and is visually explained in figure 5.3.1.1. In their vision three aspects are connected: (1) local (*lokaal*), (2) involved (*betrokken*) and (3) sustainable (*duurzaam*) (Energiefabriek013, 2016).

1. Sustainable because of the sources used to produce energy and the need for maintaining these sources.
2. Local because of a desired independency from less sustainable external suppliers; the visibility for people about where their energy comes from; the need for raising awareness and because of keeping the profits of sustainable energy within the boundaries of the city of Tilburg, which are both financial profits as CO₂ reduction profits.
3. Involved because of achieving support by both users and other stakeholders; the active participation and ownership of citizens; the reduction of energy wasting; and the access to sufficient sources for financing.

Essential in the vision of Energiefabriek013 is the local involvement in sustainable energy production. They state that participation will result in more awareness for the public, resulting in less energy consumption and leading to more sense of ownership by the public. This will then lead to a higher sense of responsibility (Energiefabriek013, 2016).

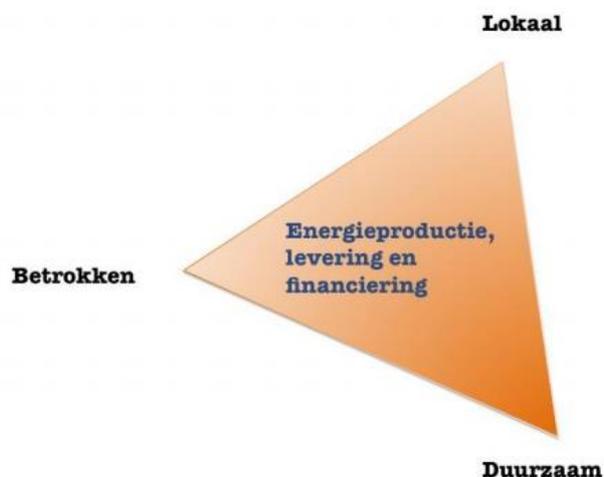


Figure 5.3.1.1 The vision of Energiefabriek013 (Energiefabriek013, 2016)

5.3.1.2. The projects

Energiefabriek013 has several different projects and services they offer. The main projects of the energy cooperative are 1) Living room tour, 2) energy supply, 3) solar energy and 4) wind energy. These categories will be further explained in the coming parts.

Living room tour

For Tilburg to become energy neutral the production of sustainable energy is only a part of the solution. Reduction of energy usage is also an important aspect of reaching the city's sustainability goals (Municipality of Tilburg, 2017). Energiefabriek013 wants to contribute to the reduction of energy in Tilburg with the project 'Living room tour'¹⁶. This project is a collaboration of the municipality of Tilburg and the energy cooperative to guide home owners in the process of energy saving. The living room tour project consists out of three different aspects: the kitchen table conversation; a customized advice; and a thermographic photo. The kitchen table conversation costs €15,- and involves an energy advisor to come along who discusses the possible measures to save energy and gives an indication about the costs of these measures and the expected profits. The costs of this kitchen table conversation can remain low because it is heavily subsidized by the municipality (Van den Boel, pers. com., 19-07-18). A customized advice is more expensive and costs €200,- for a small dwelling (<180 m²) and €275,- for a larger dwelling (>180 m²). For this amount home owners receive a report which includes: an overview of the structural and installation-technical aspects of the dwelling, the energy index, energy scenarios and the improvements related to each scenario's measures and the costs, profits and the payback periods of the scenarios. The thermographic photo costs €75,- and shows the places where heat is leaking out of the dwelling and where insulation is desirable. For all the different aspects of the living room tour project it is not necessary to be a member of Energiefabriek013, these services are offered to all citizens of Tilburg.

Energy supply

In September of 2015 Energiefabriek013 and the energy supplier GreenChoice came to an agreement of the supply of sustainable energy which is produced, as much as possible, in Tilburg. Via GreenChoice it is possible for members to receive energy from the Energiefabriek013. Energiefabriek013 receives a fee for every member who has an energy supply contract with GreenChoice via Energiefabriek013. This fee is dependent on the amount of energy the member buys from GreenChoice and is set for private individuals on €0,005/kWh for electricity and €0,010/m³ for gas. (Energiefabriek013, 2016).

Solar energy

The solar energy projects of Energiefabriek013 can be divided into 'sun on your own roof' and 'sun on someone else's roof'. The 'sun on your own roof' project was in fact the first project of Energiefabriek013, as they started their activities with unburdening and advising people who wanted solar panels on their roofs (Van den Boel, pers. com., 19-07-18). Today, Energiefabriek013 still advises people who are interested in solar panels on their roof and has made price agreements with five local and reliable installers. For every PV installation installed by one of these installers via Energiefabriek013 the cooperative obtains a €25,- fee from the installers.

¹⁶ <http://www.energiefabriek013.nl/huiskamertour/>

Energiefabriek013 has up till now realized one project regarding their ‘sun on someone else’s roof’ activities. This project has been realized by making use of the ‘*Regeling verlaagd tarief (= postcoderoosregeling)*’. This is also the first solar energy project in the municipality of Tilburg which has been completed with the *postcoderoosregeling*. The first step of this project was taken in December 2016, when an intention agreement was signed by Energiefabriek013 and a local farmer¹⁷. This farmer had plans for building a new, large stable which seemed to be perfect for solar energy production. The roof of the stable points to the southeast, has a favorable angle of inclination and is free of shadows¹⁸. Formally agreed upon was that the roof could be used for 15 years by the cooperative in exchange for a financial compensation for the farmer. In the beginning of 2018 people were able to sign up for this project. As it contains a *postcoderoosregeling* project, only those living in the zip areas around the stable were allowed to sign up. The roof contains 700 solar panels and people could sign up for 1 solar panel as a minimum and the maximum number of solar panels depended on the specific electricity consumption of each individual, as participants only retrieve energy taxes back over their own electricity consumption. One solar panel cost €325,- and has an expected yield of 270 kWh per year. It is expected that this solar roof will produce enough energy for 60 households. Within a couple of months all the solar panels were signed up for by 91 people. Formally, the project is no longer a responsibility of Energiefabriek013 as a new cooperative was created for the realization of this project: Energiefabriek Oude Leij¹⁹. At the first general meeting of this new cooperative the responsibility was delegated formally from Energiefabriek013 to Energiefabriek Oude Leij. The project lasts for 15 years, after which the new cooperative will be dissolved.

Energiefabriek013 wants to create larger solar energy projects and is currently conducting a feasibility study for a new project in the *Spoorweg* area of Tilburg. Although this project has no concrete shapes yet, people can already sign up for this project as a potential participant, making sure they are being kept informed about future developments²⁰

Wind energy

Energiefabriek013 wants to produce wind energy too. Therefore, the cooperative participates in the project Windpark De Spinder. Windpark De Spinder is a citizen’s wind park and is currently being developed by a collaboration of eleven energy cooperatives and the developing agency *De Brabantse Ontwikkelingsmaatschappij* (BOM). Of these eleven energy cooperatives, five are located in the municipality of Tilburg. These are Energiefabriek013, Berkel-Enschot Energie Coöperatie, Coöperatieve Vereniging Samenwerkend Udenhoud and Energie Coöperatie De Blaak. The remaining energy cooperatives are located in the neighboring municipalities and are: Coöperatie DEC-Oisterwijk, Coöperatie vereniging Energie Collectief in de gemeente Loon op Zand, Coöperatie Vereniging Samenwerkend Dongen, Coöperatie Energie Gilze-Rijen, Coöperatie Hilverstroom en Gas and Energie Coöperatie DuurzaamRielGoirle. The eleven energy cooperatives have united in a new energy cooperative, called *Coöperatieve Vereniging Burgerwindpark De Spinder*. Figure 5.3.1.2 shows the areas of activity of the energy cooperatives and the location where wind park De Spinder will be built. The wind park will consist of four wind mills which have an aggregative power of 14,4 MW,

¹⁷ <http://www.energiefabriek013.nl/zonnepanelen-op-de-walhoeve/>

¹⁸ <https://www.armhoefseakkers.nl/7788-2/>

¹⁹ <http://www.energiefabriekoudeleij.nl/>

²⁰ <http://www.energiefabriek013.nl/woensdag-14-maart-info-avond-zon-op-andermans-dak/>

producing electricity for 7500 households each year (Coöperatieve Vereniging Burgerwindpark De Spinder, 2018).

The expected costs of this wind park are estimated somewhere between 10 million euros and 15 million euros. The call for tender is still out, so these costs are not sure yet. To get a loan from the bank the initiators of wind park De Spinder have to invest 3 million euros themselves. Half of this amount will be invested by the BOM, which will then also own the wind park for 50%, and the other half must be collected by the energy cooperatives. To do so, members of the cooperatives can buy *Spinderdelen*. There are 6000 *Spinderdelen* for sale for €250,- per piece. Also, people who are not a member yet are allowed to buy *Spinderdelen*, on the condition that they become a member of the cooperative which is active in the area they live in. The Energiefabriek013 explains that the cooperatives want as many as possible participating citizens for the project (pers. com., 19-07-18). This means that if the 6000 would be exceeded, it will be made sure that everyone is able to participate. Meaning that citizens who bought a lot of *Spinderdelen* are then obliged to buy less.

The wind mills have an expected life span of 20 years. Participants will receive a yearly profit on their *Spinderdelen*. This contains a base payment of €18,25 per *Spinderdeel* per year, which is guaranteed due to the SDE subsidy the project received. If more energy will be produced in a year, due to higher wind velocities, participants will receive a wind bonus. This wind bonus contains 30% of the amount higher than the base payment. The other 70% of the amount higher than the base payment are determined for the energy cooperatives, for the purpose of new sustainable projects. A cautious estimation shows that a *Spinderdeel* of €250,- will grow in 20 years to €538,- and a presumable estimation shows a growth to €630,-. The amount the cooperatives will receive per *Spinderdeel* are presumed on respectively €404,- and €619,-. The total profit for the energy cooperatives will be divided by 11, thus every cooperative will receive the same amount. This is not dependent on how many *Spinderdelen* each cooperative has sold to its members.



Figure 5.3.1.2 Participating Energy Cooperatives and the location of De Spinder

5.3.1.3 The organization

The board of Energiefabriek013 consists out of 5 people: a chairman, a treasurer, a secretary and two regular board members. According to Van den Boel (pers. com., 19-07-18) board members have a monthly meeting of two hours and every month some other meetings will arise. In total board members spend 6-8 concrete hours on the cooperative in a month. Besides the board, Energiefabriek013 has several working groups in which board members and active members work together on specific tasks. The current working groups are: 'communication', 'sun on someone else's roof', 'wind energy' and a 'member council' which functions as a sounding board for the cooperative's board. According to Breure (pers. com., 19-07-18) she spends, as an active member in the communication group and in the working group with all the cooperatives involved with wind park the Spinder, normally 2 hours per week, but now this easily is 4 hours per week due to the Spinder project. In 2016 there were more and different working groups (Energiefabriek013, 2016), but Van den Boel (pers. com., 19-07-18) explains that this constantly changes depending on the focus of the cooperative. In the beginning of Energiefabriek013 the focus was more on energy saving and stimulating people to buy solar panels, nowadays the focus is more on larger solar energy projects and wind energy.

Most of the activities the board and the working groups do, they must do from home as Energiefabriek013 has no official office somewhere (Breure, pers. com., 19-07-18). However, there are two locations the cooperative can use occasionally for specific purposes such as meetings. One of the board members makes his office available for the cooperative in the evenings and the *Technische Unie* (a wholesale business) has made its location available for all the energy cooperatives in Tilburg for free (Breure and Van den Boel, pers. com., 19-07-18).

Energiefabriek013 has 70 members, which all pay a contribution of €10,- per year to be a member of the cooperative. According to Van den Boel a third of the cooperative's members is active. Meaning that they attend the general member meetings or participate in working groups. Specific for the general member meeting; normally around the 15 à 20 members attend those. The general member meeting is the highest decision organ and every member present has one vote for the decisions being made on the meeting (Energiefabriek013, 2016). In this way the members are able to set the directions for the cooperative.

As most of the work for the cooperative is done on a voluntary basis, there are several people who are financially compensated for their works for the cooperative. This contains one coordinative function and two people who make respectively social and structural/technical analyses for projects. According to Van den Boel (pers. com., 19-07-18) this is necessary for making significant progress. Also, the website is built by a professional who has been paid by the cooperative.

5.3.1.4 The process of De Spinder

Wind park De Spinder will be built on a site where waste disposal and water treatment activities take place. The land is owned by three landowners: the municipality of Tilburg, water board De Dommel and waste disposal company Attero. In 2012 these three landowners signed a Green Deal which was an intention to use this location for sustainable energy production. Begin 2015 they signed a new Green Deal which was more specific: the location will be used for the production of wind energy. At first, the three land owners thought about doing the exploitation themselves. However, the municipality of Tilburg wanted this wind park to be a citizen's wind park. Not only for the inhabitants of Tilburg, but also for the inhabitants from the neighboring municipalities, as the wind mills will also be visible from a wide surrounding (Energiefabriek013, pers. com., 19-07-18). To include the citizens of all these areas, the municipality of Tilburg approached the energy cooperatives. All eleven energy cooperatives joined, and the collaboration started in 2015. The land owners, Tilburg, Attero and De Dommel, will receive financial fees in the form of rent for 20 years (Spinderwind, 2017).

In 2016 the *milieueffectrapportage* had been conducted which included the possible effects concerning nuisance, cast shadow, soil, archeology, water, safety, landscape, cultural history, ecology, energy profits and avoided emissions. The MER shows that the nuisance from the wind mills will stay within the legal boundaries²¹.

In 2017 the draft zoning plan and the draft surroundings permit were available for inspection by people living nearby and other stakeholders for six weeks. During this period four *zienswijzen* were received. On July 3 the city council of Tilburg determined the zoning plan alteration, with only one vote against. In September 2017, after the final zoning plan and surroundings permit were available for inspection again for six weeks, they became definite. From the four *zienswijzen* before, there was none left eventually. They turned out to be not strong enough to be put through by the opponents (Tetteroo, pers. com., 03-08-18) There were no other protests against the wind park.

The people living nearby and others who are interested were first informed in October 2015, when an information letter was distributed amongst 1150 addresses and an information night was organized. In 2016 seventeen house visits were conducted to speak with the people living nearby and to answer questions. In the beginning of 2017 a second information night was organized, announced by the distribution of 1150 invitations again (Spinderwind, 2017). Initially, the initiators wanted to build 5 wind mills, however they expected that the fifth wind mill would be too close to the community living nearby and would cause too much nuisance, so the decision was made to cancel the fifth wind mill (Tetteroo, pers. com., 03-08-18). On the information night the people living nearby did indeed react positive on this news (Spinderwind, 2017).

To reach out to the people living nearby wind park De Spinder and to compensate them for the nuisance, they get precedence with the buying of *Spinderdelen* over other citizens. (Energiefabriek013, pers. com, 19-07-18). According to Tetteroo no other compensations were made with the people living nearby the wind park. She states that the communication with these people via info nights and media, but also by conducting house visits, is the key to a good process (pers. com., 03-08-18). Energiefabriek013 listened a lot and gave plenty of explanations. Tetteroo states that the lack of protest eventually was not due to the local nature of the project, but more due to a good communication process (pers. com., 03-08-18).

When all the *Spinderdelen* are sold and the bank grants the loan, the building of the wind mills will start. This will occur in the end of 2018 and the prognosed finalization of the building process is in

²¹ <https://www.spinderwind.nl/faq/>

the fall of 2019. Then the wind mills will start rotating and thus producing energy. 2020 will be the first complete year of energy production, meaning that in 2021 the participating members will receive their first profits (Energiefabriek013, pers. com., 19-07-18).

5.3.2 The story of Energiefabriek013: *vertical development*

The vertical development of Energiefabriek013 will be explained at the hand of the four domains presented by Oteman et al. (2014).

Political domain

The municipality of Tilburg finds sustainability very important, states Breure (pers. com., 19-07-18). This statement can be verified by the goals the municipality of Tilburg has set for itself concerning sustainability. Tilburg wants to be climate neutral in 2045, with an intermediate goal of being 30% climate neutral in 2020 (Municipality of Tilburg, 2017). To realize this goal the municipality of Tilburg thinks energy cooperatives can be very helpful. Energiefabriek013 is even mentioned in the *Energievisie* of the municipality of Tilburg (2017) as a partner in 'social innovation'. This means that Energiefabriek013 and the municipality work together to find improvements in the way of approaching citizens and how more citizens initiatives can be stimulated. According to Breure (pers. com., 19-07-18) the municipality realizes that they themselves might not be the ideal sender of certain messages. They see the benefits of having Energiefabriek013 as a partner in stimulating citizens to take sustainability measures, as the energy cooperative is being seen as more neutral or even on the side of the citizens, by the people of Tilburg (Breure, pers. com., 19-07-18). Besides, the municipality thinks of Energiefabriek013 as a good brainstorming partner in sustainability questions, Van den Boel mentions (pers. com., 19-07-18).

Two concrete projects in which the interconnectedness of the municipality of Tilburg and Energiefabriek013 becomes more apparent are the living room tour and wind park De Spinder. In the living room tour both parties benefit clearly from each other. The municipality's policy of stimulating home owners to enhance the sustainability of their dwellings (municipality of Tilburg, 2017), is advertised by a citizen's initiative, which they assume a better messenger. On the other hand, Energiefabriek013 receives financial income due to these activities and gains more name recognition and practical experiences. The project wind park De Spinder shows a slightly different connection between both parties. The municipality could have exploited the wind park themselves, but they granted it to the energy cooperatives. By doing so, they helped the cooperatives to gain more income and experience, which may result in more sustainable projects by the cooperatives in the future (Energiefabriek013, pers. com., 19-07-18).

Economic domain

The municipality of Tilburg chose for wind park De Spinder being realized by the cooperatives from the surrounding areas. This is fundamentally different then choosing for a large investor. The alderman of Tilburg, who is responsible for the energy transition, formulated this as follows: "Sharing is the key word. By sharing this project with all the cooperatives, support is created. Also, the people in surrounding municipalities benefit from the project, instead of an energy giant with an office somewhere in the *Randstad*."²². This local aspect of energy is also noticeable in the collaboration of Energiefabriek013 with GreenChoice. By choosing GreenChoice as energy supplier, the cooperative chooses to highlight the local component of energy even more, as citizens are able to buy energy by

²² <https://duurzaammoed.nl/spinderwind-houdt-de-vaart-erin/>

GreenChoice via Energiefabriek013. With the fee Energiefabriek013 receives, they can invest in new local projects.

Legal domain

In the legal spheres, Energiefabriek013 has not yet had significant obstacles. The planning procedures in wind park De Spinder went well and are currently declared definite. Initially there were four *zienswijzen* however, these eventually were not persisted by the protesters. The support of the municipality for this project was helpful too, as in the city council there was only one vote against the wind park. Further, Energiefabriek013 has no influence on the legal domain.

Socio-cultural

The first projects of Energiefabriek013 were based on stimulating and helping people becoming more sustainable. The living room tours and sun on your own roof projects, were not only meant to realize concrete measurements, such as insulation and solar panels. But also for raising awareness amongst citizens of what the possibilities are, what influence this has on the environment and how people could benefit financially from it their selves.

Regarding wind park De Spinder the eventual lacking *zienswijzen* is an indicator for the support people have for the activities of energy cooperatives.

5.4 Case 4 – WindpowerNijmegen

How has WindpowerNijmegen horizontally & vertically developed and what is its upscaling potential?

5.4.1 The story of WindpowerNijmegen: *Horizontal development*

The founding act of WindpowerNijmegen was signed on May 17 in 2013 in Nijmegen, municipality of Nijmegen.



Figure 5.4.1 Official start of building the wind park²³

²³ <https://www.lagerweywind.nl/blog/2016/05/11/officiële-start-bouw-windpark-nijmegen-betuwe/>

5.4.1.1 Vision

The cooperative WindpowerNijmegen was a proposal by the foundation Wiek-II, which exists out of *De Gelderse Natuur en Milieufederatie* (GNMF) and the local company Izzy Projects (WindpowerNijmegen, 2012). Although they did not exclude the possibility of other sustainable projects, the main goal of these two initiators at that time was to realize a citizen's wind park on location De Grift: Windpark Nijmegen-Betuwe. The incentives for the realization of a citizen's wind park, in which the citizens of Nijmegen and surroundings were able to participate through the energy cooperative WindpowerNijmegen, were (Ibid., 2012):

- A former initiative to realize a wind park on location De Grift by a large developer did not succeed and the initiators sensed that there was a large group of citizens of Nijmegen with the wish to realize their 'own' sustainable energy.
- Being able to be a frontrunner in the realization of a citizen's wind park and thereby become an example for other initiatives.
- A contribution to the climate ambitions of Nijmegen by realization of the wind park, without the necessity for the municipality of finding a new developer: the citizens will develop instead.
- Keeping the revenues of the wind park within Nijmegen.

In December 2016 the realization of the wind park was finished, which also means that the main goal of the cooperative had been accomplished. Therefore, WindpowerNijmegen decided in their member meeting in 2017 to broaden their activities to enhance the local, sustainable energy transition (WindpowerNijmegen, 2017). The future strategy now exists of contributing to this transition by the realization of more sustainable energy production projects, supporting local initiatives, enhancing awareness and education and broaden and deepen the cooperative movement (Ibid., 2017).

5.4.1.2 The projects

Different from other energy cooperatives, WindpowerNijmegen was founded with a specific project in mind: Windpark Nijmegen-Betuwe. Therefore, the activities of WindpowerNijmegen were until 2017 mostly focused on the realization of the wind park. However, the cooperative did manage to realize energy supply as well. Also, WindpowerNijmegen decided recently that solar energy should be produced as well and started a new project. Wind energy, energy supply and solar energy will be elaborated upon in the following parts.

Wind energy

Producing wind energy was the main reason why the energy cooperative WindpowerNijmegen has been founded. Their goal of realizing a citizen's wind park was realized in December 2016. Now, four wind mills are rotating along the highway at the location *De Grift*. These windmills have a power of 10 MW in total, which is sufficient electricity for over 7000 households per year. As Windpark Nijmegen-Betuwe is a cooperative citizen's wind park, there was participation of inhabitants of Nijmegen and its surroundings involved. In 2015, a successful campaign made 1.013 people participate in the project. People could participate by buying shares, *Windaandelen*, which costed €250,- per piece (WindpowerNijmegen, 2015). People were allowed to buy more *Windaandelen*, with a maximum of 80 pieces per individual. These participants raised together 2 million euros, which was necessary to obtain a loan from the bank. The total costs of the wind park were 14,8 million euros. The 2 million euros raised by the citizens were complemented by the *Gelderse Natuur en Milieufederatie* to 2,8 million euros, which is the cooperative's own capital in the project. The Rabobank then was willing to give out a loan of 12 million euros which meant financial closure for the project. According to Van Mameren (pers. com., 20-06-18) more *Windaandelen* could have been sold, as there were registrations for more than 3 million worth of *Windaandelen*. However, WindpowerNijmegen did not choose for selling more than €2 million worth of *Windaandelen* (which are 8000 pieces) at the time, because the rates with the bank were lower than the profits which must be paid to the participants with *Windaandelen*. Therefore, the participants with the most *Windaandelen* had to be satisfied with less shares, as WindpowerNijmegen wanted as many participants as possible with the 8.000 *Windaandelen* they had for sale (WindparkNijmegen, 2015).

The wind mills of Windpark Nijmegen-Betuwe have an expected life span for at least 20 years. Participants will receive a yearly profit on their *Windaandelen*. This profit contains out of a base payment, which is €17,50 per year. This payment is guaranteed by the SDE subsidy the project received from the national government. The expectation is however that more wind energy will be produced in a year, due to higher wind velocities. The amount of profits higher than the base payment will for 50% be paid as a wind bonus to the participants. The other 50% of this amount higher than the base payment goes to a fund, called *Fonds Duurzame Energie Nijmegen*. This fund will be elaborated upon later in this chapter. A cautious estimation shows that a *Windaandeel* of €250,- will grow in 20 years to €583,- and a presumable estimation shows a growth to €674,-. The amount which will flow in to the *Fonds Duurzame Energie Nijmegen* has been presumed on respectively €224 and €311 per *Windaandeel*. It is expected that in 20 years around the 2,5 million euros will flow in to this fund (WindpowerNijmegen, 2015).

Energy supply

WindpowerNijmegen has a sales contract with the local company in Nijmegen, called *Huismerk Energie*. Via Huismerk Energie people can buy the electricity from the wind park Nijmegen-Betuwe. This is regulated via the guarantee certificates of the origin of the energy. Huismerk Energie buys the electricity of Windpark Nijmegen-Betuwe, together with these certificates. Members of WindpowerNijmegen receive a discount on the electricity from Huismerk Energie, but it is not obliged to be a member for buying electricity by this company.

Solar energy

The energy cooperative WindpowerNijmegen wants to broaden its scope in stimulating the energy transition on Nijmegen. Therefore, the cooperative is currently making plans for the realization of solar park *De Grift*. This solar park is intended to be realized on the same location as the wind park is realized. The planning is to install 17.000 solar panels underneath the wind mills, which will have a total power of 4,7 MWp. This will be enough electricity for 1.245 households per year. The cooperative and the municipality of Nijmegen have already a declaration of intent about the future use of the land. In September the municipality will decide on the permit application of WindpowerNijmegen. If the decision is positive it will become definite and the SDE subsidy will be applied for. Although the permit is definite, it is not yet irrevocable. People still have the right to object against the solar park. In the fall of 2018 the cooperative starts with the recruitment of participants in the solar park. It is not yet clear how this participation will take form. Essential for the financial profitability of the project is the granting of the SDE subsidy. Together, solar park De Grift and wind park Nijmegen-Betuwe form the beginning of the intended future energy landscape WindpowerNijmegen wants to realize on this location. Including heat pumps and large batteries for example²⁴.

²⁴ <https://www.zonneparkdegrift.nl/zonnepark/>

5.4.1.3 The organization

The board of WindpowerNijmegen consists out of six people: A chairwoman, a treasurer, a secretary and three regular board members. Beside the current board members, WindpowerNijmegen is searching for one extra board member with experiences in the field of communication to work on the internal and external communication activities of the cooperative²⁵. All board members work for the cooperative on voluntary basis. According to Van Mameren (pers. com., 20-06-18) they spend approximately one day a week on their activities for the cooperative. Besides the board members, there are around 60 members of WindpowerNijmegen actively engaged in the cooperative. These people contribute to the developments of the cooperative by taking part in working groups. These working groups continually change, accordingly to the shifts in the activities of the cooperative. Two important working groups at this moment are about the future strategy and about the solar park De Grift (Van Mameren, pers. com., 20-06-18). Also, two working groups are currently working on the cooperative's intentions of being more active in the support of active citizens with their own local energy initiatives and in the educational activities the cooperative wants to carry forward²⁶.

The wind park Nijmegen-Betuwe has 1.013 shareholders and the cooperative has even more members, approximately 1100 à 1200 Van Mameren states (pers. com., 20-06-18). To become a member of WindpowerNijmegen citizens can either participate in the wind of the solar project, or, as the wind project is finished, and the solar project is not yet open for participation, can participate in the cooperative itself. Both contain €25,- registration costs and the participation in the cooperative itself is €50,-. It is also possible to become a donator, this involves a single payment of €25,- as well and allows citizens to be present at general member meetings and will keep them informed about the developments of the cooperative. However, donators do not have voting rights. Members on the other hand do have a voting right. Van Mameren explains (pers. com., 20-06-18) that at the general meeting of WindpowerNijmegen, important decisions are made with the help of red and green cards. Every member has a single vote and a decision is approved when a minimum of half of the attendees plus one show the green card. Except for statute changes and name changes, then a minimum of 2/3 has to show the green card. This recently resulted in a no-go for the change of the cooperative's name from WindpowerNijmegen to a new name which should cover more of the cooperative's activities than wind solely. General meetings are visited by over 80 members according to Van Mameren (pers. com., 20-06-18). Present are the active members, but also members who are less active within the cooperative

As mentioned before, the board of WindpowerNijmegen works on a voluntary basis. The cooperative however does have one paid function. This person is entrusted with the more technical aspects of the sustainable energy projects and has experience with the realization of wind parks all around the world (Van Mameren, pers. com., 20-06-18). If necessary, this person is also allowed to call in experts in the form of consultancy offices. Also, a part of the communication is contracted out.

²⁵ <http://www.windparknijmegenbetuwe.nl/nieuws/vacature-bestuur/>

²⁶ <http://www.windparknijmegenbetuwe.nl/nieuws/leden-verbreding-windpowernijmegen/>

5.4.1.4 The process of Windpark Nijmegen-Betuwe

The first ideas of the realization of a wind park in Nijmegen go back to 1996 and the first concrete plans of the development date from 2009, as the municipality of Nijmegen and Eneco start a plan procedure for a wind park. In 2011 the municipality agreed on a zoning plan adjustment, however the Council of State disapproved the plans in 2012, because of formal errors in the MER, after protests of neighborhood association Reeth. This decision resulted in the retreatment of Eneco as a developer for the project^{27, 28}.

At the time, both the municipality and local parties the *Gelderse Natuur en Milieufederatie* (GNMF) and Izzy Projects wanted to push the plans through. Additional to the former plans, the GNMF and Izzy projects wanted the project to be a citizen's project. Therefore, they founded together the foundation Wiek-II, which would act as the developer of the proposed wind park. To involve the citizens, foundation Wiek-II in 2013 founded the cooperative: WindpowerNijmegen (WindpowerNijmegen, 2012). The city council of Nijmegen agreed (with only two votes against) on the zoning plan changes and the new MER in 2014 and after a protest procedure the Council of State adjudicated the plans irrevocable.

This protest procedure was again done by the neighborhood of Reeth, which is located next to Windpark Nijmegen-Betuwe. According to Van Mameren this group of citizens was firmly against the plans of the cooperative. Their protest against the wind park were part of a larger protest about the plans the municipality and province of Gelderland have for the living environment of Reeth and its surroundings. Before the realization of the wind park, a railway was built close to their backyard, and there were plans for the development of a rail terminal to stimulate companies to locate their distribution centrums in the area, these plans are currently in the preparatory phase. In a research by Jansen (2017) the process of the cooperative with the people living nearby is reflected on by several members of WindpowerNijmegen. It appeared that the protesters had, besides the presumed devaluation of their area and house prices, had significant problems with the way of communicating of the municipality and province. This also emerges in a recent protest letter from neighborhood Reeth concerning the rail terminal, in which they state that the participation process of municipality and province has failed and verbal promises of civil servants never lead to official improvements^{29, 30}.

The energy cooperative WindpowerNijmegen has actively communicated with the neighborhood association of Reeth, listened to their concerns and tried to come to solutions together (Van Mameren, pers. com., 20-06-18). With personal conversations with the citizens of Reeth, articles in local newspapers and information nights, they were kept informed and also invited to think together of suggestions for possible compensations. Although WindpowerNijmegen did offer financial compensations for the protestors as well, the neighborhood of Reeth did refuse this (Van Mameren, pers. com., 20-06-18). A possible explanation for the refusal of financial compensation is the fact that When a deal is made, their protest loses legal rights (Jansen, 2017). The protest of the neighborhood association of Reeth delayed the process by 1,5 years, of which the Council of State's procedure lasted slightly less than a year, Van Mameren states (pers. com., 20-06-18).

The cooperative did however make a deal with a single home owner, who was not in favor of the plans for a wind park as well. This deal did not get much attention as the cooperative tried to keep it out of the publicity. The cooperative did however inform their members about the deal (Jansen,

²⁷ <https://www.rvo.nl/initiatieven/co%C3%B6peratieve-energieprojecten/burgerwindpark-nijmegen-betuwe>

²⁸ <http://www.windparknijmegenbetuwe.nl/nieuws/leden-in-beeld-volkert-vintges/>

²⁹ <https://api1.ibabs.eu/publicdownload.aspx?site=overbetuwe&id=100050861>

³⁰ https://gelderland.notubiz.nl/document/6618687/1/Insprekersbijdragen_%28PS2018-404%29

2017). The deal involved the placement of solar panels on the protestor's shed, for preventing this person to take legal steps against the wind park. Although this is in fact contrary to the policy of WindpowerNijmegen, this was a matter of 'necessity knows no law' (Jansen, 2017).

A different actor who influenced the process of Windpark Nijmegen-Betuwe is a farmer owning the land next to the land the wind mills are located on. The current four windmills, which are located on rented land of the municipality of Nijmegen, originally were intended to be accompanied with one more wind mill. This intended fifth wind mill was planned on the land of the farmer. The farmer however did not want the wind mill on his land and did not want to sell either. WindpowerNijmegen is having an ongoing dialogue with the farmer and hopes to come to an agreement one day, without having to use legal procedures (Jansen, 2017).

WindpowerNijmegen wanted that the profits of Windpark Nijmegen-Betuwe were not only for the members who participated in the project by buying Windaandelen. The profits should be as well for the local surroundings of the wind mills. Therefore, a surroundings fund was initiated, with the intention to improve the livability of the direct surroundings of the wind park (Stichting Omgevingsfonds Windpark Nijmegen-Betuwe, 2018a). According to Van Mameren this fund could be used for the improvement of a community house or the development of a playground for instance (pers. com., 20-06-18). A foundation has been founded to be concerned with the activities of the fund. For every MW wind energy the wind park produces, €1,- will be put in the fund, which equals approximately €24.000,- per year. Every two years a subsidy round will be organized, which will be actively promoted in the region by the cooperative. People from Reeth, Oosterhout, Ressen and Nijmegen-Oosterhout (the surrounding area of the wind park) with ideas about enhancing the region's, sustainability, energy savings, livability or social cohesion can hand in an application by the board of the fund's foundation. The board will then make a first selection and afterwards the inhabitants of the concerning regions are able to vote on the initiatives if too many applications were done (Stichting Omgevingsfonds Windpark Nijmegen-Betuwe, 2018b). The first application period is from September 15 to October 15 this year³¹.

Besides the surroundings fund, a different fund exists: *Fonds Duurzame Energie Nijmegen*. This fund will receive 50% of the profits above the base profits (the other 50% is going to the participants with Windaandelen, as explained in part 5.4.1.2). This fund is in maintained by the energy cooperative itself and will be used for new projects in Nijmegen concerning the stimulation of the local energy transition (Van Mameren, pers. com., 20-06-18).



Figure 5.4.1.4. Location of Wind park Nijmegen-Betuwe and the neighborhood Reeth (WindpowerNijmegen, 2015).

³¹ <http://www.windparknijmegenbetuwe.nl/omgevingsfonds/>

5.4.2 The story of WindpowerNijmegen: *vertical development*

The vertical development of WindpowerNijmegen will be explained at the hand of the four domains presented by Oteman et al. (2014).

Political domain

After the first plans of a wind park realized by Eneco were cancelled, the municipality found a new party in the initiators of the energy cooperative WindpowerNijmegen. Ever since the beginning of the plans WindpowerNijmegen received support from the municipality, especially a former alderman has given the cooperative a lot support (Van Mameren, pers. com., 20-06-18). This support resulted in financial assistance for researches in advance and the municipality made the land for the wind mills available for a lower price than market conform. The cooperative put in a lot of effort in convincing the municipality, and even more the city council, of the necessity of wind power and the benefits of a citizen's wind park (Van Mameren, pers. com., 20-06-18). This eventually led to the acceptance of the plans for Windpark Nijmegen-Betuwe by the city council with only two votes against. Van Mameren states that this was definitely a result of the strong communication with the municipality, as they gave presentations to the city council and lobbied a lot. However, the fact that WindpowerNijmegen is a local cooperative was presumably the most important. Especially the confirmation of support from the inhabitants of Nijmegen and the fund for more sustainable projects in the future convinced the city council (pers. com., 20-06-18). Altogether WindpowerNijmegen received a lot support from the municipality, but Nijmegen being 'left' gave her the name '*Havana aan de Waal*' for a reason, Van Mameren states (pers. com., 20-06-18)

Regarding the national political level, WindpowerNijmegen could not have realized Windark Nijmegen-Betuwe without the SDE subsidy and regarding the provincial political level, the province was early involved with the realization of a wind park, as they choose the location long ago as a suitable place for wind mills (Van Mameren, pers. com., 20-06-18).

The other way around, the municipality of Nijmegen gets also support from WindpowerNijmegen. The municipality sees the cooperative as a forerunner who has a lot of knowledge and experience. Therefore, the municipality asked WindpowerNijmegen to stimulate other citizens with their initiatives. Some of the board members work together with the municipality in sustainability commissions, brainstorming about strategies and climate policies (Van Mameren, 20-06-18). According to Van Mameren municipalities and provinces in general, should do a lot more to support cooperatives, as they contain people who are producing outstanding achievements in the field of sustainability, without even getting paid for it (pers. com., 20-06-18).

Economical domain

Initially it was the plan that the wind park would be realized by the large energy company Eneco, but after the verdict of the Council of State Eneco stepped out of the plans and it became a citizen's wind park. This means that the profits do not flow out of the region, as would have happened if Eneco had realized the wind park, but they stay within the region. This happens in the form of direct financial profit for the members of WindpowerNijmegen who participated by buying Winddelen, but also in the form of the two funds the cooperative has set up. These funds stimulate future projects in Nijmegen, concerning both sustainability and social cohesion.

This local aspect of WindpowerNijmegen emerges in more activities of the cooperative. The wind mills of Windpark Nijmegen-Betuwe for instance, were bought from a company from Barneveld,

which is also located in the province of Gelderland (Van Mameren, pers. com., 20-06-18). Further, the decision to sell the energy and the green certificates to Huismerk Energie, an energy supplier from Nijmegen, expresses the philosophy of WindpowerNijmegen of keeping the profits in the region. According to Van Mameren (pers. com., 20-06-18) Huismerk Energie is probably not the cheapest supplier, so buying energy by Huismerk Energie will not be perfect for consumers searching for the lowest price. Consumers who choose for this supplier, do this as sustainability and localness are their priorities.

When WindpowerNijmegen raised the 2 million euros by selling Windaandelen, the Rabobank was willing to give out the remaining 12 million euros as a loan to the cooperative. Prior to choosing for the Rabobank, the cooperative had a long discussion about the preconditions they should determine in choosing for a certain bank. Eventually, the cooperative did not choose for a bank with the cheapest loan, but for a socially involved bank, the Rabobank (Rijk van Nijmegen), which they found both sustainable and reliable (Van Mameren, pers. com., 20-06-18). The low interest of loans from a bank resulted in the decision of the cooperative for not giving out more than 8.000 Windaandelen. Even though there was a demand for more Windaandelen, but this was financially less profitable as the rates of return of the additional Windaandelen.

Legal domain

Eventually the cooperative received all the permits and zoning plan changes it needed for the realization of Windpark Nijmegen-Betuwe. However, according to Van Mameren (pers. com., 20-06-18) this was a difficult process. During the process the cooperative discovered the high number of permits were necessary in realizing a wind park. Many permits had to be obtained at different institutional locations, especially with the municipality and Rijkswaterstaat. There is a lack of a 'one-stop' policy regarding the different permits. Van Mameren therefore thinks that the national *Omgevingswet* could be a possible solution. Van Mameren states also that it took a long time for the municipality to change the zoning plan, as the land was meant as an industrial site. Although there was no interest in this land for years, it took the city council a long period to decide to destine the land for the use of wind mills by the cooperative (pers. com., 20-06-18).

Besides the efforts of WindpowerNijmegen to communicate with the people living nearby, they could not prevent the neighborhood association of Reeth to protest to the wind park up to the Council of State. This resulted in a delay of 1,5 year. Concerning the farmer owning the land on which the cooperative wants to build a fifth wind mill, the cooperative wants to keep the dialogue going, instead of a legal procedure (Jansen, 2017).

Socio-cultural domain

Currently two working groups are working on a strategy for the educational activities and the stimulation of other initiatives by WindpowerNijmegen. This is also something the municipality of Nijmegen has asked the cooperative to be involved in. In line of these stimulating plans, WindpowerNijmegen organizes a lot of activities to create more awareness for sustainability and the cooperative itself. For instance, the cooperative organizes guided tours to the wind park, whereby visitors can see the wind mills from the inside and the outside. Regularly an open house is organized, which always attracts a lot of visitors (Van Mameren, pers. com., 20-06-18).

To enhance the awareness of the public, WindpowerNijmegen has a very intense communication strategy Van Mameren says (pers. com., 20-06-18). Every time something has occurred, the

cooperative sends out a small news report online and in regional papers. WindpowerNijmegen even won a price for their communication strategy. In 2018 Nijmegen is Green Capital of Europe, this is also very helpful in the attention the cooperative receives, as there is more media attention for it.

Lastly, the surrounding fund is an important way to stimulate the involvement of the region. By making finances available for local improvements, people from the neighborhood are able to propose their own plans for the area. The proposed improvement does not have to be necessarily in the field of sustainability or energy but can also be an enhancement for the livability or the social cohesion of the region.

5.5 Case 5 – Alkmaar Energie

How has Alkmaar Energie horizontally & vertically developed and what is its upscaling potential?

5.5.1 The story of Alkmaar Energie: *Horizontal development*

The founding act of Alkmaar Energie was signed on October 10 in 2013 in Alkmaar, municipality of Alkmaar.



Figure 5.5.1. Transferring wind mill De Boekel to a collaboration of four cooperatives among which Alkmaar Energie ³².

³² <https://www.verenigingafvalbedrijven.nl/nieuws/nieuwsbericht/plaatselijke-cooperaties-nemen-aandeel-windmolen-alkmaar-over.html>

5.5.1.1 The vision

Inspired by energy cooperatives in the surroundings of Alkmaar, the founders of Alkmaar Energie thought in 2013 about how they could contribute to Alkmaar becoming energy neutral. On 'sustainability day' (October 13) in 2013 they decided that the best way to reach the goal of Alkmaar becoming energy neutral would be by doing with the people of Alkmaar themselves, and they founded the energy cooperative Alkmaar Energie. Since that moment the cooperative has grown every year and gradually comes closer to their sustainable dream³³. Benny Duimel, chairman of Alkmaar Energie, explains that Alkmaar Energie is a local club which believes that a sustainable Alkmaar can be reached by doing it together with the people of Alkmaar, for the municipality of Alkmaar (pers. com., 25-06-18). Focusing on the local aspect of renewable energy is an important aspect of Alkmaar Energie's activities, as the cooperative announced in 2016 that every year € 66 million goes to energy companies from outside the region³⁴. Alkmaar Energie states that if this money would stay within the region, it could be used for enhancing the region's sustainability.

The mission of Alkmaar Energie is as follows:

"Alkmaar Energie aspires a completely sustainable and energy neutral Alkmaar, by producing energy within the municipality of Alkmaar and stimulate the saving of energy within the municipality of Alkmaar. Alkmaar Energie wants to do this in its own region to keep the financial profits within the region as well, stimulating the local economy" (Alkmaar Energie³⁵)

5.5.1.2 The projects

Advices

The oldest projects of energy cooperative Alkmaar Energie contain advisements for the citizens and local companies of Alkmaar regarding energy savings and individual energy production. To advice people of the house improvements they can do regarding sustainability, Alkmaar Energie is every Saturday present in "*Het slimste huis van Alkmaar*" (Duimel, pers. com., 25-06-18). This is a project initiated in 2014 by the municipality of Alkmaar and is a showroom-house with many innovative examples to increase living comfort and homecare by using robotica and E-health (Domotica). Alkmaar Energie is present at this location to help people with questions regarding the improvement of sustainability in their houses. Depending of the type of question, Alkmaar Energie gives answers based on their own expertise, or they point people into the direction of a company or organization which can help them further. An organization to whom the energy cooperative often refers to is the '*Duurzaam Bouwloket*'. This is an organization which is financially supported by the municipality to help people with enhancing their sustainability at home (Duimel, pers. com., 25-06-18).

A second project in advising citizens is a collaboration with the municipality of Alkmaar in which they search for home owners of dwellings built in the period 1945-1985. People who are interested in renovating their homes will be brought in contact with companies who can help them making their home energy neutral. This is part of the national project, called '*Nul-op-de-meter*'³⁶.

³³ <https://www.alkmaar-energie.nl/cooperatie/historie>

³⁴ <https://us11.campaign-archive.com/?u=ba5e3e3b3e24902bc63f822ab&id=1cf0335735>

³⁵ <https://www.alkmaar-energie.nl/cooperatie/onze-missie>

³⁶ <https://www.alkmaar-energie.nl/projects/details/4/nul-op-de-meter>

Energy supply

Alkmaar Energie is also a supplier of renewable energy. To do so, they act together with SAMEN OM, an energy supplier consisting out of 35 local energy cooperatives. All the customers of SAMEN OM are obtained via a local energy cooperative. If new consumers buy their energy by SAMEN OM and do this via Alkmaar Energie, the cooperative receives a fee.

Solar energy

Alkmaar Energie is active in the realization of solar energy. At this moment, they have realized two small solar projects and are busy realizing two larger solar projects. With the realization of the two smaller projects, Alkmaar Energie had an advising role and offered knowledge and experience. By doing so, Alkmaar Energie helped with the installation of 18 solar panels on the roof of a botanic garden and with 21 solar panels on the roof of the cultural organization Hal25. Although the energy cooperative helped with these projects, they are not benefiting from it financially now. Nor were these projects for all citizens of Alkmaar. Therefore, Alkmaar Energie is now conducting two projects with the *postcoderegeling* (Duimel, pers. com., 25-06-18).

The first large solar project Alkmaar Energie participates in is actually an initiative of the *Noord Hollandse Energie Coöperatie* (NHEC) (Duimel, pers. com., 25-06-18). This *postcoderoos* project is now almost finished, 300 solar panels have been placed on the roof of a tennis hall in Daalmeer, municipality of Alkmaar, and has just a few more options for participation left. People from the surrounding zip code areas are able to participate in this project by buying solar panels. One solar panel costs €300,- and includes the membership of the newly founded project cooperation *Energie Coöperatie DaalmeerZon*. As this project is initially an initiative of the NHEC there is no membership of AlkmaarEnergie bound to it. Due to the return of the energy tax and the selling of the electricity to an energy supplier, it is expected that participants will earn their investment back in 9 years³⁷.

The first solar project fully developed by Alkmaar Energie will be realized on a roof in the centrum of Alkmaar (Alkmaar Energie, 2018)

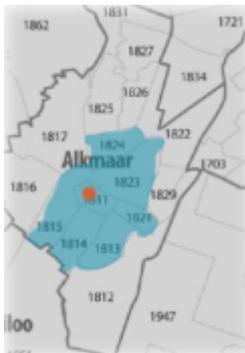


Figure 5.5.1.2 Postcoderoos Alkmaar (Alkmaar Energie, 2018).

Recruiting of participants for this project has only recently begun and the cooperative has already received 1/3 of the applications needed for this project (Duimel, pers. com., 25-06-18). The project will contain 240 solar panels and citizens from the surrounding zip code areas can participate in the project. For the realization of this solar roof, Alkmaar Energie has founded a new project cooperative, named *Zonnedak Alkmaar Centrum* (Alkmaar Energie, 2018). Citizens can participate by buying one or more solar panels for €235,- per piece. When buying one or more solar panels participants will automatically become a member of AlkmaarEnergie, without further costs for a membership. The participants will receive a rate of return on their investment, existing of the selling of electricity to

³⁷ <https://www.alkmaar-energie.nl/projects/details/6/daalmeerzon>

SAMEN OM and the return of the energy taxes via the *postcoderegeling*. These are respectively €9,- and €27,- per solar panel every year. From this annual total amount of €36,- administration costs of €7,50 per year will be subtracted. These administration costs go to Alkmaar Energie and will be used for insurances and roof rental for example (Alkmaar Energie, 2018). What will remain of these costs the cooperative uses for other expenses, like hiring a room to work or to receive guests (Duimel, pers. com., 25-06-18). Altogether the participants will receive an expected amount of €28,50 per year, which means that they have earned their investment back in 8 to 9 years.

Wind energy

In 2016 five municipalities and an energy company started a collaboration to enhance the renewable energy production in the region. The municipalities are Alkmaar, Bergen, Castricum, Heerhugowaard Heiloo and Uitgeest and the energy company is HVC. They formed together the cooperative *Duurzame Energie Coöperatie Regio Alkmaar (DECRA)*³⁸.

The goal of DECRA is to stimulate sustainable projects by investing in them. The profits of the investments then will be used again to invest in new sustainable projects. DECRA started with an amount of €470.000,- to invest in renewable energy projects and the first investment DECRA did, was buying the shares of an existing wind mill: De Boekel. This wind mill is located in the area Boekelermeer in Alkmaar. The intention of DECRA was to give the citizens of Alkmaar and surrounding municipalities the opportunity to share in the benefits of the wind mill. This participation idea was organized one year later in 2017, when DECRA sold 37% of their share in the wind mill to Alkmaar Energie and three other cooperatives (Duimel, pers. com., 25-06-18). Alkmaar Energie has united with Bergen Energie, CALorie (Castricum) and Heiloo Energie in the founding of a new project cooperative, named: *Stichting Administratie Kantoor (STAK) Windmolen Boekel*. The remaining 63% of the shares is owned by HVC. Wind mill De Boekel has a power of 2,3 MW.

Citizens of the involved municipalities can participate by buying certificates of Windmolen De Boekel of €300,- per certificate. Per person there is a maximum of 20 certificates (STAK Windmolen Boekel, 2018). The amount of €300,- is build up out of €250,- for the certificate itself and €50,- for the energy cooperatives to buy certificates their selves too. The cooperatives use this amount for the administration costs and for future investments (Duimel, pers. com., 25-06-18; STAK Windmolen Boekel, 2018). In total there are 1688 certificates, of which 245 certificates are reserved for the energy cooperatives. These certificates are divided over the different municipalities at the hand of the population size of the area. Alkmaar has 41% of the certificates and therefore 592 certificates to give out to its citizens. The expected rate of return of one certificate contains 5%. With a duration of the project of 18 years, the invested €300,- will be expected to grow to circa €475,- at the end of the project (STAK Windmolen Boekel, 2018). However, if wind velocities turn out higher than expected, the participants will obtain a higher rate of return (Duimel, pers. com., 25-06-18). Participants living in Alkmaar will automatically become a member of Alkmaar Energie when buying a certificate.

³⁸ https://www.rudnhn.nl/Nieuws/Nieuwsberichten/2016/DECRA_Regionaal_investeren_in_duurzaamheid

5.5.1.2 The organization

The board of Alkmaar Energie consists out of five people and is searching for one or two people for joining the board. The cooperative has working groups in which always one or more board members are joining in. These working groups change all the time, regarding the focus of the cooperative. According to Duimel the board members are actually the most enthusiastic members of the cooperative. Often other members are willing to help, but these tasks contain mainly very specific activities, like helping with a stand during an energy market or doing some research on a specific subject. However, it is hard to find members who are willing to be involved with a project from start to end and really think along with the board (pers. com., 25-06-18). The board has a meeting every Tuesday evening, and two members are present at *Het Slimste Huis* every Saturday for four hours. Duimel states that ideally the cooperative could use some active volunteers who could work for the cooperative during the day and have experience in sustainability and have a large network. However, in practice the cooperative is glad to welcome everyone who is enthusiastic about what Alkmaar Energie does (pers. com., 25-06-18). Further, Alkmaar Energie has a member who works on the website and one member who does the press messages and other marketing aspects. Both do this voluntary (pers. com., 25-06-18).

The meeting of Alkmaar Energie's board every Tuesday is from 20:00 till 21:30 in a community centrum in the heart of Alkmaar. During this time people are welcome to come along and ask questions. On Saturday the energy cooperative is present in *Het Slimste Huis*. Sometimes, for appointments with people a room somewhere will be hired (Duimel, pers. com., 25-06-18).

Alkmaar Energie has currently a member total of circa 50 people. To become a member people have to pay a contribution of €25,- per year or join in the *postcoderoos* project in the centrum of Alkmaar or participate in wind mill De Boekel. The annual general meeting of Alkmaar Energie is the highest decision organ. According to Duimel, there are circa 10 members present at the general meeting (pers. com, 25-06-18).

There are no paid employees within Alkmaar Energie, however there is some discussion within the board of the cooperative about this. Duimel thinks it would be very useful to hire someone for several shifts per month, who can accomplish some tasks on a structural basis (pers. com., 25-06-18). This should be on the condition that this would be an employee for a long period, otherwise the cooperative would lose the continuity it just obtained. Duimel thinks a subsidy construction with the municipality on this would be ideal (pers. com., 25-06-18).

5.5.2 The story of Alkmaar Energie: *vertical development*

The vertical development of Alkmaar Energie will be explained at the hand of the four domains presented by Oteman et al. (2014).

Political domain

Alkmaar Energie feels that the municipality of Alkmaar thinks the cooperative is on the right track concerning their activities regarding sustainability (Duimel, pers. com., 25-06-18). Often the cooperative gets a helping hand in the form of a telephone number of an acquaintance, or they have a meeting together on a subject. However, Duimel thinks this collaboration between municipality and Alkmaar Energie could be better. The helping hand of the municipality does not go further than a number or a suggestion, while it would be useful as well if the municipality would contact their acquaintances instead (pers. com., 25-06-18). Municipality of Alkmaar has a coordinator for sustainability, with whom Alkmaar Energie often is in contact. Communication often is about possible roof surfaces for solar energy projects.

According to Duimel the municipality sees Alkmaar Energie also as a representative of the citizens of Alkmaar (pers. com., 25-06-18). Therefore, the municipality invited Alkmaar Energie to join several meetings regarding policy making about sustainability concerns. For instance, in the gasless policies of Alkmaar, Alkmaar Energie has been asked for their opinion. Duimel states that he is proud that the cooperative has reached this state of acknowledgement and the influence they can have on the matter, however he does not think that the existence of Alkmaar Energie has led to more sustainable policies of the municipality in general (pers. com., 25-06-18).

A more specific influence the municipality of Alkmaar has had on Alkmaar Energie is the selling of the wind mill De Boekel to the regional cooperatives. The municipalities in the region, united in DECRA, made this wind mill available for the energy cooperative. Besides a financial profit for the members who participate in the wind mill, this also enhances the collaboration between the cooperatives, increases their knowledge and experience and ensures financial capital for future projects (STAK Windmolen Boekel, 2018).

Economical domain

Buying wind mill De Boekel by the municipalities, and later by the cooperatives, from the initial owner (a large energy company) did not result in the production of more renewable energy. It did however change the flow of financial profits. The profits of this wind mill are no longer flowing out the region of Alkmaar but stay within the region. This is in line with the cooperative thinking of Alkmaar Energie that energy should be produced local. According to Duimel (pers. com., 25-06-18) this is an indirect enhancement of sustainability, as the profits can be used for new sustainable projects.

The collaboration with SAMEN OM is an enhancement for the localness of energy as well. A disadvantage Duimel mentions of the position of SAMEN OM in the energy market, is the fact that SAMEN OM is not able to give welcome bonuses for new consumers. This is something the larger energy suppliers can easily do (pers. com., 25-06-18). And the price of energy is still important Duimel states. Also, with the participation in solar or wind energy projects, people see this most of the time as a financial investment instead of a way of becoming more sustainable. SAMEN OM is the most sustainable energy supplier of The Netherlands, that could also be an incentive to choose them, instead of financial incentives only, Duimel argues (pers. com., 25-06-18).

A disadvantage Alkmaar Energie has, just like other energy cooperatives, towards larger developers, is being less financially strong (Duimel, pers. com., 25-06-18). It is not possible for an energy cooperative to start with the realization when only 50% of the solar panels or wind certificates has been sold. An investor who would offer such financial capital would be very useful Duimel thinks (pers. com., 25-06-18).

Legal domain

The wind mill Alkmaar Energy partially owns, had already been realized earlier, so there have not been experiences with the legal process of realizing a wind mill. However, the legal aspects of the realization of a solar project on someone else's roof enquires a lot of legal knowledge too. Duimel states that this is something they cannot do their selves and they must hire expertise (pers. com., 25-06-18).

Socio-cultural domain

Alkmaar Energie conducts a lot of activities to be in contact with the citizens of Alkmaar. As mentioned before, they are every Saturday in *Het Slimste Huis* where they are visible and approachable for questions concerning sustainability of people's homes. Alkmaar Energie is also present on *Duurzaamheidsmarkt* Alkmaar organizes every year, and often flyers on regular markets. Besides, they send out press messages in regular media and in social media and they organize information nights for specific projects, and in 2017 Alkmaar Energie hosted an event with Andre Kuijpers as a speaker, this was a huge success (Duimel, pers. com., 25-06-18).

Besides these activities for reaching the public, Duimel admits that the people who participate actively are mostly the early adaptors and that it is difficult to reach the other citizens. Alkmaar Energie tries, but it is hard to make people more aware of the necessity of sustainability (pers. com., 25-06-18).

5.6 Case 6 – De Groene Reus

How has De Groene Reus horizontally & vertically developed and what is its upscaling potential?

5.6.1 The story of De Groene Reus: *Horizontal development*



Figure 5.6.1 Board member De Groene Reus opens digital Energie loket Almere³⁹.

³⁹ <https://degroenereus.nl/nieuws/>

5.6.1.1 The Vision

Energy cooperative De Groene Reus has a strong belief that they, as a cooperative for citizens and local companies, can make the difference in making the world more sustainable, starting with Flevoland. As De Groene Reus is an energy cooperative for the inhabitants of the entire province of Flevoland, most of the activities currently take place in Almere (Haanstra, pers. com., 04-07-18), trying to contribute significantly to the ambitious goals set by the municipality of Almere becoming an energy neutral city in 2022.

The energy cooperative De Groene Reus will not only enhance sustainability by producing clean, renewable and local energy, but will also contribute to the local economy and the rates of employment in Flevoland. The cooperative states that four values are of high importance while trying to achieve this, namely: innovation, local involvement, reliability and doing projects together. As a cooperative, De Groene Reus wants to contribute to a democratic energy transition in Flevoland. Democratic means in this case that the energy transition will take place with the involvement of citizens and local companies in both the vision and the projects⁴⁰

According to chairwoman Haanstra the all-embracing vision of De Groene Reus contains:

“The vision of De Groene Reus is to contribute to the energy transition by using less energy and that the energy we do use, being clean energy instead of fossil energy. This contribution must take place cooperatively, to give citizens a say in what happens with the energy and a chance to benefit from the energy profits”. (Haanstra, pers. com., 04-07-18).

⁴⁰ <https://degroenereus.nl/over-ons/>

5.6.1.2 The projects

Stimulating citizens

After the foundation of De Groene Reus in 2012 the cooperative spent most of its time stimulating neighborhood initiatives regarding sustainability. The municipality of Almere requested the cooperative to seek for ways to promote collective purchasing of solar panels on street or neighborhood level. By doing so, the municipality tried to enhance the willingness and awareness of citizens regarding green energy (Haanstra, pers. com., 04-07-18). Nowadays De Groene Reus is still involved in stimulating people to take sustainable actions themselves, by offering free advice. The cooperative does this in collaboration with *Het Energieloket*, an initiative of the *Natuur en Milieufederatie Flevoland* (NMFF). *Het Energieloket* can be reached by phone, mail or by making an appointment for at home. This is free for all inhabitants of Flevoland and they deliver information on solar panels, insulation possibilities, heat pumps and subsidy options.

Energy supplier

De Groene Reus is also a supplier of renewable energy. To do so, they act together with SAMEN OM, an energy supplier consisting out of 35 local energy cooperatives. All customers of SAMEN OM are obtained via local energy cooperatives. De Groene Reus receives a fee for every new customer joins SAMEN OM via them.

Solar energy

De Groene Reus is very active in the field of solar energy. At this moment the cooperative has covered 8 roofs with solar panels. The first solar roof was realized in 2015 and the other 7 solar roofs were realized in 2018 as one large project.

By the realization of the first solar roof in 2015, De Groene Reus had support of the municipality of Almere as they offered the roof of sport hall *Almere Poort* for the placement of solar panels. In October 2015 all 120 solar panels were installed and have capacity of 30 kWp. This project was realized completely with a loan from the ING Bank and the national SDE subsidy. As the project costed among 60 to 70 thousand euros, it took a long time (over a year) to convince a bank to receive such a loan (Haanstra, pers. com., 04-07-18).

The realization of seven solar roofs in Almere in 2018 is a collaboration with *Zorggroep Almere*, a caregiver in Almere. De Groene Reus and *Zorggroep Almere* came to an agreement that the energy cooperative could use the roofs of seven locations of the caregiver. Not only the roofs were made available, *Zorggroep Almere* is also the buyer of the electricity produced by the solar panels on the roofs, for market-conform prices. The roofs contain circa 100 to 200 solar panels per location, varying from 30 kWp to 56 kWp of power per location. Similar to the solar roof in Almere Poort, the SDE subsidy was used for the realization of these seven solar roofs. However, according to Haanstra De Groene Reus was not able to find a bank willing to give out a loan for this project, as the banks all thought the risks were too high in working with the energy cooperative and the eventual profits were too low to be interesting enough (pers. com., 04-07-18). Therefore, the energy cooperative chose to let people participate in these projects. Via a crowdfunding platform all people in The Netherlands were allowed to buy participations of €1000,- per piece with an additional €20,- transaction costs per piece. The rate of return was determined on 5% per year. As the participation is a type of loan, participants will receive every year both the 5% profit and a part of the money they invested. This results in a yearly payment of the cooperative to the participants of €129,50 per participation per year. Eventually, a participation of €1020,- (transaction costs included) will grow in the determined 10 years of the project to €1.295,05 (De Groene Reus, 2018). In total the amount needed to be raised

by the crowdfunding action for the project of seven solar roofs was €206.000,-. Haanstra explained that the reason De Groene Reus did not use the *postcoderoosregeling* for these seven roofs is that they wanted to make sure that they would sell enough participations. Almere is a relatively 'flat' city and people are able to place solar panel on their own roofs. De Groene Reus was worried not to sell all the participations solely to citizens in the zip code rose. A second reason is the fact that De Groene Reus is an energy cooperative for Flevoland and they wanted more people being able to participate than those in the zip code rose (pers. com., 04-07-18). Eventually the crowdfunding was completed within 10 hours.

Wind energy

In the municipality of Zeewolde, located east of Almere, there are 220 wind mills located. Currently the plans of replacing these wind mills with 91 new, modern wind mills are being predeveloped. These 91 new wind mills will produce 2,5 times more energy than the current wind mills and will be enough to deliver electricity to 280.000 households. The start of the building process is expected to be in 2020. This large wind project is initiated by the developing association Zeewolde, which exists out of 200 agricultural entrepreneurs which are owning the current wind mills.

To become involved in the plans for this large wind park, De Groene Reus bought together with the energy cooperative of Zeewolde (Zeenergie) one of the old wind mills of a farmer who did not want to be part of the large developments and granted the opportunity to the cooperatives for them to participate in the plans (Haanstra, pers. com., 04-07-18). This has led to the foundation of a new energy cooperative named *De Nieuwe Molenaars*, which is founded by REScoop in collaboration with De Groene Reus and Zeenergie. This new wind cooperative *De Nieuwe Molenaars* is currently working on the plans of making it able for local citizens to invest in Windpark Zeewolde. Currently the plans are that of the 91 new wind mills, one wind mill will become property if the citizens of Zeewolde and Almere, via De Nieuwe Molenaars.

5.6.1.3 The Organization

The board of De Groene Reus consists out of three people and is currently searching for two volunteers willing to join the board. Besides the board, the energy cooperative has some volunteers working on specific tasks. There are no working groups yet, however Haanstra argues that especially on promoting activities a working group would be useful (pers. com., 04-07-18). Further, De Groene Reus has a council of advice, which are people providing council on financial and juridical aspects and on how to steer volunteers. Board members spend among 1,5 to 2,5 days per week on activities for the energy cooperative (Haanstra, pers. com., 04-07-18). The cooperative has an office from which board members and volunteers can work, which they share with a solar panel installer. This office is however not easily reachable for people to visit. For this purpose, De Groene Reus has a collaboration with *Het Energieloket*. These *Energielokketten* (initiated by the NMFF) are located on strategic places of the six municipalities in Flevoland, where people can ask their questions about sustainable measures for their homes (Haanstra, pers. com., 04-07-18). All members and board members of De Groene Reus are working on voluntary base. Occasionally people are hired, to help the cooperative with financial or technical questions.

Currently the member total of De Groene Reus is circa 100 and twice a year the member meeting is organized, which is mostly attended by circa 20 members (Haanstra, pers. com., 04-07-18). To become a member a single contribution fee of €50,- has to be paid. On the member meetings members share the vision of De Groene Reus of contributing to the production of renewable energy. However, some members are more motivated by environmental issues and others are more motivated by the belief that the profits of renewable energy should stay within the region. This has not lead to any significant differences on the meetings (Haanstra, pers. com., 04-07-18).

5.6.2 The story of De Groene Reus: *vertical development*

Political domain

When De Groene Reus was founded by a group of active citizens, the municipality of Almere quickly understood that this new energy cooperative was a useful partner in making citizens more aware of the need for sustainable measures. Therefore, De Groene Reus and the municipality of Almere worked together in stimulating citizens to invest in sustainable improvements for their homes, preferably together with the neighborhood (Haanstra, pers. com., 04-07-18).

As De Groene Reus is an energy cooperative for Flevoland, they experience significant differences between the two largest municipalities of the province. The municipality of Almere has elaborated policies on sustainability and acknowledges the energy cooperative as a helpful partner in achieving their sustainability goals. Therefore, the municipality of Almere has supported De Groene Reus numerous times in the past years, mostly by giving the cooperative tasks, such as stimulating citizens initiatives or advising sport clubs in being more sustainable and pay the cooperative for these tasks. Haanstra especially mentions that this is different than giving subsidies to the energy cooperative, as the cooperative offers their services in return for payments. (pers. com., 04-07-18). Because of Almere being already very supportive towards the cooperative, De Groene Reus has not had any significant influences on the policies of the municipality. In Lelystad the municipality and the energy cooperative do not yet have a relationship as good as in Almere. De Groene Reus has had several meetings in Lelystad with different parties to enhance the collaboration with them. The message of De Groene Reus was that it is possible for the municipality to uptake a stimulating role towards energy cooperatives. Not necessarily in the sense of financial stimulations, but also in stimulating citizens to get active themselves and working together with the energy cooperatives. De Groene Reus also advocated to introduce policies in Lelystad which obligate citizens involvement in projects. In Almere there have been some projects developed with such participation obligations included (Haanstra, pers. com., 04-07-18).

Regarding the national political level, De Groene Reus has realized their solar projects with SDE subsidies. Due to the zip code restriction, the *postcoderoosregeling* was not an option in Almere.

Economical domain

According to Haanstra one of the most significant problems in the economical domain is the economic situation of energy cooperatives in terms of competition towards larger investors (pers. com., 04-07-18). De Groene Reus was not able to obtain a loan for the realization of the seven solar roofs as banks thought of the investment being either too risky or too small to even get involved. Larger conventional investors have more financial resources and are well known to the banks (Haanstra, pers. com., 04-07-18). On the other hand, the position of the cooperative was an advantage in finding suitable location for solar roofs. Both the municipality of Almere and *Zorggroep Almere* chose to give their roof space to the cooperative because of their ideological purposes rather than financial purposes (Haanstra, pers. com., 04-07-18). Eventually, there appeared to be a high demand for the participation in solar projects, as the crowdfunding for the realization of the solar roofs was completed within ten hours.

Legal domain

De Groene Reus has had no problems with legal procedures. There are however two other legal aspects which caused problems. First, before the cooperative was able to do the crowdfunding for the solar projects they had to set up an information memorandum to cover all the possible failures which could happen. This eventually took over a year to complete, Haanstra mentioned (pers. com., 07-04-18). Second, the obligation to create new cooperatives or *BVs* for every new project makes it very difficult to maintain a clear overview. Haanstra speaks of a “Christmas tree of governance”, including cooperatives in cooperatives and small *BVs* for different projects. When she took over the position of chairwoman it took her three months to figure out precisely where she was responsible for (pers. com., 04-07-18).

Socio-cultural domain

The first year of De Groene Reus were dominated by stimulating citizens in being more sustainable, while more recent years the focus of the cooperative lay more on producing sustainable energy their selves. However, De Groene Reus is currently busy preparing a large campaign for in 2019 in which the cooperative again tries to stimulate people’s awareness of the necessity of sustainability. This campaign will last for six months and will include social media action and the old-fashioned handing out of flyers.

Chapter 6: Cross-Case Analysis

In this chapter the six cases which have been elaborately explained in the previous chapters will be compared to each other.

6.1 Comparison of the Horizontal Development of Local Energy Cooperatives

6.1.1 Vision

The six local energy cooperatives in this study all have a strong vision about how they think the energy transition should be organized. The visions of the energy cooperatives in this study are very similar to each other, as they all contain the following three aspects. First, they are unanimously about the fact that energy should be produced sustainably, and energy usage should be reduced. Second, they want to achieve renewable energy production and energy savings together with an involved community. In their vision citizens are involved in the energy transition, as they are able to participate in the making of plans. Third, the aspect of energy being a local product is important for the energy cooperatives. This means that citizens can profit from the energy production in their region as well.

To sum up, all the cooperative’s visions contain renewable energy, local participation and local profits.

6.1.2 Projects

Advices

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Advices	Energy coaches Members are able to receive an energy scan for their home for €50 (regular costs are €250)	No specific projects	Living room tour Collaboration with the municipality to stimulate energy savings. For all citizens of Tilburg and costs depend on the type and size of advice.	No specific projects	Het slimste huis Every Saturday Alkmaar Energie is present here to help people with questions about sustainability.	Energieloket Collaboration with the NMFF to offer free advice to all inhabitants of Flevoland, regarding solar panels, insulation, heat pumps and subsidy possibilities.

Table 6.1.2.a Advices

Four of the six local energy cooperatives have specific projects regarding advising citizens on how they could organize their houses more sustainable. Alkmaar Energie and De Groene Reus offer free advices on a more general basis. Leudal Energie and Energiefabriek013 offer very specific advices for home owners, which come with higher costs. Both energy cooperatives offer these services for all citizens of the municipality, however Leudal Energie provides their members a significant discount.

Energy supply

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Energy	SAMEN OM	GreenChoice	GreenChoice	Huismerk Energie	SAMEN OM	SAMEN OM

Table 6.1.2.b Energy supply

All six the local energy cooperatives are involved in the supplying of energy. In three cases a collaboration with SAMEN OM has been set up, in two cases GreenChoice is the partner and WindpowerNijmegen chose to work with Huismerk Energie. Huismerk Energie buys the electricity and certificates from the Windpark Nijmegen-Betuwe. All three energy suppliers use the local aspect of energy as a selling point. Besides, for every customer these energy suppliers receive via the cooperative, the cooperative receives a fee. SAMEN OM consists solely out of 35 energy cooperatives.

Solar energy

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Solar Energy	<p>Realized: Two school roofs contain 240 solar panels in total. Financed by SDE subsidy, Rabobank loan and citizens participations of €250 per piece.</p> <p>In the pipeline: a <i>postcoderoos</i> project on the roof of the town hall. Citizens are currently able to participate for €325 per piece.</p>	<p>In the pipeline: a <i>postcoderoos</i> project on a sport hall. Citizens can now subscribe to the project to reveal their interest.</p>	<p>Realized: A large stable roof contains 700 solar panels, realized with a <i>postcoderoos-regeling</i>. Citizens were able to participate for €325 per piece. After realization the responsibility of the project was transferred from Energiefabriek013 to a new project-cooperative.</p> <p>In the pipeline: citizens can sign up as potential participants for a large solar energy project.</p>	<p>In the pipeline: The cooperative wants to broaden its scope from wind to solar energy. Plans are to install 17.000 solar panels beneath the wind mills. When the permit is granted, an SDE subsidy will be applied for and participation options for citizens will be clarified. Different than the other cases, this solar project will be realized in a meadow instead of on a roof.</p>	<p>Advised: three solar roofs in which Alkmaar Energie has participated with an advising role.</p> <p>In the pipeline: a <i>postcoderoos</i> project of 240 solar panels on a roof in the centrum of Alkmaar. Currently 1/3 of the participations have been sold, for €235 per piece.</p>	<p>Realized: a solar roof on a sport hall with 120 solar panels. Financed with a loan from ING Bank and the SDE subsidy. There were no further participation options</p> <p>Realized: seven solar roofs together with <i>zorggroep Almere</i>. As banks did not want to get involved, it was financed by SDE subsidy and crowdfunding. All Dutch citizens were able to buy participations of €1000. The necessary €206.000 were raised within 10 hours.</p>

Table 6.1.2.c Solar Energy

All the six energy cooperatives are involved in solar energy, however only three cooperatives have realized solar projects already. Two energy cooperatives have realized these with the SDE subsidy and only one project was realized with the *postcoderoosregeling*. Of the solar projects in the pipeline, three will be realized with the *postcoderoosregeling* and one with the SDE subsidy. Due to the large size of the solar field of WindPowerNijmegen they chose to use the SDE subsidy, as this does not have a zip code restriction. This was also the reason for De Groene Reus to choose for SDE subsidy. In all solar projects, both realized as in the pipeline, citizens are able to participate financially, except for one solar project of De Groene Reus.

Wind energy

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Wind energy	<p>In the pipeline: Windpark Neer, consisting of 3 wind mills. Costs are €14.000.000. Rabobank is willing to give a loan but over €2 million must be invested by the cooperative. Members can participate for €250 per piece. Currently €700.000 has been sold. The rate of return for participants is 4-6%.</p>	<p>In the pipeline: Windpark Greenport Venlo consisting of 9 wind turbines. This project is being developed by a large developer and the cooperative joined later with the intention to keep profits within the region. One of the wind mills will be divided in 3000 shares of €250. All Dutch citizens are able to participate; however, the rate of return is the highest for people in Horst aan de Maas and Venlo. Precise numbers are not yet available.</p>	<p>In the pipeline: Windpark De Spinder, consisting of 4 wind mills. A collaboration of 11 cooperatives is developing this wind park. To receive a loan from the bank, €1,5 million has to be collected by participations., which cost €250 per piece. An estimation states that this investment will grow in 20 years to somewhere between €538 and €630.</p>	<p>Realized: Windpark Nijmegen-Betuwe consists of 4 wind mills. 1013 citizens of Nijmegen and surroundings invested in total €2 million. The GNMF invested €800.000 and the Rabobank gave a loan of €12 million. The participations were €250 per piece. An estimation states that this investment will grow in 20 years to somewhere between €583 and €674.</p>	<p>Realized: A share of 37% in wind mill De Boekel together with 3 other cooperatives. Citizens can buy participations of €300 per piece. The expected rate of return is 5% but might turn out higher if wind velocities were higher.</p>	<p>Realized: a share in an old wind mill. The cooperative has bought this to have a say in the developing of a new large wind park. The way of participation is still under consideration.</p>

Table 6.1.2.d Wind Energy

As all the six energy cooperatives are involved in wind energy, only three are involved of the realization of a wind park from scratch. WindPowerNijmegen is the only cooperative who has realized a complete wind park by themselves. The plans of Leudal Energie and Energiefabriek013 are both well advanced, Leudal Energie on its own and Energiefabriek013 in a collaboration of 11 cooperatives. Reindonk Energie has successfully stepped in in the existing plans of a large developer to keep a part of the profits within the region. All the wind parks use the SDE subsidy for the realization and all energy cooperatives offer the opportunity to citizens to participate in the realization of the wind parks and receive a rate of return on their investment.

6.1.3 Organization

Since 2013	Members	Board	Volunteers	Member meeting	Paid employees	Facilities
<i>Leudal Energie</i>	300 members who pay a contribution of €10 per year.	5 board members who are occupied 1 day per week. Every month they meet. Depending on the activities they meet more often.	15 active members divided over working groups. Each working group contains at least one board member.	2-3 times a year with 40-50 members present. Here large decisions are made by voting.	2 project leaders are paid per hour and the volunteers doing the 4-hour energy scan receive a €35 compensation.	An office where people can visit, including receptionists. There is a meeting room where working groups meet too.

Table 6.1.3.a Organization of Leudal Energie

Since 2015	Members	Board	Volunteers	Member meeting	Paid employees	Facilities
<i>Reindonk Energie</i>	70 members (mostly still friends and family) who pay a contribution of €10 per year.	4 board members who are occupied 10-12 hours in the week. Every Friday morning they meet	Members willing to help with activities, but no working groups. Structural thinking along would be useful.	2 so far, with 30 members.	No. However, the cooperative gets paid for the expertise board members share with local organizations on energy savings.	No office, the board members work from home.

Table 6.1.3.b Organization of Reindonk Energie

Since 2013	Members	Board	Volunteers	Member meeting	Paid employees	Facilities
<i>Energiefabriek013</i>	70 members who pay a contribution of €10 per year.	5 board members who are occupied for 2-4 hours a week.	Several working groups in which board members and active members work on specific tasks.	Attended by 15 to 20 members. Every member present has one vote per decision.	A coordinator, a social analyst, a technical analyst and the website builder are being paid for their activities.	No office, volunteers work from home and occasionally can use the office of one member.

Table 6.1.3.c Organization of Energiefabriek013

Since 2013	Members	Board	Volunteers	Member meeting	Paid employees	Facilities
<i>WindPower Nijmegen</i>	1100 - 1200 members. Wind park participants are members and now citizens can become member by participating in the cooperative for €50. Both come with €25 registration costs.	6 board members who are occupied for 1 day a week.	60 active members participate in several working groups.	Attended by over 80 members. Voting takes place with green and red cards.	A technical expert and a communication expert are being paid for their activities. Sometimes specific expertise is hired as well.	A facility right next to the wind park can be used for meetings and hosting visitors.

Table 6.1.3.d Organization of WindPower Nijmegen

Since 2013	Members	Board	Volunteers	Member meeting	Paid employees	Facilities
<i>Alkmaar Energie</i>	50 members who pay a contribution of €25 per year or participate in the solar roof project.	5 board members who meet every Tuesday evening.	One volunteer works on the website and one volunteer works on marketing. Two volunteers are present on Saturday in <i>Het Slimste Huis</i> .	Once a year, attended by circa 10 members.	No paid employees.	No office, meetings are in a community centrum. Citizens can find the board there every Tuesday and volunteers on Saturday.

Table 6.1.3.e Organization of Alkmaar Energie

Since 2012	Members	Board	Volunteers	Member meeting	Paid employees	Facilities
<i>De Groene Reus</i>	100 members who have paid a single contribution of €50.	3 board members who are occupied for 1,5 -2,5 days per week. They are looking for 2 more board members.	No working groups. They do have active volunteers and a council of advice.	Twice a year, attended by circa 20 members.	No paid employees. Occasionally financial and technical experts are hired.	An office from where board members and volunteers can work.

Table 6.1.3.f Organization of De Groene Reus

The tables 6.1.3. a until 6.1.3.f give an overview of how the six local energy cooperatives are organized. Five of the six cooperatives have among 50 to 100 members, but only WindPower Nijmegen has 1100 to 1200 members, which is more than ten times more than the others. Further, the cooperatives differ in the maturity of the organization. The presence of working groups, paid employees and facilities are indicators for the maturity of the organization.

6.1.4 The process of...

To receive insight in the role local energy cooperatives can play in the process of the realization of wind parks, the cases of Leudal Energie, Reindonk Energie, Energiefabriek013 and WindpowerNijmegen are compared in table 6.1.4.

	Leudal Energie: <i>De Kookepan</i>	Reindonk Energie: <i>Greenport Venlo</i>	Energiefabriek013: <i>De Spinder</i>	WindPowerNijmegen: <i>Windpark Nijmegen-Betuwe</i>
<i>Resistance</i>	2 <i>zienswijzen</i> : one regarding the bat population and one regarding scenery pollution. Both not strong enough to stop the plans. Municipality in favor of wind park: permit approved by city council. People living nearby have become members eventually.	Large resistance against the wind park. City council disapproved the permit on ground of lack of support from surroundings and health issues regarding nuisance. Now: people are able to object to the <i>Provinciaal Inpassings Plan (PIP)</i> .	4 <i>zienswijzen</i> at first, but eventually none was strong enough to be put through. Municipality is in favor of the project: permit approved. Also, the idea of realizing it cooperatively with 11 cooperatives was from the municipality.	Resistance from one specific neighborhood, who had to endure a railway and distribution center as well. Also caused by poor communication from municipality. Resistance delayed the project for a year, as the verdict went to the Council of State.
<i>Communication</i>	From the start people living nearby were kept informed about the plans. 4 meetings were organized with the land owners of the proposed area.	Trying to convince the municipal board, Reindonk Energie talked to aldermen, gave a presentation to the board and talked to all the political parties.	Extensive communication towards people living nearby. Information folders were sent, information nights were held, and people nearby received home visits to be informed about the plans and be given the chance to ask questions.	WindpowerNijmegen actively communicated with the opponents. With personal conversations, articles in local newspapers and information nights, citizens were informed and also invited to think together of suggestions for possible compensations
<i>Compensation</i>	€100.000 for the several land owners. Surroundings fund: €1 per MWh (€25.000 to €30.000). Can be used by people living nearby for their sustainable projects. People living within 750 m: free house insulation. Annual compensation for people living nearby (depending on distance to wind park this varies from €1000 to €250 yearly)	A fund of €600.000 has been made available for the two involved local energy cooperatives. Reindonk Energie can decide for what activities the surroundings can use this.	People living nearby receive precedence in buying participants. The fifth wind mill was cancelled as the cooperative expected to much nuisance from this mill. This news was received very positive. When wind velocities are higher, the extra profits will be divided over the 11 cooperatives, which they can use for future investments.	Financial compensation was offered to the resisting neighborhood but refused. A deal with one single opponent, concerning the placing of solar panels on his shed. A fifth wind mill was cancelled, to prevent problems with a resisting land owner. Surroundings fund: €1 per MWh (€24.000 per year). Every two years people can apply for a part of this money. The cooperative will select ideas and citizens can vote on the ideas.

Table 6.1.4. The process of...

Table 6.1.4 gives an overview of the resistance each process had to deal with and the way the cooperatives handled this by communicating and compensating. The case of Greenport Venlo differs from the others on two main points. First, the cooperative got involved in the wind park in a later stadium. The plans were initiated by the province and a developer and Reindonk Energie decided later in the process that the citizens of Horst aan de Maas and Venlo should have the opportunity to participate as well. Second, this case differs as it is the only case in which the municipality is not in favor of the wind park. Reindonk Energy spend a lot of energy in convincing the municipality, however they did not manage to convince. Even a fund of €600.000 for surrounding improvements did not help. In the other cases the municipality was in favor of the wind park, resulting in permit approvals in all cases. The three energy cooperatives all used both communication as compensation to deal with resistance, but there are differences between the cases. Leudal Energie focused strongly on the financial compensation of people living nearby. This in combination with keeping people informed eventually led to the surrounding citizens even becoming members of the cooperative. Energiefabriek013 focused more on communication than compensation. Due to this communication it was decided to cancel the fifth wind mill as this would cause too much nuisance. Finally, WindpowerNijmegen tried both extensive communication and offered financial compensation but this had no effect. The resistance was too strong and led to a delay of a year. They too decided to cancel the fifth wind mill to prevent issues with an unwilling landowner.

6.2 Comparison of the Vertical Development of Local Energy Cooperatives

6.2.1 Political domain

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Political Domain	<p>Municipality has helped the cooperative in the beginning phase by giving small financial and informative support.</p> <p>City council voted in favor of The Kookepan.</p> <p>United in REScoop Limburg, Leudal Energie and other cooperatives realized policies on future wind parks being obliged to be 50% cooperative at least.</p>	<p>The connection of Reindonk Energie and the municipality has improved over years. The new coalition wants to collaborate more.</p> <p>A lot of energy was spent on convincing the municipal board to vote in favor of the wind park, but they vote against.</p> <p>Reindonk Energie participated in solar energy policies of the municipality, however did not receive a permit for a solar field.</p>	<p>Energiefabriek013 works with municipality to enhance citizens initiatives and they brainstorm about current sustainability issues.</p> <p>Municipality sees cooperative as a suitable messenger for sustainability issues as they are more on the side of the citizens. Municipality pays the cooperative for their activities.</p> <p>Municipality wanted Spinder to be a collaborative project of 11 cooperatives. So, they are in favor of the cooperative way of thinking about energy.</p>	<p>Municipality was supporting in advance to the wind park process by granting financial assistance and offering the land for reduced prices.</p> <p>Municipality sees cooperative as a frontrunner started a collaboration to stimulate more citizens initiatives.</p> <p>Board members of the cooperative join the municipality in sustainability commissions.</p>	<p>The relationship between cooperative and municipality is fine, however could be more intensive.</p> <p>Alkmaar Energie gets asked for their opinions by the municipality as representative of the citizens.</p> <p>The region's municipalities sold a share of their wind mill to cooperatives with the intention to help them getting finances, knowledge and experience.</p>	<p>Municipality of Almere sees cooperative as a partner in stimulating citizens to be sustainably active. The cooperative gets paid for their tasks.</p> <p>The relationship with Lelystad is less intensive.</p> <p>In Almere the cooperative has stimulated the municipality to create policies about future renewable energy projects must be partly cooperative. In Lelystad they try to achieve the same.</p>

Table 6.2.1. Political domain

Regarding the political domain there are differences between the relationships of the municipality and the local energy cooperatives. As the municipalities of Leudal, Tilburg, Nijmegen and Almere were very helpful, especially in the beginning phase of the local energy cooperatives, the municipalities of Horst aan de Maas, Alkmaar and Lelystad are less active regarding the local energy cooperatives. In the case of Reindonk Energie this led to the disapproval of the permit for the wind park. In all cases the local energy cooperatives are somehow involved in the policy making of the municipality on sustainability issues. Energiefabriek013 and Alkmaar Energie are seen by the municipalities as representatives of the people and therefore values their opinion. De Groene Reus, WindpowerNijmegen and Energiefabriek013 are collaborating with the municipality specifically on the stimulation of more citizen's initiatives regarding sustainability. Reindonk Energie participated in the development of solar energy policies but did not receive a permit for a solar field after all. Leudal Energie and De Groene Reus have accomplished the most concrete influence on the political domain, as they realized policies on future renewable energy developments obliged to be partly realized cooperatively. Leudal Energie accomplished this for the region of Noord-Limburg in a collaboration with other cooperatives in REScoop Limburg and De Groene Reus accomplished this in Almere.

6.2.2 Economical domain

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Economical Domain	<p>Finding a bank for the wind park was easy as this is a solid investment, finding a bank for smaller (solar) projects was difficult.</p> <p>Regional Rabobank has become a partner who even grants €25.000 subsidy the coming three years.</p> <p>Focus on local and green with SAMEN OM</p>	<p>Difficulties in finding a bank willing to grant a loan, as banks think the risks with cooperatives are too high and the profits too low.</p> <p>Focus on local and green with Greenchoice. Making energy a regional product.</p> <p>Hard to receive consumers for energy supply, as people tend to stay with their conventional supplier.</p>	<p>Rabobank willing to grant loan for wind park and solar project was realized without a loan.</p> <p>Municipality chose cooperative realization of the wind park, meaning that they chose for the profits to stay within the region.</p> <p>Focus on local and green with GreenChoice.</p>	<p>Years before the cooperative, Eneco wanted to realize the wind park. This failed and in the current situation the profits stay within the region instead of flowing away.</p> <p>Focus on localness by buying turbines in Gelderland and collaboration with Huismerk</p> <p>Chose for local and green bank instead of the cheapest.</p>	<p>By buying a share from a wind mill previously owned by a large investor, the profits remain in the region.</p> <p>Focus on local and green with SAMEN OM instead of financial incentives.</p>	<p>Tried for a year to receive a loan for the seven solar projects, but banks did not want to be involved. Risks are too high and profits too low.</p> <p>This is a disadvantage the cooperative has towards large investors.</p> <p>An advantage is finding a roof, because of the goodwill toward cooperatives by roof owners.</p>

Table 6.2.2. Economical domain

The experiences of the six local energy cooperatives in the economical domain are quite similar to each other. All cases show a viewpoint on energy being a local product. A strong indicator for this viewpoint is the collaboration with energy suppliers which have the same opinion about energy. WindpowerNijmegen stresses the local aspect even clearer, as they bought the wind turbines in Gelderland, chose an energy supplier from Nijmegen and chose the regional bank over the cheapest bank. Regarding wind energy, banks are willing to invest. However, for smaller loans it seems much more difficult for cooperatives to receive a loan, because banks expect high risks and low profits. The need for loans by a bank stresses the fact that local energy cooperatives do not have much financial capital. In the case of De Groene Reus an advantage that local energy cooperatives have, has come forward, namely the goodwill of roof owners to make their roof available for a solar project.

6.2.3 Legal domain

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Legal Domain	Legal procedure of wind park goes well. No further obstacles	The legal procedures have caused a delay in the realization of the wind park, because the city council did not approve the permit application.	Legal procedure of wind park goes well. No further obstacles.	Many permits on many different places had to be received. Changing the zoning plan in favor of wind energy took long. Legal procedures caused a delay of 1,5 year.	The legal aspects of realizing a solar project on someone else's roof requires expertise. The cooperative had to hire someone for this.	The making of the information memorandum for the crowdfunding took over a year. A complex governance structure arises due to the obligation of making new cooperatives for each project.

Table 6.2.3. Legal domain

When resistance towards the realization of a wind park exists, this is most likely to cause a delay for the project. Both Reindonk Energie and WindpowerNijmegen have experienced this. When there is hardly any resistance, the legal processes do not cause any problems. This is the case with Leudal Energie and Energiefabriek013. WindpowerNijmegen also experienced a delay because the change of the zoning plan took long, and the number of permits was perceived as dreadful. Alkmaar Energie and De Groene Reus experienced difficulties with boarding up the legislation in respectively the placement of solar panels on someone else's roof and the information memorandum for crowdfunding. Lastly, complex governance structures arise as new cooperatives must be founded for each project.

6.2.4 Socio-cultural domain

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Socio-cultural domain	The solar panels on the elementary schools were combined with education programs. Visibility of E-coaches and solar panels confronts people with it every day	The cooperative ideas are often hard to explain, before people truly accept them. A bus tour to a wind park in Germany was organized. A marketing office has been asked to help with a communication strategy.	In the beginning phase of the cooperative a lot of energy was put in raising awareness. Now the focus is more on realizing projects.	Working group thinking of educational activities. Working group thinking about stimulating other initiatives. Nijmegen is Green Capital, momentum to receive a lot of attention. Possibilities to visit the wind mills.	Present at <i>Het Slimste Huis</i> every Saturday. Recently organized a sustainability event with André Kuipers as speaker. Difficulties in making more people aware than are already.	In the beginning phase of the cooperative a lot of energy was put in raising awareness. In 2019 a campaign of six months will focus again on raising awareness.

Table 6.2.4. Socio Cultural domain

All six the local energy cooperatives are involved in some kind of educational or raising awareness activities. The types of activities differ from lesson on school to bus tours to German wind parks and

from visiting a wind mill to inviting former astronaut André Kuipers. Reindonk Energie and Alkmaar Energie stress the fact that it is rather difficult to raise any more awareness.

6.3 Determining the Upscaling Potential of Local Energy Cooperatives

This chapter will provide an overview of the presence of the factors to determine the upscaling potential. First the factors knowledge, leadership, finances, access to expertise and access to the grid will be displayed. Then the quantitative data of the survey filled in by the local energy cooperatives will be explained.

6.3.1 Comparison of determining factors

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Knowledge	<p>All board members have different relevant backgrounds.</p> <p>One board member has realized a wind park before</p> <p>Lacking: knowledge on communication</p>	<p>Board members have different relevant backgrounds.</p> <p>The first years were deliberately used for gaining (technical) knowledge.</p> <p>Marketing office helps with communication strategy.</p>	<p>Board members have different relevant backgrounds, of which a communication background.</p> <p>In the realization process of the wind park, knowledge was provided by <i>Brabantse Ontwikkel-maatschappij</i>.</p>	<p>Board members have different relevant backgrounds.</p> <p>Wiek-II provides a lot of experience as well.</p> <p>Won a prize for their communication strategy, which contains sending many news items to regional papers.</p>	<p>Founders were active in the sustainable energy sector.</p> <p>A coordinator who had experiences in founding energy cooperatives helped in the beginning.</p> <p>Lacking: communication strategy</p>	<p>In the beginning a lot of help from REScoop and other cooperatives.</p> <p>Now a board with different relevant backgrounds.</p> <p>Still searching for a workgroup for enhancing knowledge on promotion activities.</p>

Table 6.3.1.a. Knowledge

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Leadership	<p>First this was present by the founders.</p> <p>Now this leadership role has been handed over to new board members.</p>	<p>The four founders are still the leaders. ‘</p> <p>As there are no working groups yet, they do most of the work themselves.</p>	<p>Present in the form of the board members who give direction to the working groups.</p>	<p>First this was present by Wiek-II.</p> <p>Now the leadership role has been taken over by the board, who gives direction to the working groups.</p>	<p>Leadership is present in the form of the board members.</p> <p>Necessary for keeping focus with a lot of volunteers without working groups.</p>	<p>First this was one person; however, the organization has matured.</p> <p>Now procedures and policies are leading.</p>

Table 6.3.1.b. Leadership

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Finances	Initial costs for projects have been no problem, as the local Rabobank gives a subsidy of 3 times €25.000 per year And the municipality has helped too with small subsidies.	Receiving income by offering expertise to municipality, housing cooperatives and companies. €20.000 subsidy is available for a <i>postcoderoos</i> project, from the province of Limburg.	Frugal policy made sure the finances were sufficient. Getting paid by municipality for their services. They do not want subsidies from the municipality.	Received financial support from the municipality in the beginning. Now receiving income from the wind park.	Received small subsidies from municipality for flyers and marketing. Local companies can become member for €250 a year.	Banks did not want to be involved in the solar projects. Crowdfunding was full in 10 hours. They are not in favor of receiving subsidies from a municipality.

Table 6.3.1.c. Finances

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Access to expertise	Due to sufficient finances, the cooperative was able to hire a communication expert and a business model advisor.	For the wind park Etriplus (large developer) has expertise. For the <i>postcoderoos</i> project the subsidy of the province can be used to hire expertise.	Hired if necessary. BOM has brought in a lot of expertise regarding the wind park.	Paid employee has the technical expertise. Other expertise will be hired if necessary.	Legal expertise is hired. Expertise on communication strategy is desired.	Technical expertise is hired.

Table 6.3.1.d. Access to expertise

	Leudal Energie	Reindonk Energie	Energie-fabriek013	WindPower Nijmegen	Alkmaar Energie	De Groene Reus
Access to the grid	Not yet a problem. However, a warning letter has been sent to the grid owner arguing that grid capacity improvements are necessary considering the proposed new wind parks.	Future problems with the grid capacity in the outer parts of The Netherlands are expected. Question is: who will pay for this?	No problems.	No problems. Paid employee knows his way around the grid owners.	No problems.	No problems.

Table 6.3.1.e. Access to the grid

6.3.2 Local Energy Cooperatives: survey

A quantitative addition to this qualitative research is the survey the local energy cooperative's respondents have filled in about how they assess the importance of these factors. Six respondents have filled in the survey. First, they had to grade the necessity of the factors in table 6.3.2 for respectively the horizontal development and the vertical development. Horizontal development meaning the growth of the organization itself, the projects they realize and possible replication and vertical development meaning the interaction and influence with/on the municipality, the position in terms of economical competition, overcoming legal obstacles and dealing with the public awareness. Respondents were able to grade the necessity from 1 to 5 (1=none and 5= very strong). Second, respondents had to choose between yes and no if the factor is present in their cooperative.

Table 6.3.2 shows the averages of the gradings by the respondents about the necessity of the factors for both horizontal and vertical development. Besides it shows in how many of the six local energy cooperatives the factor is sufficiently present according to them.

Factor	Necessary for horizontal development?	Necessary for vertical development?	Present in the cooperative?
Strong shared vision	4,33	3,17	5/6
Large number of (active) members	3,17	3,67	3/6
Involvement of the community and local actors	4,33	3,83	5/6
Internal and external communication	4,17	4,17	3/6
Leadership	4,0	3,83	6/6
Political leadership	4,17	4,0	6/6
Subsidies	3,5	2,67	5/6
Cooperation with other cooperatives	3,5	3,33	5/6
Intrinsic motivation	4,67	4,0	6/6
Other: ...			

Table 6.3.2 Valuation of factors determining the upscaling potential

The factor which has been valued the most important for horizontal development according to the local energy cooperatives is 'intrinsic motivation', followed by a 'strong shared vision' and the 'involvement of the community and local actors'. The factor valued the most important for vertical development is 'internal and external communication', followed by 'political leadership' and 'intrinsic motivation' again.

'Intrinsic motivation' is present in all the cooperatives, according to the respondents, however 'internal and external communication' is only present in half of the cooperatives. A second factor which only three of the six respondents state is present in their cooperative is a 'large number of members'.

6.4 Generalizing new theory

The cases in this thesis have been explained in detail in chapter five and the previous sections of chapter six compared the different cases to each other. The data and the comparison of the data will in this section be used for the creation of new theories. First, the data distinguished two main types of developing strategies of the cooperatives. Second, there are four types of municipal involvement and the additional effects of this involvement. Third, the way in which local energy cooperatives tend to overcome resistance to larger energy projects, mainly wind parks, can be distinguished in two different ways.

6.4.1 Developing strategies

The six cases investigated in this research show two different types of developing strategies. The first developing strategy is used by five of the six local energy cooperatives and will be referred to as the 'Gradual Growth' developing strategy. The second strategy was only used by WindPower Nijmegen in this research but showed significant differences with the other cases. This developing strategy will be referred to as the 'Project Orientation' developing strategy. Both strategies will be explained in table 6.4.1.

 Gradual Growth	 Project Orientation
<p>Local energy cooperatives with the developing strategy of Gradual Growth start with the intention to set up a local organization to enhance the region's sustainability in a way that the profits will be kept in the region as well.</p> <p>The activities are first focused on building an organization, building a member base, receiving name recognition and gradually start with small projects.</p> <p>The first projects are often advice-related or contain solar roofs. Small scale projects, with relatively low risks.</p> <p>The cooperative grows both as an organization as with its projects in a gradual way. Knowledge and financial capital grow after every deliberate step.</p> <p>After the realization of smaller projects, the cooperative will also be involved in larger projects, such as wind parks.</p> <p><i>This strategy creates a platform, which gradually comes up with new activities.</i></p>	<p>Local energy cooperatives with the developing strategy of Project Orientation start with the intention to realize one large project which contributes to the region's sustainability in a way that the profits will be kept in the region as well.</p> <p>The activities are focused on accomplishing this large project (most likely a wind park) and will follow from the needs of this project. These activities contain a search for participants, creating a business case, promotion activities.</p> <p>While working on the realization of this project, the organization grows as well and gains knowledge and name recognition.</p> <p>After the project has been realized and the goal is accomplished, the cooperative searches for new activities to get involved in.</p> <p><i>This strategy realizes a project, which results in the development of an organization as well.</i></p>

Table 6.4.1 Developing strategies

A significant difference between the two development strategies in this research is the number of members of the local energy cooperatives. The gradual growth strategy has resulted in 50 to 100 members for all five cases using this strategy. The single case using the project orientation strategy however has now a member base of 1100-1200. On the other hand, the gradual growth strategy has a higher rate of democracy as members have influence on every step in any direction the cooperative makes. Also, the risks are lower, as the developing steps are smaller. Failure of one project contains only a minor setback. Within the project orientation strategy, failure would mean that there is nothing left to build on, which is especially a risk with wind parks, as those are highly sensitive to resistance.

6.4.2 Levels of municipal involvement

The cases in this research show a wide spectrum of involvement of the municipality. The level of involvement varies from being opponents to mutual benefiting from each other. Table 6.4.2 shows the four levels of municipal involvement and illustrates how this affects the local energy cooperative.

Opposing	Neutral	Stimulating	Mutual benefits
<p>An opposing municipality not only lacks the willingness or capability to help the local energy cooperative, it really sets the cooperative back.</p> <p>This is the case when permit applications are denied for solar or wind energy.</p>	<p>A neutral municipality acknowledges the existence of the local energy cooperative but does not actively stimulate it nor sets the cooperative back.</p>	<p>A stimulating municipality acknowledges the existence of the local energy cooperative and is in favor of its activities.</p> <p>Useful support the municipality can give is the granting of municipal roof surface for solar projects and granting financial and informative support in the beginning phase of cooperatives.</p>	<p>A municipality who sees the mutual benefits does not only stimulate the cooperative but actually benefits from the local energy cooperative.</p> <p>Local energy cooperatives are a perfect messenger for the municipality's sustainability agenda and can be helpful in making sustainability policies.</p>
<p>Example: Reindonk Energie saw both the permit for a solar field as for a wind park being denied.</p>		<p>Example: Municipality offers WindpowerNijmegen land for wind turbines for a price far beneath market value.</p>	<p>Example: Energiefabriek013 gets paid tasks from municipality to work on their policies. Example: Leudal Energie and De Groene Reus accomplished agreements on future sustainable projects mandatory to be partly cooperative.</p>

Table 6.4.2 Levels of Municipal Involvement and examples.

6.4.3 Coping with resistance

Local energy cooperatives who are involved in the realization of wind energy need to cope with the resistance of people living nearby. The results of this research show that local energy cooperatives have different options to overcome resistance. The options can be divided into two categories: 'Cooperative as a Communicator' and 'Cooperative as a Compensator', see figure 6.4.3.

 Communicator	 Compensator
<p>Local energy cooperatives as a communicator use many different ways of communication with the people living nearby, such as info flyers, info evenings, house visits and prearranged meetings.</p> <p>These communication options are not specific for local energy cooperatives, but the message they have is. The fact that people can participate and that the energy will become 'our' energy is an argument specifically for local energy cooperatives.</p> <p>Also, the members of the cooperative trying to convince people living nearby is also from the region and, especially in rural areas, might be a familiar face. This makes it easier for people to trust the cooperative. The local aspect of the local energy cooperative can be used to convince people.</p>	<p>Local energy cooperatives as a compensator have different options when it comes to compensate people living nearby for the nuisance they experience. Direct compensations for those affected is a first option. This could take place in direct financial compensation, or customized measures such as insulation or solar panels.</p> <p>Specific compensation options for local energy cooperatives, are indirect compensations. These are for instance project participation advantages, such as higher rates of profits for people living closer to the wind park.</p> <p>A second indirect compensation option contains a surroundings fund. The profits of the wind park will partly flow into a fund which can be used for local improvements. The preconditions can vary from strict (only sustainability) too loose (own choosing of locals).</p> <p>A third indirect compensation is that profits for the cooperative itself will also be used for future regional investments, instead of becoming profit for large developers.</p>

Table 6.4.3 Coping with resistance

It is most likely that local energy cooperatives use options from both the communication strategy as the compensation strategy. Combining both may result in very specific measures, such as the cancelling of one extra wind mill or agreeing upon very specific demands of protesters.

Chapter 7: Conclusion & Discussion

7.1 Conclusion

To answer the research question of this thesis '*How can local energy cooperatives contribute to the energy transition in The Netherlands?*' The chapters in this thesis about the development of local energy cooperatives, both horizontal and vertical, already gave extensive insight and many examples about all the different ways of *how* local energy cooperatives can contribute to the energy transition. For being able to conclude, the different sub questions will be answered.

The first sub question contains: *What is the current state of energy cooperatives in The Netherlands?* Energy cooperatives have a long history in The Netherlands, however only recently they have grown rapidly in numbers. In 2017 there were 286 local energy cooperatives in The Netherlands, producing enough energy for over 85.000 households. The different domains of Oteman et al. (2014) have been researched on a national level to receive clearer insight about the regime local in which energy cooperatives have to develop. It can be concluded from this chapter that the current state of energy cooperatives in The Netherlands is not only that they are developing rapidly horizontally, but that they also are developing vertically on a national level. Local energy cooperatives are involved in policy making, are adding value to the 'local aspect' of energy instead of just low costs, are constantly addressing the legal obstacles they face and open dialogues about sustainability over and over.

So, if local energy cooperatives currently have reached a state of fast-developing both horizontal and vertical, how have they developed precisely? The second sub question is: *How have local energy cooperatives horizontally developed in The Netherlands?* To answer this question a qualitative multiple case study has been conducted among six local energy cooperatives, investigating the aspects: vision, projects, organization and the process of wind park realization. The **vision** and **projects** of the six cases are highly similar to each other. All the cooperative's visions contain renewable energy, local participation and local profits. Also, the projects of the cooperatives are similar to each other. Regarding to wind energy, this has only been achieved by WindpowerNijmegen, and Leudal Energie and Energiefabriek013 are on the right track. Each local energy cooperative has developed their own **organization**. The activities of these organizations are quite similar to each other, the only thing that really stands out is the number of members the cooperatives have. This varies from 50 to 1200 without one cooperative being much older than the others. The final aspect of the horizontal development is **the process of** wind park realization. The way of handling resistance to the wind park is unique for every case. As one cooperative tries to do it all with communication, the other focusses also strongly on financial compensation. Besides, if the resistance is too strong, local energy cooperatives cannot solve this, which is the case with WindpowerNijmegen and Windpark Venlo. It cannot be concluded if the local aspect of the cooperatives helps in preventing resistance. Both Leudal Energie and Energiefabriek013 have had almost no resistance. Geenen (Leudal Energie) states that this is surely because of the localness of the cooperative, but Tetteroo (Energiefabriek013) argues that the extensive communication has prevented resistance.

The third sub question contains: *How have local energy cooperatives vertically developed in The Netherlands?* In the **political domain** collaboration between municipality and energy cooperatives differ from case to case. The municipality can help cooperatives very concretely by financial support or the granting of roof surfaces. Also, it becomes clear that the municipality is increasingly understanding that they can use energy cooperatives, and vice versa. Energy cooperatives can create support and are often a better advocator for the sustainability cause than municipalities. The other way around can energy cooperatives benefit from (paid) tasks they receive from the municipality and

the support as mentioned before. In the **economical domain** cooperatives will receive a loan from a bank, only after they have a starting capital. This starting capital will in most cases be realized by the selling of participations in the project to citizens. Local energy cooperatives stress the fact that receiving a loan for smaller projects is very difficult, as banks think the risks are too high and the profits too low. Without the national subsidies it would be difficult for energy cooperatives to have a closing business case. However, municipal subsidies are not something the cooperatives are striving for, as they tend to be very careful with their finances they do not spend more than they earn. Lastly, the local aspect of renewable energy is very much used as an advertising factor, also by collaborations with Greenchoice, SAMEN OM and Huismerk. In the **legal domain**, the cooperatives do not tend to have a significant influence. For the realization of solar projects, the legal aspects are not easy, but also not a problem “it has to be done, you have to deal with it, but it is not a showstopper” (Van de Boel, Energiefabriek013, pers. com. 19-07-18). For the wind power projects, the legal domain can be a showstopper as stakeholders (people living near by most of the time) can make legal protest. If the project is carried out by the rules, protest will only result in delay. Energy cooperatives often start with giving advices about sustainability measures, help people with their questions and stimulate them for being more sustainable. During this period, they are the most actively trying to increase the public’s awareness about renewable energy and therefore influencing the **socio-cultural domain**. However, when energy cooperatives are developing, their focus shifts more to energy production.

The final sub question is *What is the horizontal and vertical up-scaling potential of energy cooperatives?* The factors investigated in this research did not suggest any problems in the near future. Especially knowledge, leadership and access to expertise are abundantly available. Finances can be a problem for smaller projects, as banks are not eager to invest. Access to the grid is not a problem yet, however the two local energy cooperatives from Limburg expect serious surcharging problems in the future. The factors the respondents think, are the most important for horizontal development are intrinsic motivation, a strong shared vision and involvement of the local community and actors. They also think these factors are present in the cooperatives. The factors respondents think, are the most important for vertical development are internal and external communication, followed by political leadership and intrinsic motivation again. Regarding these factors the communication is lacking in three cooperatives.

Having answered all the sub questions, the research question *How can local energy cooperatives contribute to the energy transition in The Netherlands?* First, it can be concluded that there are two ways of how energy cooperatives can organize their developments. Namely with a Gradual Growth development strategy or with a Project Oriented strategy. Both strategies will result eventually in sort like activities concerning sustainable energy production, energy supply and energy savings. At this moment, the total amount of renewable energy production by local energy cooperatives in The Netherlands is relatively small. However, there is a second way of how local energy cooperatives can contribute to the energy transition, which is more significant. This contains the intention of local energy cooperatives to change the ideas about energy production. All cooperatives share the same vision about energy being not only sustainable, but also involving local profits and local participation. This new idea about energy production is slowly altering the current regime, which can be observed by the mutual beneficial relation with municipalities some local energy cooperatives are developing. Also, the economical domain of the regime is changing, as ‘localness’ of energy is receiving value. This means that the energy transition is influenced by the cooperative thinking as well, instead of solely the aim for producing renewable energy. Lastly, local cooperatives can contribute to the energy transition by reducing wind park resistance. Local energy cooperatives can hereby act as a communicator or a compensator.

7.2 Discussion

7.2.1 Reflection on theory

Hoppe et al. (2015) and Hielscher et al. (2011) argued that local energy initiatives were allowed to be seen as one niche, because they have the same way of thinking about renewable energy. This can be verified for local energy cooperatives. All six the local energy cooperatives in this research have the same visions, as they all contain the aspects: renewable energy production (or energy savings), energy production should involve local profits and energy production should be open for participation.

The barriers to entry of Huybrechts and Mertens (2014) were only found to be partly true. The access to finance turned out to be a barrier indeed, especially for smaller projects it was difficult to receive finances from banks. The access to suitable locations on the other hand is not a guaranteed barrier for local energy cooperatives. Roof owners often grant their surfaces to the cooperative just to be supportive to the cooperative instead of financial motivations. Besides, the municipality can play a role in offering space for projects for the cooperatives.

Concerning the ideas about local energy cooperatives being able to reduce resistance to wind parks (Wolsink, 2000; Huybrechts and Mertens, 2014) two different categories of options are observed to being used by local energy cooperatives. A cooperative can either use options as a communicator or as a compensator. In this research the opinions of respondents differ about which role is better, although its most likely that a combination of the two is used the most. Moreover, it can be concluded that having a local energy cooperative does not guarantee a resistance-free process. Some resistances are simply too persistent or have too much history to overcome.

According to Hufen and Koppenjan (2015) energy cooperatives are too 'unique' from each other for finding structural ways for scaling up. Following the results in this thesis I disagree to their statement. Of course, as the multiple case study offers a very detailed insight in the story of each cooperative, the six cases are very different from each other on the detail level. However, on a more general level, the cases show strong resemblances. As mentioned before, the visions and the type of projects of the local energy cooperatives are very similar to each other. But also when looking to the determining factors for the upscaling potential, similarities occur. The factor causing most often a barrier is 'finance'. Especially in the beginning phase of a Gradual Growing local energy cooperative, as the cooperatives face costs while starting up and do not have incomes from projects yet. The survey shows that the cooperatives struggle the most with communication and finding more members. In contrast with Hufen and Koppenjan (2015) I think that there are possibilities to find ways for structural scaling up, following from these similarities.

Reflecting on the domains by Oteman et al. (2014), the political domain offers the most possibilities for regime changes in favor of the local energy cooperatives, especially on the municipal level. Local energy cooperatives and the municipality can mutually benefit from each other, making it easier to realize changes.

7.2.2 Reflection on research approach

Data was retrieved by doing in depth interviews with respondents who are important members within the cooperative, this has the advantage that they know a lot about what is going on, but on the other hand can be a problem if they are overly positive. Therefore, I tried to use triangulation by searching other information sources, such as folders and websites, but this did not always contain as much data as the in-depth interview could give. Also, doing more interviews for one case to validate the data was difficult. As it was difficult at the first place to get respondents.

Deciding the upscaling potential at the hand of the data given by the respondents in the survey is a bit tricky, as respondents could be wrong, or too skeptical or too enthusiastic. For quantitative research six cases are not enough, but in this research the quantitative aspect is only a small part of the thesis and the qualitative data can be used to check the quantitative results.

Ideally, the geographical distribution of the cases in this research would be more divided over The Netherlands, as the northeast and southwest have not been covered now. However, including more than six cases was not an option due to the size and time of this research. Besides, different local energy cooperatives from all provinces were invited to participate, but many were not able to join.

Six cases are not representative for all the cooperatives in The Netherlands, so results are not generalizable without fail for all local energy cooperatives. According to Yin (2009) this is a commonly known problem of case studies, as there are many case specific characteristics. However, the fact that this thesis contains a qualitative multiple case research and thereby goes deeper into the cases, legitimizes this. It is not the main goal to generalize data, but to receive better insights in the 'story' of the development of the cooperatives and how they contribute to the energy transition.

7.2.3 Recommendations for science

A first recommendation for the scientific field is to do more research into the role local energy cooperatives can have in the prevention of resistance to wind parks. In this thesis it is expected that local energy cooperatives have a positive influence on decreasing resistance towards wind parks. However, this cannot be concluded from the data, because the respondents differ in their viewpoints. For being able to conclude this, more local energy cooperatives who are involved in the realization of wind energy should be researched. Also, conducting a survey among people living nearby wind parks realized by local energy cooperatives would be useful. Input from citizens living in the direct surroundings could offer insights in how energy cooperatives could reduce the resistance to wind parks. This was unfortunately not reachable within the scope of this thesis, as this research focused more on the internal organization of local energy cooperatives and how they are related to the regime they develop within.

A second recommendation for science is for business scholars to do research into the differences of the organizations of local energy cooperatives. In this research a division has made between local energy cooperatives using a development strategy of Gradual Growth and Project Orientation. A significant difference is the number of members, which is ten times larger using the Project Oriented strategy. Even although the cooperatives have approximately the same age. Of course, this contains only one case, so the evidence is certainly not indisputable. However, conducting research into the reasons behind these differences in organizations of local energy cooperatives could establish useful insights for cooperatives for their development.

A third recommendation for science is conducting a normative research to the effect local energy cooperatives have on the energy market. A main conclusion of this thesis is that local energy cooperatives have introduced the cooperative thinking about energy to the energy transition. Their vision that local energy production should come along with local participation and local profits has already started to seep through into the political domain and the economical domain. What does this lead to if the movement of local energy cooperatives grows significantly larger? As a matter of fact, local energy cooperatives are not indispensable for the transition from fossil energy to sustainable energy, but they do have a significant influence on where the profits of the renewable energy will go to. Also, is it normatively acceptable that external developers are excluded from investing in

sustainable energy in regions where regulations about mandatory involvement of a cooperative have been implemented? A useful method might be conducting a thought experiment about The Netherlands' energy market being fully cooperatively established. What are the effects on, for instance, our current institutions?

7.2.4 Recommendations for practice

A recommendation for practice is for municipalities to make sure they stimulate local energy cooperatives. It shows that if the local energy cooperative receives help in the beginning phase. This might be small financial or informative support or granting cooperatives a roof to get started with a solar project. Such investments in a local energy cooperative are not just acts of charity, as a strong local energy cooperative can be very beneficial for a municipality with a sustainability agenda. Local energy cooperatives and municipality can mutually benefit from each other, has become clear in this thesis.

There are two very concrete points of support municipalities can offer to local energy cooperatives. First, in the beginning phase, the cooperative has not yet any financial capital and banks are not eager to get involved in this phase. Small financial stimulations, for instance to produce information flyers, are very helpful for the cooperative in this early phase. Second, local energy cooperatives state that communication is important for their development, but also state that this factor is often lacking. Communicative support therefore is very helpful for local energy cooperatives as well.

As stimulating existing local energy cooperatives is advocated, this is not certain for stimulating a new local energy cooperative to develop. Intrinsic motivation is the most important factor according to the respondents in this thesis. Which resembles the idea that it might not be useful to force the founding of a new local energy cooperative, as this might go at the expense of the intrinsic motivation.

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