Let’s turn up the heat transition!

An exploration of the role of energy cooperatives in the transition towards a sustainable heat provision

Daan Mulder
Master Thesis Human Geography,
Nijmegen School of Management
Radboud University Nijmegen,
7 October 2018
“Where the leaders fail to lead and people are really concerned about it, the people will take the lead and make the leaders follow.”

(Kofi Annan, 2014)

Let’s turn up the heat transition
An exploration of the role of energy cooperatives in the heat transition
September 2018

Author
Daan Mulder
S4833147
Master thesis
Human Geography
daan.mulder02@gmail.com

Scientific supervision
Dr. Lothar Smith
Nijmegen School of Management
Radboud University Nijmegen
Heyendaalseweg 141
6525 AJ Nijmegen
The Netherlands

Practical supervision
Alwin Veldboom
Outside Inc.
Spaarnplein 2
2515 VK Den Haag
The Netherlands
Preface

Dear reader,

Before you lies the dissertation ‘Let’s turn up the heat transition’. It has been written to fulfill the graduation requirements of the Economic Geography program at the Radboud University Nijmegen. The research was undertaken at the request of Outside Inc., where Daan undertook an internship. I was happy to supervise the researching and writing of his dissertation from February to October 2018.

In this period, I have come to know Daan as an enthusiastic, friendly, hardworking and open person with a wide range of interests. He made a valuable contribution to our team both as an individual and in delivering our services to customers. He assisted various colleagues in preparing and facilitating workshops in multiple programs and was unofficially appointed ‘Creative Cinematographic-arts Director’ after shooting and producing no less than five videos. Moreover, he joined several strategic team-meetings and lended a hand in the organisation of the fifth anniversary of our company.

It should not come as a surprise that one of Daan’s challenges was to balance between his research efforts and his time spent working on Outside Inc. projects. He experiences a rather bumpy ride defining the topic and scope of his dissertation, but with a little delay managed to get into a steady ‘flow’. Where many students would have struggled to find respondents in the empirical phase of this research project, Daan proved to be more than capable of mobilising targeted organisations and professionals to participate in his interviews. Not in the last place (besides his infectious enthusiasm), because he chose a topic that caused heated debates in the Netherlands at the time he was writing his dissertation.

With his dissertation, Daan contributes to understanding the complex dynamics of the paradigm shift that is taking place in the (Dutch) energy sector. He presents insights derived from the heart of where this transition is taking place: energy cooperatives.

I hope you will enjoy your reading.

All the best,

Alwin Veldboom, Innovation Manager Outside Inc.
Summary

The heat transition in the Netherlands is a practical example of how the socio-technical transition theory works. Since almost every household changed its heating provision from coal to natural gas in the 50’s, the natural gas regime of dominant market parties, science, policy and techniques existed unquestionably for many decades, until the last one or two decades in which landscape developments, as Grin et al. (2010) calls slow continuing global trends (see figure 1, p. 19), have put pressure on the natural gas regime: the effects of climate change became more vivid, the geopolitical relation of The Netherlands with fossil fuel producing countries such as Russia and the Middle-East worsened and the damage of earthquakes which are caused by gas extraction in the northern Dutch province of Groningen increased to €320 million. When the Ministry of Economic Affairs and Climate Policy published the Energy Agenda with the main lines for the energy policy until 2050 in 2016, it broke up the natural gas regime: in 2050 all Dutch household need to be CO2 neutral, hence natural gas heating systems need to be replaced by renewable energy sources.

Meanwhile, society seems to have taken matters in own hands. Because of the lack of action by government and market parties, a bottom-up movement in the broader energy transition has been established: the number of energy cooperatives in the Netherlands grew from about 20 in 2010 to almost 400 in 2017. Although this growth is remarkable, cooperatives still form a small niche in the energy sector: to put in perspective, the energy cooperatives had in 2017 about 63 thousand members (Schwencke, 2017). Being already involved in the broader energy transition, energy cooperatives are now exploring the possibilities in the heat transition. The upcoming cooperative form of entrepreneurship seems paradoxical in a more and more individualistic society, but according to Jonker (2014) it is part of a broader social movement towards a sustainable economy.

The role of society in a transition is not clearly explained by the transition theory, hence this research aims to answer the following research question: What is the role of energy cooperatives as an emerging form of societal organisation in transition process of the heat supply for households in the Netherlands? Combining a holistic case study design with a constructivist and qualitative research approach, this question was answered by conducting and analysing 12 interviews with grid operators, energy suppliers, three layers of governmental bodies, advocacy groups and knowledge institutions and 33 questionnaires filled in by energy cooperatives.
The energy cooperative functions between three entities: Society, the state and the market. Therefore, the results in from this research are threefold. First, its role in society. Energy cooperatives form the formal organised institutions in which frontrunners in the transition unite and create the awareness in society which triggers more frontrunners to join the cooperative. These frontrunners are in general relatively knowledgeable and aware of the challenges of the transition because they for example are employed in the energy sector. In Giddensian terms, energy cooperatives facilitate practices of agents of change which together form new structures, providing the resources for new practices in society (Giddens, 1984). Therefore, the role of energy cooperative is to reproduce agents of change in the heat transition, meaning that agents of change create the facilities to trigger more agents of change. This results is an ongoing loop through which more and more citizens get actively involved in the transition.

This societal role of energy cooperatives is not endless and has geographical boundaries, which are created by four elements: at first by the availability of frontrunners in an area as discussed above. Second by the local identity which includes for example local values sentiments and social networks. Like Giddens too argued, tacit knowledge (local not codeable knowledge) and related local values determinants the way people understand each other (Giddens, 1984). The local social networks which are intertwined through the cooperative create a trust bond between the members of the cooperative. Third, the cooperative is marked by technological solutions. Since there is no single technological innovation which is publicly accepted as the basis for the new regime, there is a lot of debate. Frontrunners with similar ideas and opinions tent to unite in the same cooperative. Fourth, the boundaries of energy cooperatives in society are marked by physical geographical characteristics like population density, type of housing and the neighbourhood’s year of construction. These characteristics determines the technological solutions that are available, the local identity and the number of frontrunners. The energy cooperative connects the four layers of the heat transition in society.

Secondly, the role of energy cooperatives in relation to the state entity is mostly to represent the citizens in local energy policy decision making and to complement the local government in giving energy advice. Since the governmental bodies are hesitant to intervene in the market, energy cooperatives can go further in consulting citizens by for example preselecting trustworthy and local suppliers or installers, therefore it is able to lead the citizen through the customer journey. On the other hand, energy cooperatives need the subsidies from the government to professionalize and scale. Besides, it needs to be noted that representing society does not mean that energy cooperatives always plead for the
‘best-fitting’ solution when looking at the broader region. Municipalities or provinces in general have the overview in a bigger region to make the most (cost) effective decision.

Thirdly, in relation to the market entity, the energy cooperatives have a role in creating a market and public support for technological innovations. Since energy cooperatives do not (yet) have the scale and capital to develop innovations themselves, they need the market to supply these. On the other hand, market parties often struggle to find public support for projects concerning renewable energy, of which the developments of wind parks is perhaps the most clear example. With the help of energy cooperatives, this public support can be granted. Although in potential and in a few examples this exchange seems fruitful, in practice there is very little cooperation between market parties and cooperatives. Cooperatives reject the commercial character of big market parties and market parties on their turn struggle with the lack of professionality of energy cooperatives. If it is necessary to cooperate with a market party, cooperatives tend to prefer local entrepreneurs within their social networks to cooperate with. Therefore, this study shows that they have a role in the establishment of localism as well.

Overall, the energy cooperatives give society a place in the playing field of the heat transition by being the voice of society to market and governmental parties. Besides, based on this research, there can be concluded that energy cooperatives take the heat transition to the next step by creating more awareness and agents of change in society, providing the market with new consumer markets to launch innovations and complementing the government in reaching the policy goals. A constant exchange between market, state and society in the form of energy cooperatives is essential for the role of energy cooperatives. Since the transition is young just started to develop, the effect of these roles are at time of writing still modest. Besides, the cooperatives have various aims. If the aim is to be part of the future regime of heat provision by setting the example for new business models in the energy sector, energy cooperatives need to scale to professionalize and to gain a more established position in the regime, but this needs to be balanced with the main strength of the energy cooperatives: its local embeddedness. Finding this balance seems to be the biggest challenge of all.

At last, more abstractly, the role of energy cooperatives in the heat transition shows that Giddens’ structuration theory is still relevant in modern society: to create change in society, new structures through which this change is facilitated are needed. A connection between agents based on time and space is essential to create these new structures. In the heat transition, energy cooperatives are an example of facilitators of networks of agents of change.
# Table of content

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preface</td>
<td>2</td>
</tr>
<tr>
<td>Summary</td>
<td>3</td>
</tr>
<tr>
<td><strong>1. Introduction</strong></td>
<td>8</td>
</tr>
<tr>
<td>1.1 Background</td>
<td>8</td>
</tr>
<tr>
<td>1.2 Research objective and question</td>
<td>9</td>
</tr>
<tr>
<td>1.3 Societal relevance</td>
<td>12</td>
</tr>
<tr>
<td>1.4 Scientific relevance</td>
<td>13</td>
</tr>
<tr>
<td>1.5 How to read this thesis</td>
<td>14</td>
</tr>
<tr>
<td><strong>2. Transition theory</strong></td>
<td>16</td>
</tr>
<tr>
<td>2.1 Socio-technical transitions</td>
<td>16</td>
</tr>
<tr>
<td>2.2 Multi-level perspective</td>
<td>17</td>
</tr>
<tr>
<td>2.3 Structuration theory</td>
<td>19</td>
</tr>
<tr>
<td>2.4 Natural gas in The Netherlands</td>
<td>20</td>
</tr>
<tr>
<td><strong>3. Theorizing the role of energy cooperatives</strong></td>
<td>24</td>
</tr>
<tr>
<td>3.1 Energy cooperatives: facts, figures and definitions</td>
<td>24</td>
</tr>
<tr>
<td>3.2 Cooperative as a business model</td>
<td>27</td>
</tr>
<tr>
<td>3.3 Energy cooperatives and society</td>
<td>29</td>
</tr>
<tr>
<td>3.3.1 Local identity</td>
<td>29</td>
</tr>
<tr>
<td>3.3.2 Energy cooperatives in relation to agents of change</td>
<td>31</td>
</tr>
<tr>
<td>3.4 Energy cooperatives and the regime</td>
<td>34</td>
</tr>
<tr>
<td>3.4.1 Cooperative innovation</td>
<td>34</td>
</tr>
<tr>
<td>3.4.2 Cooperatives as new regime</td>
<td>36</td>
</tr>
<tr>
<td>3.5 Conceptual model and operationalisation</td>
<td>37</td>
</tr>
<tr>
<td><strong>4. Methodology</strong></td>
<td>41</td>
</tr>
<tr>
<td>4.1 Philosophical background</td>
<td>41</td>
</tr>
<tr>
<td>4.2 Strategy</td>
<td>41</td>
</tr>
<tr>
<td>4.3 Data collection</td>
<td>42</td>
</tr>
<tr>
<td>4.3.1 Literature</td>
<td>42</td>
</tr>
<tr>
<td>4.3.2 Qualitative questionnaire</td>
<td>43</td>
</tr>
<tr>
<td>4.3.3 Semi-structured interviews</td>
<td>46</td>
</tr>
<tr>
<td>4.4 Data analysis</td>
<td>49</td>
</tr>
<tr>
<td>4.5 Validity and reliability</td>
<td>50</td>
</tr>
<tr>
<td>4.6 Fieldwork reflection</td>
<td>53</td>
</tr>
<tr>
<td>4.7 How to interpret the results</td>
<td>54</td>
</tr>
<tr>
<td><strong>5. Cooperatives as societal change (re)producer</strong></td>
<td>55</td>
</tr>
<tr>
<td>5.1 Inform and advise to create awareness</td>
<td>55</td>
</tr>
<tr>
<td>Section</td>
<td>Page</td>
</tr>
<tr>
<td>----------------------------------------------</td>
<td>------</td>
</tr>
<tr>
<td>5.2 Uniting agents of change</td>
<td>61</td>
</tr>
<tr>
<td>5.3 Resources for change</td>
<td>63</td>
</tr>
<tr>
<td>5.4 The power of local embeddedness</td>
<td>65</td>
</tr>
<tr>
<td>5.5 Concluding remarks</td>
<td>68</td>
</tr>
<tr>
<td>6. Cooperatives as representatives of society</td>
<td>70</td>
</tr>
<tr>
<td>6.1 Energy cooperatives and the state</td>
<td>71</td>
</tr>
<tr>
<td>6.1.1 Interaction in practice</td>
<td>71</td>
</tr>
<tr>
<td>6.1.2 Complementing the state entity</td>
<td>72</td>
</tr>
<tr>
<td>6.1.3 Balancing localism and the overview</td>
<td>74</td>
</tr>
<tr>
<td>6.2 Energy cooperatives and the market</td>
<td>76</td>
</tr>
<tr>
<td>6.2.1 Collaborate with local business</td>
<td>76</td>
</tr>
<tr>
<td>6.2.2 Energy cooperatives and innovation</td>
<td>78</td>
</tr>
<tr>
<td>6.2.3 Mutual dependence between cooperatives and market parties</td>
<td>80</td>
</tr>
<tr>
<td>6.2.4 Diffusion of the cooperative business model</td>
<td>82</td>
</tr>
<tr>
<td>6.3 Concluding remarks</td>
<td>85</td>
</tr>
<tr>
<td>7.1 Balancing scale and professionality</td>
<td>87</td>
</tr>
<tr>
<td>7.2 Energy cooperatives as (con)temporal movement</td>
<td>88</td>
</tr>
<tr>
<td>7.3 Concluding remarks</td>
<td>90</td>
</tr>
<tr>
<td>8. Conclusions and recommendations</td>
<td>92</td>
</tr>
<tr>
<td>8.1 Energy cooperatives as the voice of society</td>
<td>92</td>
</tr>
<tr>
<td>8.2 Connecting layers of the heat transition in society</td>
<td>94</td>
</tr>
<tr>
<td>8.3 (Con)temporality of energy cooperatives</td>
<td>96</td>
</tr>
<tr>
<td>8.4 Visualising the conclusion: conceptual model</td>
<td>97</td>
</tr>
<tr>
<td>8.5 Broader implications</td>
<td>99</td>
</tr>
<tr>
<td>8.6 Critical reflection</td>
<td>100</td>
</tr>
<tr>
<td>8.7 Recommendations</td>
<td>101</td>
</tr>
<tr>
<td>8.7.1 Further research</td>
<td>101</td>
</tr>
<tr>
<td>8.7.2 Policy recommendations</td>
<td>103</td>
</tr>
<tr>
<td>8.7.3 Recommendations for energy cooperatives</td>
<td>103</td>
</tr>
<tr>
<td>Bibliography</td>
<td>105</td>
</tr>
<tr>
<td>Appendix A: Qualitative questionnaire</td>
<td>113</td>
</tr>
<tr>
<td>Appendix B: Participating cooperatives</td>
<td>116</td>
</tr>
<tr>
<td>Appendix C: Interviewguide</td>
<td>117</td>
</tr>
<tr>
<td>Appendix D: Justification of sampling interviews</td>
<td>119</td>
</tr>
<tr>
<td>Appendix E: Coding scheme interviews</td>
<td>123</td>
</tr>
</tbody>
</table>
1. Introduction

Groningen, January 2018: Eight thousand people demonstrated in torch march against the gas winning in their province after a relative heavy earthquake of 3.4 on the Richter Scale. The number of protesters has doubled in comparison to the torch march one year earlier (NOSa, 2018). Numerous earthquakes in the province have led to a damage of €320 million and the Groningers are no longer willing to accept the gas winning in their province. The pressure seemed to have its impact. The Hague, 29th of March 2018: The Dutch cabinet announced a stop on the winning of natural gas within 12 years (NOSb, 2018).

Besides the protection of the Groningers, the decision to replace natural gas supports the Energy Agenda (Energieagenda), published in december 2016 by the ministry of Economic Affairs. In this agenda, the plans for a transition to an energy supply with the minimum CO2 emission are described for the period until 2050. One of the main pillars is that households have to be CO2- neutral, hence not using natural gas. In the Netherlands this is a challenge since 90% of the energy used in the heating of building comes from natural gas (Ministerie EZ, 2016). The Dutch have a long and strong standing relationship with natural gas, already in the 1950’s the heating of buildings went through a transition from coal to gas (Kemp, 2010). This chapter answers the fundamental twofold question a reader might have when reading this research: What is being researched and why is this relevant?

1.1 Background

The pressure of the Groningers on the government as described in the anecdote above, is symbolic for the bottom-up movement in the Dutch energy transition. The Netherlands is lagging behind on their European companions, with the lowest renewable energy share of all EU members (Eurostat, 2018). Tangible events like the earthquakes in Groningen and the geopolitical developments in fossil energy supplying countries in the middle east and Russia (including the crash of the MH17 which took 196 Dutch victims) in combination with the lack of governmental action seem to have led to the realisation that society needs to take matters in own hands instead of waiting for political or market action. Citizens who want to act and organise for instance collective energy purchasing or get involved in political action groups.

If the citizen initiatives want any investment and subsidies, a legal form is needed. The most appropriate legal form seems to be a cooperative (coöperatie uitgesloten
In this research these forms together are called ‘energy cooperatives’, which is in line with Schwencke (2017), who confirms in the local energy monitor that the number of energy cooperatives in The Netherlands is booming: in 2010 there were about 20 energy cooperatives in The Netherlands, in 2017 almost 400 (Schwencke, 2017). Where energy cooperatives are more and more established in the field of collective purchasing of electric power and sustainable energy generation, they are looking into the possibilities in the recently deployed heat transition to get involved. The question is, what kind of role can societal action in the form of energy cooperatives play in this transition?

Although examples in Denmark and Germany where cooperatives function as heat suppliers in many locations show that a key role is possible (Bohnerth, 2015), issues such as a lack of professionality, overdependence on voluntary labour and geographical limits of its local social embeddedness raise the question whether energy cooperatives as energy supplier should be the ultimate goal. Energy cooperatives might ‘just’ be the means through which the energy regime is pointed into the right direction. In this research the aim is to make a snapshot of the bottom-up role of society in the form of energy cooperatives in the heat transition and how they can influence the heat transition in the Netherlands.

1.2 Research objective and question

As stated in the introduction above, this research aims to understand the role of society in the heat transition by looking into the case of energy cooperatives. The following research question and objective are formulated for this research:

**Objective:** By researching the role of energy cooperatives in the heat transition this research aims to understand the way in which society organises itself to change the existing energy regime.

**Question:** What is the role of energy cooperatives as an emerging form of societal organisation in the transition process of the heat supply for households in the Netherlands?

First, the term ‘Heat transition’ requires an explanation. The word ‘heat’ refers to the way houses are heated in the Netherlands, which is at the moment in most cases by the combustion of natural gas in a central heating unit. This combustion takes place in each individual house. The natural gas is distributed through a network. Consequently, the heat
transition refers in this research to way the energy that is meant for heating houses is supplied, not to the the provision of heat. The heat transition can therefore be considered as part of the broader energy transition. The word ‘transition’ will be further explored in chapter 2.

Second the notion of ‘role’ requires clarification. I follow Wittmayer et al. (2017, p. 49) that “[roles] can be described as a set of recognizable activities and attitudes used by an actor to address recurring situations” This interpretation takes on one hand a functionalist perspective into account by accepting a universally agreement of a social position of an actor, but leaves room for a interactionist perspective that roles never stand on its own; they depend on relations with other roles. In this research, the actors are the energy cooperatives and the recognizable activities and attitudes need to be determined from the literature and interviews. With the help of the Multi Level Perspective (MLP), this research aims to describe the role of energy cooperatives in the heat transition in a broadly supported way.

Third, ‘energy cooperatives as a form of societal initiative’ requires some explanation. As mentioned in the research objective, this research aims to understand the role of society in the heat transition. But as described in the introduction, the entrepreneurial citizens in society that want to act in the heat transition need a legal form and from the recent major increasing number of energy cooperatives, this seems to be the most used form. Also in the orientational conversation with members of the expert panel which were a method to improve my understanding of the subject before researching it (methodology explained in chapter 4), this assumption was confirmed. Therefore, the energy cooperatives are in this research seen as the representatives of societal initiatives concerning the heat transition.

Fourth, the ‘transition process of the heat supply for households’ requires clarification. The heat transition in this research means the transition of households that are heated by gas installations towards sustainable alternatives. The transition process is based on the sustainable socio-technical transition theory of Grin, Rotmans & Schot (2010). A transition is defined as “the transformative change from one dynamic system equilibrium to another one, involving a change in the deep structure of the system” (Grin et al., 2011, p78)

To answer the research question, four subquestions are formulated. All four need some introduction to clarify why they are relevant and how they support the research question. Below the questions with their explanations are listed:

**Subquestion 1:** What is the role of society in socio-technical transitions?
Although the research is focused on energy cooperatives as a form societal initiative, it could be helpful to look at the role of society in transition as a whole. Sustainability transition is a major field of research. In this subquestion there will be studies what could be learned from theory and other research regarding the role of society in transitions.

**Subquestion 2**: How do energy cooperatives function between society and the socio-technical regime?

When looking at energy cooperatives as a movement from society, there is a social role to represent a group of people. It could be a ‘tool’ to facilitate interactions between society and institutions. How is this social role integrated in the heating sector? Does society feel represented by the cooperatives? Does it also work the other way around, that cooperatives can create public support for projects? What can be learned from cooperatives in the whole energy sector?

**Subquestion 3**: What is the function of cooperatives in a market economy?

Liberal economist and nobel prize winner Milton Friedman once wrote that “there is one and only one social responsibility of business – to use its resources and engage in activities designed to increase its profits” (Friedman, 1962, p. 133). Cooperatives are quite the opposite as meant by Friedman since for this form of entrepreneurship economic profit is subordinated to social value creation and although we live in a globalised and capitalist economy, cooperatives have been a form of entrepreneurship with strong roots in in society (Normark, 1996). The emerging cooperative business model in a more and more capitalist free market seem to be contradictory but very much needed as a new business model in a sustainable and inclusive economy (Jonker, 2014), as explained in chapter 3.2. Why does society embrace this form of nonprofit entrepreneurship?

**Subquestion 4**: How are energy cooperatives involved in (technical) innovations?

As can be learned from transition studies, innovations are the precondition for a regime change (Geels & Schot, 2010). There are different views and ways how these innovation reach the surface of the socio-technical regime. How are energy cooperatives involved in this? Do they implement innovations themselves? Do they function as pilot areas? Or what other roles could be distinguished?
**Subquestion 5:** What potential do energy cooperatives have in forming the new regime?

The question is whether energy cooperatives have a function within the system that cannot be performed by other organisations. The role might be temporal to set the new rules of the game so that energy suppliers, governments and grid operators are set in the right direction, the role might be permanent in the new energy regime, or there might be a completely different role.

1.3 Societal relevance

We know the alarming environmental figures like great losses in biodiversity, global warming, sea-level rise, etc. from countless documentaries, researches and articles repeating ‘the inconvenient truth’ over and over again. Although these trends are happening on a big and global scale, the impact of gas winning is locally visible in The Netherlands. In Groningen numerous earthquakes have caused damage of about €320 million (NCG, 2017).

The decision of the Dutch government to push the country towards the tipping point in the assumed dependence on natural gas has on one hand led to debate. Science journalist and chemist Simon Rozendaal states in De Telegraaf that natural gas is rather the friend of sustainable development than the enemy, because of its relative low CO₂ emissions compared to other fossils: ‘If you would replace worldwide all petroleum and coal by natural gas, you would help the climate more than filling the earth with solar panels and wind turbines’ (Telegraaf, 2018). Project developers, construction companies and housing corporations for example have stated in De Volkskrant that they think the decision is too hasty because of the significant cost increasement in ongoing projects (Hofs, 2018). Also the lobby organisation of the Dutch municipalities, the VNG, has states that although most municipalities are happy with the pace, some are ‘unpleasantly surprised’ (Boonstra, 2018). Despite of the critical messages in the media, energy cooperatives are determined to take a key role in the heat transition and are ambitious and claim to be the voice of people: “the energy cooperatives make sure that the interests of citizens are equally considered as others” (ODE Decentraal, 2017).

On the other hand, although the visions on pace and intensity of the energy transition differ in the political landscape, energy cooperatives as a concept seem to have a broad backup: green parties are in favour of the sustainability movement, socialists support the social character of cooperatives, democrats are in favour of the democratic form of
entrepreneurship, liberals support the way in which entrepreneurs and the market deal with sustainability issues and nationalists would be happy with the local scale of the solutions and more independence of international agreements. From right to left and from progressive to conservative, every political view could find some motives to support energy cooperatives.

The potentially broad political support for energy cooperatives as entrepreneurial form to get involved in the replacement of natural gas offers opportunities to society to organise itself. But how the energy cooperatives could be involved, is still a open end. This research aims to contribute to the societal debate by determining the role of energy cooperatives in the heat transition.

1.4 Scientific relevance

On a more abstract level, Markard et al. (2012, p. 963) invite geography scholars into the field of sustainability transitions: “we are just beginning to understand the geography of transitions. A next step forward is to invite geography scholars to the research field of sustainability transitions”. Accordingly, new geographical perspectives are needed to unpack the spatial boundaries of transitions to place the research area into a globalized world. This research has an economic geographical perspective and therefore aims to answer Markard’s invitation.

Markard’s call for geographical knowledge in the field of transition puts emphasis on the relevance of space. The sustainability transition theory emerged in a post-Giddensian landscape in which structure and agency constantly shape and reproduce each other (Grin et al., (2010). This relation between the duality of structure and transition theory is further explained in chapter 2.3. The relevance of space in Gidden’s duality of structure has to do with social institutions which are basically a set of routinized practices performed by agents that are in time and space connected to each other. The mutual knowledge is tacit and therefore embedded in place (and time) (Inglis & Thorpe, 2012). This research aims to contribute to this abstract theoretical concept by researching the case of societal involvement in the heat transition. Energy cooperatives seem to be build on mutual understanding and trust, which are locally embedded in the social networks of the founders and members of the cooperatives. This is further elaborated on in chapter 3.3.

In the more technical research area of renewable energies, Viardot (2013, p. 762) suggests more research on the business case of energy cooperatives: “another interesting avenue of research would be to test if the specific attributes of co-ops made them in a better position than other businesses to undertake a RE [Renewable energy] project ”. Also Van Veen (2016) suggests a more research towards a better understanding of the relation
between cooperative and commercialized business cases since businesses increasingly seem to dive into the cooperative world. By determining the role of cooperatives in the transition with the help of interviews with businesses in the energy sector, this research can contribute to these calls.

This research could also contribute to the development of the sociotechnical transition of the heating sector as a research area. Since the developments are very recent and the transition is young, this exploratory research ends up with more questions than it started with. Hopefully, scholars will follow the recommendations for further research to develop more knowledge on the subject.

At last, a note needs to be made in relation to the body of literature on governance. According to Treib et al. (2007), governance studies mostly focus on the relationship between state interventions and societal autonomy, of which the latter also includes private party action. Although this is a phenomenon that could be sensed throughout this research, a deliberate choice is made to demarcate the thesis by the transition theory. The transition theory does too study the interaction between state interventions and other organisations, but has a broader perspective in studying other relations as well. On the other hand, it is more narrowed down towards a societal change, being a transition. Taking into account that governance structures are part of the transition theory and that I want to focus on the role of energy cooperatives instead of polity, policy or politics, I do not have a direct aim to contribute to the governance literature.

1.5 How to read this thesis

As one might have already noticed, I deliberately chose to use first-person pronouns in this research. In some research fields, the use of ‘I’ or ‘we’ is unusual or even undesirable. In this case, I want to take along the reader in my exploration of a young research field in a narrative kind of way. By using first-person pronouns I aim to make the steps I undertook to get to the conclusions clear to the reader. Besides, it puts emphasis on the constructivist philosophical background of the research methodology because it reminds the reader that the conclusions are constructed by my interpretation of the information provided by the literature and empirical data.

Besides a clarification of the use of first-person pronouns, this chapter provides you as a reader an overview of how this research is constructed and why the current form is the most logical to read it. First, this chapter provides a description of subject of research and why this subject is currently relevant. Second, the theoretical background of this subject is described in chapter two and three. This background will give you a more profound
understanding of the subject and the underlying concepts. The theoretical chapters are split into the transition theory and the role of cooperatives. In the chapter about the transition theory, I explain the underlying transition theory and structuration theory which form the basis of this thesis. In chapter three about the role of energy cooperatives, I deduct possible roles for energy cooperative in the heat transition from other studies. In this chapter you can read the broad exploration of possible roles from multiple study perspectives.

Chapter four, five six and seven contain the empirical part of the study. Starting in chapter four, you can read my philosophical approach and belonging research strategy that I have applied. Besides you will find how I analysed the data and what tactics I have used to ensure the validity and reliability of this research. Consequential, chapter five, six and seven contain the results of the empirical research. This results are mostly described in a narrative form, to increase the readability of the research.

In chapter five, the role of energy cooperatives in society is explained. This role explains the existence and position of energy cooperatives and therefore forms the basis to understand the role described in chapter six: the representative of society to the market and government. The roles of energy cooperatives in society and in relation to the government and market is essential to understand before reading chapter seven in which the potential of these roles in the future are further explored.

At last, chapter eight contains the conclusions and recommendations that emerge from combining the literature and empirical study. It concludes for example that energy cooperatives are the connection between four layers of the heat transition, including agents of change, technical solutions, local identities and the physic geographic environment. Besides, it concludes in what ways government, market actors and energy cooperatives are mutually dependent. In providing recommendations for future research, policy and energy cooperatives, I hope to give handles that can bring the transition to the next step.
2. Transition theory

2.1 Socio-technical transitions

To reach a gas free society, the system has to undergo a transition. A transition is “the transformative change from one dynamic system equilibrium to another one, involving a change in the deep structure of the system” (Grin et al., 2011, p78). According to Geels & Schot (2010), transitions have typically five characteristics. First, transitions are co-evolutionary and involve both the development and adoption in markets and society. Second, transitions require interactions between different actors: corporations, consumers, policy makers, social movements etc., and are therefore multi-actor processes. Third, transitions are radical shifts in the scope of change, but not necessarily in their time scope. Fourth, although breakthroughs can emerge relatively fast, transitions are long term processes that take several decades. Last, transitions are macroscopic, meaning that analysis of the phenomenon should include the totality of relevant actors: an organizational field.

The playing field of a transition can be demarcated by a societal system, which “is a part of society that can be attributed a functioning and functioning is the way a societal system meets a societal need” (De Haan & Rotmans, 2011, p. 92). Although a rather functionalist approach to the notion of a societal system could be criticized by the limited power to explain social change, De Haan & Rotmans (2011) advocate that a broad range of structures can be considered as societal systems with this definition such as mobility, agriculture, a geographical region or in this case heat supply. Put simply, the societal need is a warm home and therefore the societal system has created a heating supply fed by natural gas, however the reality is more complex.

Societal systems consist of numerous constellations, which differ in their size and power. The dominant constellations that shape the equilibrium in the dynamic system and are called ‘regimes’. These regimes are powerful and ideally meet the societal needs. The antonym of a regime in sense of power is a niche. Niches are constellations in societal systems that have very little to no power, but meet very specific societal needs in novel ways. Many of the constellations are neither niches nor regimes and are therefore called niche-regimes. During a transition a shift of dominant constellations occurs and the system of regimes and niches is reorganised (Grin et al., 2011).

Agents of change within a societal system find each other in the transition arena. This is a virtual innovations area in which the front runners of a transition connect. Ideally this
arena contains individuals from five different groups: corporate sector, government, knowledge institutes and intermedians. The transition arena interacts with at first the market arena which is aimed at short-term action, efficiency and profit. Secondly, it interacts with the political arena which is aimed at short and middle-term action, incremental innovation and goal oriented solutions. All arenas can act on landscape, regime and niche level (Rotmans, 2014).

2.2 Multi-level perspective

In geography and spatial planning, the layer approach concept has been a widely used method to represent the physical landscape. In the layer approach, the relation between humans and their environment is visualised, containing three layers: first the ground layer which represents the physical environment, second the network layer which represents the infrastructure and third the occupation layer which represents the actual use of the space. The layer approach concept is used in many governmental planning documents and could be used to analyse complex spatial issues (Hagens, 2006). For transition studies, a similar approach for analysis was designed: the multi-level perspective (MLP). The MLP represents the ‘layers’ of a societal transition, but without the physical spatial features.

The multilevel perspective describes three functional scale levels in transitions: macro, meso and micro. This perspective underlines the need for interactions between different actors since “transitions only take place when trends, developments and events on the three scale levels strengthen each other in one and the same direction” (Grin, 2010, p. 131). On the macro level, landscape changes such as occur relatively slow and on a global level. Trends such as globalization and individualization, but also changes in transnational organisations (e.g. UN, WTO) influence transition. The meso level contains regimes and dominant structures which want to maintain the status quo and therefore this is the challenging level for innovation and change. At the micro level, developments follow each other quickly and change occurs fast. It is the typical level where niches emerge, although they do not solely emerge at the micro level. Empowered niches have the ability to act between the micro and meso scale and are therefore able to ‘attack’ the regime (Grin, 2010).

Three patterns in sequences of mechanisms of change are recognized (Grin, 2010). Reconstellation resembles the macro-meso pattern in which fast changes in a landscape shape changes in regimes. Reformative legislation, installation of infrastructure and regional reorientation are typical processes of reconstellation. The micro-meso pattern is called empowerment. In this pattern, “niches emerge at the micro-level, cluster and form a
niche-regime that attacks the incumbent regime which ultimately is transformed into a new regime” (Grin, 2010, p. 137). Concrete recognition acquirement, union formin and professionalisation are processes that fit this pattern. Adaption is the meso-meso pattern in which change occurs at the meso level, which is meant to meet the societal needs better again. As the word ‘adaption’ implies, it is a reaction on certain conditions for change. Repositioning, re-organising and innovation are examples of adaptation patterns (De Haan & Rotmans, 2011).

As mentioned before, the patterns in landscapes and niches and their interaction with the regime strengthen each other. Based on three criteria involving these interactions, Geels & Schot (2010) describe a typology of pathways that transitions may follow. At first the timing of interactions is of issue. Landscape pressures may create a window of opportunity for niche-innovations when they put pressure on the regime, “But if niche-innovations are not fully developed, they cannot take advantage of this window, which may subsequently close” (Geel & Schot, 2010, p. 55). Second, the nature of the interactions: niche-innovations and landscape developments can either reinforce or disrupt the regime. Third, the type of landscape development which depend on frequency, amplitude, speed and scope.

It seems that the transition towards a gas free housing follows the de-alignment and re-alignment pathway as described by Geels and Schot (2010), visualized over time in figure 1. Bringing the former two sections together, one could argue that the transition towards gas free living has just begun. Landscape pressures such as the problems in Groningen, international agreements such as de SDG’s and the Paris Agreement and societal attention to sustainable development have opened opportunities to a transition. The Dutch government seems to acknowledge this by demanding an end to natural gas use in households. This fits the de-alignment and re-alignment pathway in that regime players lose faith due to regime problems. Now we are waiting on a replacement of the gas regime from the niche-level but there is not a clear image yet which of the niche-innovations such as described in the section above will be the substitute, as they still can co-exist. This fits the description of the de-alignment and re-alignment pathway too: “But in this path, there is no stable niche-innovation present that can fill the gap. Instead, the vacuum leads to the emergence of multiple embryonic niche-innovations, carried by outsiders or diversifying regime actors” (Geels & Schot, 2010, p. 63). Theoretically, a momentum for one of the niche-innovation will be created and hence it becomes the dominant new regime.
2.3 Structuration theory


Giddens theorizes that every human performs practices, which were in earlier theories described as actions, that are shaped by elements in its surrounding. Mostly these practices are based on practices that are performed by others in the surroundings of the individual or practices that the individual, agent, has already performed in the past. Such a set of similar practices, performed by different agents and reproduced over time is called a structure. Structures only exist within agents and are therefore internalized, but essential in providing the resources that agents need to perform their practices. Central in Giddens’ theory is the duality of structure which reflects the contradiction that structures are both the source and the outcome of social practices. The origin of the dominance of socio-technical regimes in a societal system could be explained with the help of Giddens’ theory because the agents in society get their resources to perform social practices from structures.

Since structures are shaped by practices, agents need to be connected to exchange their actions. This connection is dependent on time and space. Inglis & Thorpe (2012) use the example of ‘being a student’ to illustrate the dependence of structures on time and

Figure 1, Visualization of de-alignment and re-alignment transition pathway (Geels & Schot, 2010, p. 64)
space. The social institution ‘university’ is a place where the majority of the agents are ‘being a student’ because they all perform at the same actions that students do in their surrounding. The fact that these agents perform their action in the same place and at the same time gives them the resources to perform these actions again and therefore reproduce them. Entrepreneurial agents sometimes perform new practices, which can produce new structures and therefore expansion of their practices. A condition for the emergence of new structures is the connection of agents of change through time and place. Social institutions or networks of ‘agents of change’ are crucial in the transition theory, since they form the basis of a regime change. The connection between energy cooperatives and agents of change will be explored in chapter 3.3.

Especially the element of place is contested in the current globalised and digitalised world. Since 1995 Doreen Massey openly questioned the relevance of place in a globalised world, geographers have researched this notion (Antonisch, 2011). Meanwhile, in sustainability research, the notion of ‘think global, act local’ has gained more and more attention, which could point towards the relevance of place specifically for sustainability issues (Devine-Wright, 2013). Energy cooperatives are bound to place as well and therefore underline that place is still relevant in social practices. This will be further explored in chapter 3.3.

2.4 Natural gas in The Netherlands

In the 1950’s The Netherlands went through a energy transition switching from coal to natural gas to heat buildings. Landscape pressures such as globalization made people realize that housing standards were low and besides the regime of coal mining in the Netherlands became under pressure by competition from abroad. The discovery of a gas field in Slochteren and the creation of a state gas company made the transition happen (Kemp, 2010). Ever since this transition, natural gas has been the main energy source for households in the Netherlands (figure 2)
Gas free houses is not a specific and explicit goal of the government, it rather is a necessary step in CO2 neutral housing which is the goal for 2050 according to the Energy Agenda (Ministerie van EZ, 2016). Banning gas out of the Dutch households is a big challenge. In 2016, only 6.3% of Dutch homes were totally gas free. The biggest challenge is to disconnect existing and historic neighbourhoods. The replacement of the gas system is particularly expensive and time consuming in these areas (Ministerie van EZ, 2016).

The most used strategy to implement energy-efficient building is the Trias Energetica (figure 3). As the term ‘trias’ implies, this strategy contains three steps. First, limit energy demand, which is mostly aimed at saving energy. Insulation, orientation towards the sun and compactness of the building are for example elements in this step. Energy efficiency is crucial to make the building ready for transition. A designer focussed on the implementation of heat pumps for example, should realize that a lower capacity and cheaper pump in combination with good insulation is on the long term more cost efficient than an high capacity expensive pump (RVO, 2015).
Second, use sustainable energy (RVO, 2015). Basically there are three alternatives for gas, Slingerland et al. (2016) calculated what the market share per alternative in different scenarios would be, based on motivations pace of the transition (figure 4). At first a sustainable heat supply with residual heat from industries or geothermal energy. Although the application and installation of such underground network needs an investment, the production of heat is relatively cheap and extra insulation is in most cases not needed. Therefore a heat network is by far the cheapest replacement of gas in dense areas (Vergeer et al., 2017). Heat networks are mostly used in relatively new neighbourhoods, since 60% of the connected houses are built after 1990. Note that not all city heating network count as gas free, since some of them have a central heating on gas. City heating is mostly initiated by local municipalities. Rotterdam, Almere and Utrecht are Dutch front runners (ECN, 2016). In a talk of professor transitions and sustainability Jan Rotmans on a symposium on the heat transition, he criticizes heat networks since industries are in a energy transition as well. In other words, the production of residual heat on which heat networks mostly rely, is likely to drop. Therefore heat networks might be just a short term solutions (Rotmans, 2018).
Second, electricity could replace the natural gas structure. In order to switch to full electric solutions, homes need high insulation standards to match the comfort levels of the original gas systems, therefore the actual use of electricity is relatively low. Because in most cases a considerably high investment in insulation is needed, the electric option is more expensive (Vergeer et al., 2017). Going full electric is an option that is mostly used and initiated by home owners themselves. Project developers have created different systems in which gas is replaced by electricity. A heat pump is an example of a popular electric heating system. These system are relatively expensive as well (ECN, 2016). In spite of the investments, Rotmans (2018) labels electric solutions as the most sustainable.

Third, biomass can replace natural gas. Green gas can be produced from biomass but besides a wood stove can replace a gas heating system as well. This solution is mostly applicable to rural or remote areas. Modern and efficient solutions with the help of wood pellets for example are widely used in Austria and throughout Scandinavia (ECN, 2016).

The third step in the Trias Energetica is to use fossil energy sources efficient when needed. This step is the lowest on the ladder of sustainability, but a realistic one. When everything within reach is done to lower the energy use of the building but there is still some gas used, make it as efficient as possible. fossil energy needs to be compensated by renewable energy (RVO, 2015).
3. Theorizing the role of energy cooperatives

3.1 Energy cooperatives: facts, figures and definitions

In the 2010’s the number of local energy cooperatives has grown significantly as can be seen in figure 5 (Schwencke, 2017). Stoeldraijers (2014) calls this era of cooperative emergence the ‘second generation’, since the first generation cooperatives has risen in the 1980’s. With the energy agenda published in 2016, the Dutch government has set ambitious goals for the energy transition. Though the goals are ambitious, The Netherlands does not perform well compared to other European countries. After Luxembourg, The Netherlands has the lowest renewable energy share of all EU members (Eurostat, 2018). Therefore it seems that the acceleration phase is yet to come. Meanwhile, citizens have taken matters in own hands.

Figure 5, Total number of energy cooperatives in the Netherlands per year (Schwencke, 2017, p. 9)

There are several reasons for the sudden bottom-up movement of renewable energy production. Besides taking matters around sustainability in own hands as described above, the dependency on perceived unstable regions for energy supply in the Middle East and Russia is of issue. By producing locally, a region can regain some of its authority and besides, the local economy profits; money spent on energy stays within the region. Local energy produced by cooperative members is also presumed to be reliable in its claim to be ‘really’ sustainable. The bigger energy concerns have damaged their reputations by selling gray energy as green energy with the help of certificates. The demand for local and
sustainable products is a trend visible in many sectors (Elzinga & Schwencke, 2015). In chapter 3.2 the bigger cooperative movement is explained and chapter 3.3 elaborates on localism and identity.

There are several types of energy cooperatives. The research takes into account collectives with a legal form which usually is a cooperative (coöperatie uitgesloten aansprakelijkheid), but could also be a foundation (stichting) or an association (vereniging). Schwencke (2017) distinguishes four categories of cooperatives:

1. “Wind” cooperatives: these are primarily aimed at wind energy production and work on the realisation of multiple projects. In practice, wind cooperatives are increasingly involved in solar energy and energy saving.
2. Project cooperatives: these are founded to develop and exploit one specific project without the attempt to develop other projects in the future. In practice, project cooperatives tend to develop more projects once the first has succeeded.
3. Local energy cooperatives: these typically have a geographically limited scope with a broad aim like ‘a sustainable energy supply in region x’. Mostly these cooperatives develop multiple projects focussed on saving, producing, storing or supplying energy.
4. Cooperatives of cooperatives: some of the cooperatives are working together through another cooperative, hence the last category (Schwencke, 2017).

The boundaries between the first three categories are blurry since most of the cooperatives in practice act on a level between. Wind cooperatives are increasingly involved in solar energy projects and energy savings and project cooperatives are likely to develop more projects after the first succeeded. Hence, many cooperatives in these two categories are moving towards the ‘local energy cooperative’ category, which is by far the biggest category in numbers of cooperatives. In figure 6 the overlap is visualized including the number of cooperatives per category. Since at first many wind and project cooperatives are moving towards the local energy cooperative category, second the local energy cooperative category is the biggest category and third local energy cooperatives are more likely to have a broad scope that includes activities named in the Trias Energetica (Schwencke, 2017), this research has a focus on energy cooperatives in this category and is in line with the definition of energy cooperatives of Schwencke (2017, p.8, translated by the author): “All groups of citizens that collectively organise themselves with the goal to produce, save, purchase or
deliver energy and to reach other common energy goals”. This definition is in line with the research objective and question of this research in the sense that it qualifies energy cooperatives as forms of organisations emerging from society.

Three government subsidy systems are of issue for energy cooperatives. At first the Postcoderoos regeling (Zip code rose regulation, PCR-regulation). This regulation provides a 15 years exemption of energy taxes for cooperatives that produce wind or solar energy. This enables the possibility to use for example the roof of the local gym or other buildings with a relatively big roof. The term rose refers to the zip code areas to which this regulation can be applied: one central zip code and the surrounding zip codes as the rose’s leaves. A PCR cooperative is an emerging concept within the cooperative sector (Postcoderoosregeling.nl, 2018). Second the Salderingsregeling (netting regulation) which allows a private party with solar panels to deliver its energy on the energy net when the panels produce more than the party uses itself. This ‘extra’ energy will be deducted from the energy bill for the same price as the party would purchase the energy. In 2020 this system will be replaced by a centralized subsidy system (Van Weerdt, 2018). Third, the SDE+ (Stimulation Sustainable Energy Production) subsidy which ensures the exploitation of sustainable energy. The cost price of sustainable energy is usually higher than energy from fossil sources which means that the production of sustainable energy is not always profitable. Hence, this subsidy compensates the difference between the cost price of sustainable energy and the market value of the delivered energy (RVO, 2018)
3.2 Cooperative as a business model

The cooperative as an entrepreneurial form seems to gain popularity in the whole economy. Cooperatives have a long history in the Netherlands. Mostly in agriculture and insurances, cooperatives have always been prominent. Since almost every Dutch citizen has health insurance, cooperatives like Achmea, VGZ, Dela, CZ and Menzis have the largest number of members. De Cooperatives with the largest number of employees are the Rabobank which originally started as a bank for farmers and second FrieslandCampina, a cooperative for dairy farmers (De Jong & Griffioen, 2017). Heuvelmans (2013) however notices that in the following sectors the cooperative form is emerging: insurances, finance and banking, child care, regional sustainable/community development, health care, local renewable energy, and entrepreneurs or self-employed professionals in other sectors. The latter consists all kinds of cooperatives in creative industries, knowledge institutes and ICT.

The emergence of cooperatives in the current economy is explained by Jonker (2014) as a consequence of a changing economy in which value creation is not necessarily aimed at monetary value, but at social and ecological value as well. Evolutionary anthropologist Johnson (2013) takes this a step further and theorizes that cooperatives are more in line with human evolution than the corporate business model. According to our evolutionary roots, humans are uniquely able to cooperate and be interdependent on each other which allowed the human population to grow bigger than those of other primates. Because of this interdependence, humans developed a system in which members of their own tribe or group can be recognized rapidly and identity is created. Because cooperatives support every member of the group, this would fit the human evolution better than corporations in which a boss or manager has different goals than the employees.

To understand the role of cooperatives in the economy as a whole, Normark (1996, p430) describes that “Cooperatives are business enterprises that are owned by one or several categories of users”. These categories of users are divided into suppliers, employees and consumers. All the members of the cooperative share the risk capital and are therefore the owners of the enterprise. The role of cooperatives in society is often to represent a weak market actor. Consumers have created cooperatives to offer affordable quality products and farmers created cooperatives to get better prices for their products for example. The fact that the user owns the enterprise creates a close economic relationship. Cooperatives therefore have the ability to strengthen weak actors in markets and to make them more active in society (Normark, 1996).
In line with Normark that cooperatives have the role to strengthen weaker actors in markets, Stoeldraaijers (2014) acknowledges that most of the second generation energy cooperatives are not focussed on energy production, but on the collective purchasing of solar panels. By uniting a group buyers, the position in the negotiating process improves which results in lower prices for the solar panels. Though, a bottleneck is that in some cases the number of associates in the cooperative is too low to effectively experience the advantages.

According to Viardot (2013) one of the main barriers of renewable energy is the perceived high costs. Also in the Energy Agenda, the Ministry of EZK (2016) acknowledged that the costs of the heat transition will be significantly, especially in existing and older neighbourhoods. By uniting the forces locally in a cooperative, the price of for example insulation material could drop due to a better negotiating position. Potentially, there could be a role for the cooperatives to reduce costs and therefore accelerate the heat transition.

Following the Trias Energetica, the most used strategy to implement energy-efficient building, the first step in the transition is to make houses ‘transition ready’. This mainly means a significant investment in insulation. The insulation of existing buildings is one of the reasons that the costs of an individual transition towards gasfree living are relatively high (RVO, 2015). Van Melle et al. (2015) calculated the costs of the different aspects of the transition for middle and high insulation levels. Especially for high insulation, the costs of insulation are significant (figure 7). When cooperatives are able to lower the costs of insulation by uniting a group of consumers like suggested by Stoeldraaijers (2014) and Normark (1996), cooperatives could accelerate the first phase of the Trias Energetica.

![Figure 7, Insulation costs for households per heat source (Van Melle et al., 2015, p. 8)]
3.3 Energy cooperatives and society

3.3.1 Local identity

Localism has been a trend in consumerism in many sectors which can be of use for the cooperative sector as a whole. Friedman (1996, p. 313) points out that many approaches to consumption find common ground in the interconnectedness with self-identification: “[consumption] may be a conscious act, a statement about the relation between self and world, or it may be a taken for granted aspect of everyday life, i.e. of a predefined identity”. Together with other practices of cultural self constitution like class, gender and clothing, lifespaces and social identity are constructed. Especially in food, the search for authenticity is ongoing (Friedman, 1996). Winter (2003) explored the relation between quality food and localism and suggested that localism might be the first step towards an alternative food economy. Where defensive localism as a economic strategy is often seen as a conservative manner, it might be the solution for a post-global green world instead of a tunnel vision on the organic and ecological aspects of production.

This emerging localism in food consumerism might radiate to other sectors. Fletcher & Vitterso (2018) for example compare localist food initiatives like food miles, slow food and community supported agriculture with developments in the fashion industry. Many of these initiatives can be translated to fashion and therefore fashion can ride along with the localism in food, until the point where differences are too big (use and reuse of materials, laundry, ownership etc.). In the end, the exchange of expertise in localism is critical to make diffusion to other sectors possible (Fletcher & Vitterso, 2018). Purtik et al (2016) underline this statement by an analysis of cooperatives in sustainable neighbourhoods: “One important finding of the analysis also relates to the social learning processes induced by the cooperative and the diffusion of its ideas and practices through the member cooperatives beyond the boundaries of the new sustainable neighborhood” (Purtik et al, 2016, p. 121). In this way, energy cooperatives can import expertise and experiences from local food or other local initiatives to cocreate a localised post-global green world.

Seyfang & Smith (2007) couple the literature on grassroots innovations to sustainable development and define grassroots innovation as: “networks of activists and organisations generating novel bottom–up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the communities involved” (Seyfang & Smith, 2007, p. 585). These community-based initiatives not only experiment with greener technologies, but also with social innovations. Where conventional innovations
are driven by profit maximization, social innovations are aimed at meeting social or environmental needs that the market economy is neglecting.

Grassroots innovations possess the knowledge and experience of what innovations are appropriate in localities. Confidence, tacit knowledge and trust to new settings are some of the key characteristics of grassroots innovation that limit the ability to replicate it in various locations (Hossain, 2016). Tacit knowledge is “the deeply personalized knowledge possessed by individuals that is virtually impossible to make explicit and to communicate to others through formal mechanisms” (Dicken, 2015, p. 108). This knowledge is not codable therefore not transmittable to other places. This is crucial to understand the role of place in technological diffusion (Dicken, 2015).

This notion of place can be coupled to the claim of Seyfang & Smith (2007) that local embedding is a benefit of a community-based initiative. The knowledge of what works and what matters to local people can be a unique asset. Because the initiatives are more personal, meaningful and directly relevant they can reinforce behavioural change. The local embeddedness of energy cooperatives can create a specific environment in which the local action can be reinforced.

De Vries et al. (2016) too put emphasis on the notion of place in their distinction based on the general aim of the innovation, but specify it to user-driven and manufacturer-driven innovations. User-driven innovations are created by communities of end-users often geographically centred. The aim of these communities is usually not primarily commercial. Therefore the communities are more willing to share knowledge about their innovations than commercial parties which enables a learning process. Due to the nonprofit identity, communities are able “to identify and and solve a wide range of problems at low individual costs” (De Vries et al., 2016, p. 53).

Implicitly, these references to the notion of place brings in a Gidentian view on an energy cooperative as social institution. In Giddens’ view, social institutions are routinized practices that reproduce itself constantly because of ongoing practices by agents. For example: “The institution of a [cooperative] only exists because many agents constantly carry out the practices that are part of the mutual knowledge involved in being a [member] (...). Mutual knowledge is the tacit, taken-for-granted knowledge shared who do, or can, engage in a certain practices or set of practices” (Inglis & Thorpe, 2012, p. 228-229). To put this Gidentian view simply, the existence of the cooperative depend on the members and founders to keep doing what their doing in the place and time in which find their peers who do the same. A place in which agents share the same knowledge is crucial for the existence of an energy cooperative.
This notion of place can be coupled to techniques of sustainable energy. Although the techniques of energy provision are the same, the application of these techniques differs geographically. The technological form of sustainable energy provision could be labeled as configurational technologies: open technical systems without a general identity and multiple local manifestations. Therefore the notion of a local ‘technical identity’ is of issue: each community is organized differently and structures its projects and solutions according to what is appropriate in its own community. The local innovation processes make each community unique in its solutions (De Vries et al., 2016, p. 53). This is in line with the policy advice provided by Walker et al. (2010) to step down from the simplistic assumption to prescribe ‘what works’ and that community projects can be replicated, but that the social context is just as important as the technical.

3.3.2 Energy cooperatives in relation to agents of change

From a Giddensian perspective, practices are produced by agents and through structures. Structures provide the resources and rules that agents need to carry out practices and set of practices make the rules and resources that form the structure. Structure only exists in practice and is stored in the memory of agents that perform the practices. To make change occur, new resources and rules, hence structures, are needed. Agents of change need to stand up and convince other agents to carry out the desired practices to form new structures (Inglis & Thorpe, 2012). This subchapter seeks the connection between energy cooperatives and agents of change.

Hjorth & Bjerke (2006) mark agents of change in society as public entrepreneurs which are virtuous citizens who aim to change the normal everyday practices by facilitating new practices in organisational forms. This virtuosity should be interpreted as something that is embedded in local-historical and cultural context, not something universal. This is very much in line with Giddens’ references to the relevance of place and identity. The public entrepreneur is not aimed at creating change through products or services. Sociality is the desired outcome of the public enterprise by changing the normality: “which makes ‘public entrepreneurship’ into a creative resistance against forces of normalisation” (Hjorth & Bjerke, 2006, p. 115).

The aim to change practices in its surrounding makes public entrepreneurship a well fitted concept for the energy cooperative. Research conducted in Sweden and Denmark have pointed out the role of energy cooperatives in raising awareness through engagement amongst communities and the ability to stimulate action on climate change locally (DTI, 2005). Also Viardot (2013) points out the role of energy cooperatives in the educational
communication. From a literature study, the following main barriers for renewable energy were identified: low perceived usefulness (unreliable), low perceived ease of use, bad image (harmful side effects, e.g. killing of birds by wind turbines), lack of social backing, lack of experience, free-riding (one profits more than the other), high costs and localisation (technical constraints). The research concludes that cooperatives have a community-based social marketing role in “creating the promotional factors required for a secure investment environment, removing the most manageable concerns of a potential investor and enabling people to make changes to their homes and lifestyles” (Viardot, 2013, p. 761)

The educational character of energy cooperatives to act on what matters locally can activate citizens to take part in the heat transition. It can take away the social barriers that are of issue with renewable energy. According to Van der Schoor & Scholtens (2015), there are only few issues with innovations in renewable energy hence the social barriers to renewable energy cause bigger problems. Potentially, the educational activities of energy cooperatives can remove these barriers and create public support for local projects. Walker et al. (2010) emphasise for example the use of a community approach by policy makers in the experiences and outcomes of energy technology implementation. The opposition towards wind farms in the UK for example could have arguably been avoided by promoting locally appropriate and beneficial technologies. Projects that “seek to involve local people actively and directly and that are focused on achieving a rich set of collective outcomes” (Walker et al., 2010, p. 2662) are likely to succeed.

This role to stimulate public support does not mean that it activates people to engage in renewable energy sources and the heat transition. Hoffman & High-Pippert (2005) emphasise the intermediate role of community energy between the mass of citizens and the state. This role is extracted from the theory of a ‘stealth democracy’, in which democracy exists invisibly. This means that citizens want to have the ability to participate in decision-making if they are motivated to do so, but that they are not obligated to take part. The idea is that a minimal level of participation is strongly valued amongst citizens. Energy communities could offer the opportunity to take part in the heat transition on a grassroots level without being actively involved. In combination with the local embeddedness of the the communities, which enhances the responsibility that citizens feel for their own destinies, they could raise public support (Hoffman & High-Pippert, 2005).

To take this hypothesis a step further in terms of engagement than Hoffman & High-Pippert (2005) did, Bomberg & McEwen (2012) researched the way in which community energy could be compared to the notion of mobilization which is extracted from the broad range of literature on social movements. Traditional theories of protest referred
mainly to economic crises, deprivation and class conflict as sources of mobilization, but from the social movement perspective mobilization is explained with rational choice approaches and seen as a complex political processes based on values, goals and strategy. In sustainable energy, mobilization “refers to galvanising communities to support and actively take part in initiatives linked to energy reduction or producing energy from renewable or low carbon sources” (Bomberg & McEwen, 2012, p. 436). Energy mobilization needs financial facilitation from the government, and depends on how well the communities are able to exploit this facilitation. In deprived areas which are often presumed to fall behind in the development of renewable energy systems, this economic deprivation can be a driver for energy mobilization since it could address fuel poverty. This underlines the political interest of energy mobilization (Bomberg & McEwen, 2012).

Middlemiss & Parrish (2010) emphasise the importance of community capacity to enable mobilization. Three types of capacity were presumed to be crucial. At first personal capacity which refers to the individual resources of the community members. These include the understanding of the sustainability, skills, values, enthusiasm, etc. Second, organisational capacity which entails the values of formal organisations and whether these are aligned with sustainability values. Energy cooperatives are build upon the values of a sustainable energy supply, and could therefore be part of the organisational capacity. Third, cultural capacity which refers to the fit of sustainability into the values and history of the community. This depends as well on the way that sustainability is framed within the community and the narrative of the place. Grassroots initiatives are vital in framing sustainability in the local culture and could therefore play a useful role in the legitimising process of the steps that need to be taken in the heat transition.

An important note is that placing energy cooperatives into the literature on communities does not only presume a positive image. Communities can be apart from their inclusive appearance, exclusive to individuals who do not fit the identity or ideas of the others. Besides, communities are not the same as places since communities can overlap within places and vise versa (Walker et al., 2010). This could be problematic for some projects in the heat transition since for some technicalities a participation of a whole neighbourhood or street is needed. When an alternative replaces the gas network for every apartment in a flat for example, there is no option to keep the gas network open for one or two apartments in the building.
3.4 Energy cooperatives and the regime

3.4.1 Cooperative innovation

According to the influential economist Joseph Shumpeter, innovation is all about finding new combinations to disturb an equilibrium in an economic system. In other words, innovation is the key driver of economic change and entrepreneurs are the agents of change (Hospers, 2005). Overcoming the chasm is the biggest challenge of new technologies. The core message of the chasm theory is that there is a zone of danger within the adoption of the early majority at the start of the diffusion of a technology. (Moore, 1991).

Van der Schoor & Scholtens (2015) place the role of energy cooperatives in innovation. In their research they couple local community energy initiatives to grassroots innovations. These bottom-up innovations “have their source in local networks of engaged citizens, who are moral agents” (Van der Schoor & Scholtens, 2015, p. 668). Socially, the role of local community energy initiatives is to provide a grassroot entrance for citizens to engage in the energy transition. Though, a further development of organisation structures is needed to reach long term results (Van der Schoor & Scholtens, 2015).

Bidmon & Knab (2018) researched the role of business models in transitions. One of the potential roles is the business model as intermediate between technological niche innovations and the socio-technical regime (figure 8). In this role, the business model facilitates the technical niche innovation and helps it through the phase of stabilization to let it ultimately break through the regime. When using an existing business model, the niche innovation can use the regime infrastructure to accelerate its breakthrough, but arguably chances for the innovation to be radical are higher when using a new business model.
To summarize, the potential intermediate role of a cooperative between the regime and the niche innovation could help the innovation through the chasm to its breakthrough due to its source in local networks. In this role, the cooperative business model is rather a ladder for technical innovations than an innovation itself.

Another role of business models in relation to transition theory is that business model is a niche innovation itself (figure 9). Novel business models “can be understood as a redefinition of existing ways of creating and capturing value” (Bidmon & Knab, 2018, p. 911). These business models can challenge the regime logic without a technical innovation. They act on a higher level of structuration than technical innovations because novel business models are considered more stable than technical innovations. By creating new networks between critical actors, novel business models experiment and ultimately lay the foundation for new regimes. By building up a critical part of a new regime, novel business models have the ability to be a strong driver of transitions (Bidmon & Knab, 2018).

Figure 8, business model as intermediate between technological niche innovations and the socio-technical regime (Bidmon & Knab, 2018, p. 910)
Jonker (2014) emphasises the role of New Business Models (NBM’s) in societal transitions. Society gets shaped by transactions and transactions are the basis for value creation. In the current economic system, money is almost exclusively used as currency in transaction models while other forms of transaction could be ignored. NBM’s are part of a generation of transaction models that create value reciprocally. Businesses should be able to make a profit from society, but society needs to profit from business as well. The cooperative business model is aimed at societal value creation which is organised collectively and can therefore be an example for other business models.

Seyfang & Smith (2007) use the metaphor of a ‘green conveyor belt’ for the role of grassroots innovations to bring their ideas into the mainstream regimes. Hossain (2016) emphasis the role of niches to be a protective space for radical movements that are not yet accepted by the mainstream regime. The aim of grassroots innovations is to change a regime and therefore the incorporation of the niche by the regime is a key process. Either a large organization takes over the innovation or the innovation becomes the large organization itself. When the cooperative is the innovation itself and it is aimed at changing the regime, its new business model needs to be adopted by the regime.

3.4.2 Cooperatives as new regime

According to Van der Veen (2016), local energy cooperatives form a niche in the energy transitions and an alternative to the existing fossil energy regime. In the energy transition, the old paradigm (top-down, centralized and fossil energy) is being replaced by the new paradigm (sustainable, local energy). Cooperatives are initiated by citizens and are
active in their living environment. The goal of energy cooperatives is mainly societal; to save or generate energy. Niche developments such as the creation of cooperatives are of vital importance for a transition to succeed. Energy cooperatives take the role as alternative to the fossil energy regime (Van der Veen, 2016).

In a strategy paper for the energy cooperatives in The Netherlands, the participating members in the dialogue set the ambition to produce and save 25 PJ sustainable energy with a total of one million members in 2025. Although this seems rather ambitious when compared to the year of writing (2017) in which the production of energy by cooperatives was less than 1 PJ and the total amount of members was estimated to 50,000, the societal urgency demands to aim high according to the document. The cooperative movement will be part of the energy regime with these goals. The current issue is the status of cooperatives in society is assumed to be unprofessional. A professionalization of the sector is needed in the near future (Proka et al., 2017).

3.5 Conceptual model and operationalisation

In the chapter 2, the heat transition is explained with the help of the sustainable transition theory. Besides, keeping in mind the aim of this research to explore the role of society in the heat transition. In chapter 3, the potential roles that energy cooperatives could have in this transition were deducted from several kinds of theoretical perspectives. The conceptual model in figure 10 summarizes and visualizes the theoretical framework. In this subchapter a ‘how to read’ for the conceptual model is provided, and the model is operationalised into nigh hypotheses.

The foundation of the conceptual model is layed by the multi level perspective, but since (civil) society as an actor is intertwined through the layers, the visualisation of the MLP needs fundamental adjustments for this research. When starting to read the conceptual model from the bottom, one might recognize two layers of the MLP: Landscape pressures and technical niches. Landscape developments like the paris agreement, the visibility of climate change consequences such as the earthquakes in Groningen, geopolitical developments in the middle-east and Russia and the lagging behind of the Netherlands in renewable energy in the EU put pressure on society (1) together with technological niches in which innovations aim to grab opportunity to enter the regime (2). The pressure and innovations from niches and the landscape trigger agents of change to emerge from society (3) that in Giddensian terms seek to change structures and practices. In practical terms, some active citizens stand up and act on their believes that heating sources should be sustainable.
When several agents of change in society are triggered and want to take action to change the heating regime, a legal form is needed to get subsidies and other kinds of funding. An often chosen legal form is a cooperative. The cooperative therefore unites agents of change (4) and provides an opportunity to gain power in the negotiations with regime actors. This enables collective purchasing of for example solar panels or insulation materials. The united agents of change connect on the basis of shared problems and challenges in their neighbourhoods, hence tacit knowledge and identity is shared. The local character of the cooperatives is used to gain more members, or agents of change, and radiates back to society (5) in for instance the educational communication that Viardot (2013) mentioned. This results in mobilisation and public support for renewable energy. The process of agents of change that mobilize other agents to be agents of change via cooperatives is ongoing.

The bargaining position of the cooperative results in interaction with the regime (6). The cooperative brings new business models into the regime that are aimed at multiple value creation. Besides, the cooperative as a business model could bring technical innovation from the technological niches into the regime. The interaction between the cooperative and the regime could result in new business models (7) and the diffusion of technical innovations (8). The latter not only because innovations are brought to the regime, but also because collective purchasing by cooperatives could create a market and therefore accelerate the development of a product that originated in the regime. Ultimately, the new business models and technical innovations form the basics of a new regime (9). When the new regime is formed, the transition is completed.
The theoretical framework and conceptual model is operationalized by ten hypotheses, which are deducted from the ten relational arrows in the model. All the hypothesis are focussed on the role which energy cooperatives play in the relation, meaning that other interactions between the elements of the conceptual model are kept in mind, but not specifically researched. Note that this set of hypotheses are still far from complete and that the formulation can be different from another perspective since the literature on the subject in comprehensive, multi sectoral and can be approach from lots of science areas. Despite the multifaceted subject, this set of hypotheses is as comprehensive as possible.

1. The role of energy cooperatives in the heat transition is to translate global developments to regime action
2. The role of energy cooperatives in the heat transition is to bring technological niche innovations to the regime
3. The role of energy cooperatives in the heat transition is to bring create more agents of change that aim to replace the current regime
4. The role of energy cooperatives in the heat transition is to unite agents of change to improve their bargaining position with the regime
5. The role of energy cooperatives in the heat transition is to use its local embeddedness to create public support and to enable sustainable energy mobilization
6. The role of energy cooperatives in the heat transition is to represent society in the interaction with regime actors
7. The role of energy cooperatives in the heat transition is to innovate the business models in the heating sector
8. The role of energy cooperatives in the heat transition is to accelerate the diffusion of technical innovations
9. The role of energy cooperatives in the heat transition is to form an alternative to the existing energy regime
4. Methodology

4.1 Philosophical background

Regimes in societal systems are temporal, since transitions happen approximately each fifty years. This is very much in line with the impossibility of finding solutions for ‘wicked problems’. There are many solutions and once implemented, it is unknown whether it is better than the other possibilities; there is no good and bad. Also, there are no references from other cases, every wicked problem is unique and needs other solutions (Rittel & Webber, 1973). For transitions goes the same, after the estimated fifty years, the ‘best solution’ is replaced by the new ‘best solution’, while other promising solutions may have not gotten the chance. There is no one contemporal solution, in other words there is no single truth like there would be in mathematical puzzles. Taking into account that the truth is created by how temporal society and knowledge shapes our perception of the problem, this research is conducted from a constructivist perspective.

4.2 Strategy

Following the line of constructivist studies and the rather deepening instead of broadening character of this research, it takes a qualitative approach. Although this approach is useful to go in depth, critics question the generalizability of case studies because the often small sample does not resemble the aimed area of research. Therefore terms such as inductive or deductive are handled with care. Besides the mixed approaches in testing and exploring that will be explained in the next section, makes it hard to put an inductive or deductive label on this research. The more neutral term ‘Abduction’ is more applicable to this research. This approach is aimed at finding the best explanation from different interpretations in data and theory to potentially discover surprising new insights (Mantere & Ketokivi, 2013)

The research method is a single holistic case study. This term needs three clarifications. At first the choice for a case study which “involves the study of a case within a real-life contemporary context or setting” (Cresswel, 2012, p. 97). This type of research aims to get a profound insight in processes (Verschuren & Doorewaard, 2007), which is exactly what is aimed for in a qualitative approach.

Second, the decision for a single instead of a multiple case study. The heat transition is young, complex and comprehensive. In the year of the announcement that houses need to
be gas free in 2050, which was only two years before this research, about 96% of the houses were heated with gas (Slingerland et al., 2016). This means that organisations and science are still exploring their roles in this transition, hence the de-alignment and re-alignment character of the transition. Yin (1994) describes the revelatory case study as a rational to choose for a single case which means that “an investigator has an opportunity to observe and analyze a phenomenon previously inaccessible to scientific investigation” (Yin, 1996, p. 40). Although the term ‘revelatory’ may be somewhat exaggerated in the light of this research, it does emphasise the exploratory aim of a emerging new sector. Therefore a single case, namely the heating sector and its transition in The Netherlands as a whole, is appropriate.

Third, the holistic approach in the case study needs clarification. Yin (1996) distinguishes the holistic from the embedded approach in which the first takes into account several subunits of analysis, and the second “examine[s] only the global nature of a program or of an organization” (Yin, 1996, p. 42). As stated before, the aim in this research is to understand the role of energy cooperatives in the heat transition and which is in line with the holistic approach. Ultimately, the single holistic case that has been studies can be formulated as the role of the energy cooperatives in the heat transition.

4.3 Data collection

The data collection is conducted in three ways, to ensure the triangulation in the research. To operationalise the single holistic case study and the overall constructivist approach, in this subchapter the literature study, in-depth interviews and qualitative questionnaire are explained and justified.

4.3.1 Literature

“Stand on the shoulders of giants”, Google Scholar repeats this sentence once used by Isaac Newton at every search. It reflects the idea of the literature review in this study: find out what others have already found out about the subject and build on that knowledge. Besides, the literature study is the basis for the empirical study.

The literature can be split into two sources. At first the scientific literature, which can be classified as independent and neutral. Saunders et al. (2004) make a difference between fundamental theories, midrange theories and substantive theories (figure 11). The first (fundamental) contain theories with the highest potential to change the way we think about the world. These are the most abstract theories that are very limited in the practical application. The duality of structure of Giddens (1984) is an example of a fundamental
theory. On the other side of the spectrum, substantive theories are more practical and limited to a situation, group, time, population or problem like Viardot's (2013). Theories that have a certain practical application and with the ability to change the way we think about the world can be classified as midrange theories. Transition theories like Grin’s (2010) for example. Although the examples given above seem clear, the boundaries between the three sorts of literature are blurry. Most of the articles and theories can on some level be classified as all three. Therefore it is helpful to keep a balance between the three sorts of theories in mind, but an exact mapping is considered impossible.

![Figure 11, Cohesion of theories, based on Saunders et al. (2004)](image)

Second, the gray literature which is not academic but published by scholars ‘in the field’. Because of the provision of practical knowledge and the accuracy of these publications, they are useful. Especially with the recent developments concerning the stop of gas extraction in Groningen, organisations like HIER Opgewekt and governmental bodies are eager to publish about the heat transition. Although these publications are useful, they need to be handled with care since these organisations could have other agenda’s than just informing society. Therefore, independence and neutrality are not taken for granted.

4.3.2 Qualitative questionnaire

Since energy cooperatives are the central actor in this research, their involvement is this research is of great importance. As was stated in chapter 3.1 the focus of this research is on local energy cooperatives and not on wind or project cooperatives because this is by far the largest group of cooperatives and besides they have a broader scope which entails activities that fit the heat transition. The aim is to collect information of what these local energy cooperatives actually do in relation to the heat transition.

The method to collect this data is qualitative questionnaire. According to McGuirk & O'Neill (2016), this method is increasingly used in Human Geography to gather information about complex matters and has three advantages. First "they can provide insights into social trends, processes, values, attitudes, and interpretations" (McGuirk & O'Neill, 2016, p. 43).
Second, the use of a qualitative questionnaire is flexible and can be combined with in-depth interviews. They can even lay a foundation for the interview questions. Third, it is pragmatically a fortunate method because it enable a relatively fast collection of extended data. enables “extensive research over a large or geographically dispersed population” (McGuirk & O’Neill, 2016, p. 246), which certainly applies to the ‘population’ of energy cooperatives in The Netherlands (figure 12). This is a major advantage over interviews. Besides, the advantage of a qualitative over a quantitative questionnaire is that it leaves more room for exploration. There is more room for the respondents to answer the questions in the way they want without being forced to choose between categories or coded answers.

![Figure 12, Geographical spread of energy cooperatives (Schwencke, 2017, p. 13)](image)

Eight out of the ten questions in the qualitative questionnaire are open questions which “[make] it possible to pose complex questions that can reveal people’s experiences, understandings, and interpretations of social processes and circumstances, as well as their reactions to them” (McGuirk & O’Neill, 2016, p. 252). Although two questions are closed with several answer categories, an explanation for the chosen categories is required. Two of the ten questions are optional since they are speculative. The last question gives the respondent the opportunity to bring in roles or subjects which he or she thinks that misses. In this way, the exploratory character of this research is ensured. The other seven questions in the questionnaire are based on the hypotheses that were extracted from the literature. The
indicators in the literature that can be proven by the experiences of the particular respondent of an energy cooperative, are converted into questions for the qualitative questionnaire.

The preparation of the questionnaire is of utmost importance to get the framework and design that provoke the most relevant data. Pre-testing is a method to improve the formulation of the questions, hence the understanding of the respondent (McGuirk & O'Neill, 2016). Therefore the questionnaire was tested by one of the vice-chairman of the Morgen Groene Energie cooperative. After the test, the questions were formulated slightly different. The questionnaire can be found in appendix A.

The respondents need to qualify the description of a ‘local energy cooperative’ as described in chapter. Within this ‘population’, the respondents are randomly sampled. The distribution of the questionnaire is done in three ways. At first, two cooperatives of energy cooperatives (Om Collectief and Hoom) helped the researcher by distributing the questionnaire among their members. Second, the researcher sent emails with the questionnaire to potential respondents. Third, through snowballing other relevant cooperatives were reached. The snowballing method was only used from cooperative to cooperative, not with the help of the interviewed organisations from the following chapter. These interviewees were in many cases involved in local energy cooperatives too, but to prevent a bias of double weighted answers these cooperatives were excluded from the research. A number of 33 local energy cooperatives have participated in the questionnaire. These cooperatives with a short explanation can be found in appendix B. A map with the geographical locations of the cooperatives can be found in figure 13.
4.3.3 Semi-structured interviews

The empirical part of the research consists of twelve interviews. The responding organisations are theoretically sampled. To get a broad overview of the perceived roles of cooperatives in the heat transition, the multi level perspective is used as a framework to select respondents. Although it is a static framework which does not dive into the dynamic interdependencies over time, it “provides a snapshot in time of the transition dynamics at the various scale levels” (Grin, 2010, p. 133). The challenge in using this framework is to operationalise the levels, since the vertical axis is imprecise defined. In other words, the differences between the three levels are blurry.

In a study on the role of cooperatives in the energy transition as a whole, Van der Veen (2016) operationalised the the three levels as follows. On the macro level, she selected only national ministries since these develop the goals that provincial and municipal governments need to reach. In that way the ministries have indirect influences on policy changes that have the potential to open up a regime. On the meso level, she selected
municipalities and provinces and besides governments, a number of established market parties such as Liander and Greenchoice but also Rabobank as a financer. On the micro level, she selected the cooperatives themselves. Van der Veen’s interpretation of the MLP is more narrow than originally meant by Grin (2010) as it takes only into account organisational players, excluding structures, institutionalized behaviour and trends in the macro level. Arguably, the macro level as used by Van der Veen is the level between the landscape pressures on the macro level and the regime in the meso level. Although the interpretation is not as originally meant, it translates the MLP into a practical framework for a case study, which makes it useful for this research.

In the operationalisation of the multi level perspective, this research follows Van der Veen (2016) in her line of thought but with an essential addition. Taking the model of the de-alignment and re-alignment transition pathway into account as explained in chapter 2.2, there are more components than policy that shape the regimes at the meso levels: Industry, markets and user preferences, science, culture, technology and policy. Therefore, the focus at the macro and meso level should not only be on policy, but on other aspects as well that indirectly influence the components of the regime. Besides, according to (Bidmon & Knab, 2018), a potential role of a business model in transitions can be to be the intermediate between niche technologies and the regime structures at the the meso level. Therefore, the focus at the micro level should not only be on the cooperatives themselves but also on the providers or producers of new technologies.

From each level (macro, meso and micro), representatives of organisations are interviewed. In order to keep up with the aim to create a broad overview of the perceived role of cooperatives, the organisations per level need to have different functions in the transition. Interviewing two ministries at the macro level for example, would not create a broad interview since they both aim to influence the same regime component (policy). Table 1 provides an overview of the interviewed organisations and their place in the MLP and playing fields. A diversification of playing fields within a level of the MLP was aimed for, but not always feasible since some of the playing fields are predominantly active in one particular level (for example, policymaking organisation are typically on the meso-level). A capital and bold X resembles the core activity of the organisation, a small x refers to subjects that the organisation is involved in, but not in its core business. In appendix D, an explanation of the sampling per organisations is provided.
Table 1, Interviewed organisations sorted by their place in the MLP and playing fields

<p>| Lobby          | MLP       | Playing fields |</p>
<table>
<thead>
<tr>
<th></th>
<th>Macro</th>
<th>Meso</th>
<th>Micro</th>
<th>Policy</th>
<th>Market</th>
<th>Science</th>
<th>Culture</th>
<th>Technology</th>
<th>Industry</th>
</tr>
</thead>
<tbody>
<tr>
<td>ODE Decentraal</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netbeheer Nederland</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Government</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ministerie van EZK</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Provincie Zuid-Holland</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Gemeente X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Grid operator</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Stedin</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x</td>
</tr>
<tr>
<td>Enpuls</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Energy supplier</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Essent</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x x</td>
</tr>
<tr>
<td>Eneco</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x x</td>
</tr>
<tr>
<td>Startup</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecovat</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x x</td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Duurzaam Den Haag</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x x</td>
</tr>
<tr>
<td>HIER Opgewekt</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>x x</td>
</tr>
</tbody>
</table>

The interviews are conducted in a semi-structured way. The questions are based on the perceived roles described in the literature, but leaves room for suggestions of the respondent. A fully structured interview would close the opportunity to find roles that have not been picked up by scholars in the literature. On the other hand, a unstructured interview would provide too little steering and makes the comparison of the answers of different respondents hard. Besides, an unstructured interview is likely to take more time which is pragmatically not desirable for both respondent and interviewer.

The interview questions are based on the hypotheses and conceptual model in chapter 3.5. and are shown in the interview guide in appendix C. This interview guide is used for every interview. Naturally, the representatives of the organisations were not able to answer all questions from their own experiences. In the cases this happened, the interviewer asked for references to a person who could answer the question to provoke snowballing.
4.4 Data analysis

The method for analysis of the empirical data is a qualitative content analysis, which is widely used to elicit meaning from text. Where originally content analyses were used to radical reduce words and quantify the text, qualitative content analyses (or ethnographic content analyses, ECA) enable the researcher to elicit meaning from text more holistically (Priest et al., 2002).

The word ‘ethnographic’ distinguishes ECA from other forms of qualitative data analysis and puts in the original sense of the word emphasis on a cultural dimension of human behaviour. The researcher needs the immerse in the research area to discover. It is the context and social interaction from which meaning derives, which already brings some orientation for analyses because a harsh reduction of words could damage the meaning of them (Altheide et al., 2013).

Although the specific unit of study in this research is new and therefore not yet studied that much as stated before, grounded theory is not appropriate for this research because of the strong inductive character. This approach aims to generate theory that is grounded in the empirical data collected in the research (Priest et al., 2002). As written before, this research does not have a inductive character and the aim is to build further on existing theory. Therefore, grounded theory does not fit this research as a method for analysis.

More concretely, the qualitative content analysis entails a textual analysis of the interviews and questionnaire. Therefore the interviews need to be transcribed. The texts are submitted to numerous rounds of coding. Roughly, these rounds can be divided into at first open coding in which the codes remain close to the original text, second axial coding in which codes are categorised and third selective coding in which the categories of codes are linked to the hypotheses which were deducted from the theory. Ideally this division of coding entails a three step plan, but in practice every coding round need constant revision for a optimal result (Priest et al., 2002), as is shown in figure 14. This coding is conducted digitally with the Atlas.ti software.
4.5 Validity and reliability

This section contains an overview of the strategies used to ensure the validity and reliability of this research. In the first phase, assumption validation by experts was used. Since the heat transition is a complex and dynamic subject, previous (practical) research can be outdated. Especially at the time of writing, much is happening in this transition because the national government has decided to stop the gas extraction in Groningen. A constant validation of assumptions at the foundation of this research is therefore needed.

Experts with different backgrounds have helped the researcher to effectively demarcade the subject of research in different ways, to enrich the study with additional studies, to validate the available knowledge with their experiences and to increase the societal relevance. This method is based on the Delphi method which is regularly used to reach consensus within a group of experts and makes use of iterative consultation in different rounds and the adaptability of the method to various situations is one of its great advantages. The Delphi method fits the constructivist research approach since it takes into account different meanings that individuals give to social innovation, but follows the more objectivist notion that a consensus in the interpretation of social innovation can offer more a more sound science (Callorda Fossati et al., 2017).

Table 2 provides an overview of the experts. The following examples illustrate the important contribution of the ‘expert panel’ and how the members guided me through the complexity of the debates within the heat transition.

At first Van Prooijen pointed towards the complexity of the heat transition and that every technical solution is a sector on its own. You cannot treat heat
networks the same as all electric solutions. She advised me to focus on one solution. I discussed with Van Staveren all kinds of alternatives, and their characteristics. He explained the factors on which the ‘Warmte Transitie Atlas’ is based, a tool developed by Over Morgen to calculate the optimal heat solution per region based on the lowest societal costs for the implementation. Although this knowledge was very much needed to understand the debates, I was looking for an opportunity to look at the transition from a societal perspective.

A visit to Jan Jonker however, resulted in a more abstract view on the matter. He confirmed that the transition theory is very useful in this matter. Regular discussions with Veldboom also gave me the idea to leave the technical aspects somewhat behind. Henry Terlouw, at last, confirmed that investigating the role of energy cooperatives as a reflection of society was a fruitful perspective. He pointed towards the central role that cooperatives can play in neighbourhoods were the municipality does not take the lead.

<table>
<thead>
<tr>
<th>Jan Jonker</th>
<th>Professor sustainable entrepreneurship</th>
<th>Radboud University</th>
</tr>
</thead>
<tbody>
<tr>
<td>Henry Terlouw</td>
<td>Policy officer energy transition</td>
<td>Gemeente Den Haag</td>
</tr>
<tr>
<td>Ingrid van Prooijen</td>
<td>Business developer</td>
<td>Alliander DGO</td>
</tr>
<tr>
<td>Alwin Veldboom</td>
<td>Program manager innovation</td>
<td>Outside Inc.</td>
</tr>
<tr>
<td>Daniel van Staveren</td>
<td>Project manager and advisor</td>
<td>Over Morgen</td>
</tr>
</tbody>
</table>

Table 2, Members of the expert panel

A second method to ensure the validity and reliability of this research is through triangulation. Triangulation can be reached by creating a ‘triangle’ of data resources, or in other words, data need to be confirmed in at least three sources (Creswell, 2012). By using literature, a questionnaire and interviews three methods of data collection are used. A visualization of the triangulation in this research can be found in figure 15.
The third method for validity concerns the testing of the questionnaire. Before sending out the questionnaire to many cooperatives throughout the Netherlands, one of the *Morgen Groene Energie* initiators answered the questions as a test. In response to the feedback, some things were changed. For example, the formulation of the many questions was changed from ‘to what extent…’-questions into ‘How…’-questions. This formulation was considered to trigger a more comprehensive and complete answer.

At last, the initial results of this research were presented at the Outside Inc. conference on corporate entrepreneurship honouring its five year anniversary (see figure 16). This presentation can be considered as a validation of the results. Although few critical comments were made, an interesting note as addition to the research of the influence of existing online communities was made. Not only can energy cooperatives build on existing structures of localist consumption, identity and social networks, but also on for example existing online neighbourhood communities such as Facebook and Whatsapp groups. The remark is included in the recommendations for further research.

![Figure 15, Triangulation of methods (own figure)](image)

*Figure 15, Triangulation of methods (own figure)*

![Figure 16, My presentation at the Outside Inc. conference (own figure)](image)

*Figure 16, My presentation at the Outside Inc. conference (own figure)*
4.6 Fieldwork reflection

Halfway May 2018, I started sending out requests for interviews for my fieldwork. I was relieved and slightly surprised with the enthusiasm of the reaction that I received on interview requests. Based on earlier experiences, I expected that it would take weeks before I would have had any concrete appointments, this was a wrong presumption. Within three days I was able to make all twelve appointments with all the respondents I wished for. Everyone seemed to be very interested in the research.

I experienced the same kind enthusiasm at the questionnaire. Samen Om and Cooperatie Hoom helped me distributing the questionnaire at cooperatives and were both very helpful. Some of the cooperatives even forwarded the questionnaire to other cooperatives in their area. Best Duurzaam and 040energie were for example reached with the help of Morgen Groene Energie. It seems that the world of energy cooperative and energy transition is a close and loyal community.

However the the high pace of the fieldwork helped me a lot during the period, the threat of going too fast was lurking. I remember that Samen Om could help me out distributing the questionnaire by promoting it on a members meeting, which was shortly after I spoke to them. The questionnaire was therefore made in one or two days. Although it was tested by Morgen Groene Energie, I did not have the desired time to overthink the questions. If I have had more time, I might have extracted even more relevant information from the cooperatives. Also, doing two interviews on one day was sometimes a challenge. The interview with Roel Woudstra of Enpuls for example, could have been much longer if I did not have to leave for the interview with Ecovat. Although the interview was very good and inspirational, we could have talked much longer about his ideas.

At last, the interviews were very tightly planned after each other, leaving not much room to improve the interview guide. I noticed that every interview could have lasteded for hours and hours, not only because of all the knowledge, expertise and experience the interviewees had, but also because the questions had a very broad character. If I had left more time in between the interviews, I might have had more chance to lay more focus into the questions.

All in all, I am very satisfied by the results of the fieldwork. On front, I would have never expected to have 12 interviews and 33 responding energy cooperatives. I am very content with the provided information as well. Although the interviews were somewhat diverging in their subjects, the information gives a very broad and state-of-the-art overview of the ideas, thoughts and experiences of the role of energy cooperatives in the heat transition.
4.7 How to interpret the results

Before going to the chapters containing the results of this research, it is important to understand how these results can be interpreted. As a consequence of the coding process, the results in this study are based on my interpretation of the empirical data. Although I aim for a neutral interpretation, it would be against my conviction that a constructivist approach fits this research to claim that my interpretation is the truth. This is further explained in the critical reflection in chapter 8.2, but my point is that I challenge the readers to interpret the results from this research from their own perspective. Therefore it is fundamental to understand how to read the figures and how to find the numeric results in the next chapters. The following explanation are of issue.

At first, the tables of the results from the questionnaire are placed in the relevant chapter. These results are a coded answers to open questions. You might notice that there is a lot of diversification in how many answers are given in total per question, this is caused by the fact that there were no multiple choice questions, hence no limitation of answers. Some questions triggered a more comprehensive answer, hence the total number of answers increased. Simply put, the number a code was used is equal to the number of cooperatives who gave that answer. In the graphs with results are deliberately the absolute numbers shown instead of a percentage to underline the fact that the 33 cooperatives that filled out the questionnaire are by no means a representative sample of the total population that a quantitative research would require.

Second, besides some supporting quotes, the quantification of the codes from the interviews are not directly shown in the following chapters. This was a deliberate choice because the interviews went into different thematic directions. A quantification of the answers is therefore not a relevant support of the results. For an overview of the codes and which were used in what interview, see appendix E.
5. Cooperatives as societal change (re)producer

This chapter explains how the results of this research point towards the change productive and reproductive role of energy cooperative in society. The loop of agents of change that create more agents of change is essential to understand how energy cooperatives are related to both society and other entities. This chapter builds on the transition theory and the more abstract structuration theory of Anthony Giddens, which are explained in chapter two. To understand the interpretation of the results in this chapter, please read chapter 4.7.

5.1 Inform and advise to create awareness

According to the literature, energy cooperative raise awareness about the energy transition (DTI, 2005; Viardot, 2013) and can take away social barriers of renewable energy (Van der Schoor & Scholtens, 2015; Walker et al., 2010). This role would not necessarily mean that people are activated, but the cooperatives function in between the state and citizens as an opportunity to take part in the transition (Hoffman & High-Pippert, 2005).

The interviewees are mostly confident that the creation public support is one of the the core qualities of energy cooperatives. ODE Decentraal makes a difference between passive consumers and active citizens: ‘The active citizen creates much more public support than the passive consumer, so investing in a campaign which reaches, well, say ten people to become active as a citizen, has a multiplier effect to society’. Also HIER Opgewekt mentions that the personal level of communication leads to more involvement of people. Province of Zuid-Holland even claims that energy cooperatives have innovative ways to create public support by inventing new ways to involve people in energy issues. Van Steekelenburg himself for example invented the Energy Party, in which ‘you put the figures of your energy use weighted on in a graph together with six others. Then we have a box with forty cards which you can play a game with ‘heb ik al, wil ik al’, so if someone has solar panels and therefore a low energy use, he can explain to the others how this works’.

Municipality X claims that a ‘solution without public support does not have any chance’ and according to Eneco and Essent, municipalities require the involvement of energy cooperatives in the development of big solar and wind parks. Even without his requirement Essent would involve energy cooperatives: ‘We know too that a windpark is not possible without public support, then big scale projects get obstructed’. The downside of energy cooperatives is that they differ a lot of opinion: ‘Cooperations sometimes, depending
on the founders, turn themselves against windparks or collective heating so with a cooperative all kinds of directions are possible’.

The branch organisation Netbeheer Nederland the involvement of cooperatives is fundamental for projects to succeed: ‘If a municipality has certain sustainability goals, it would be very good to built on the thoughts of a cooperative, but if the municipality suddenly mentions that they will develop a heat network in that neighbourhood, they will resist’. Enpuls puts emphasis on the dependency on mutual confidence and the therefore the geographical boundaries of the ability to create public support. Stedin doubts whether awareness is created by cooperatives or whether cooperatives collects people who are already aware. Eneco adds that this awareness may radiate to the crowd because of communication techniques used by cooperatives. This last notion put by Eneco underlines that educational communication of cooperatives create awareness in society, as Viardot (2013) mentioned.

In this research, one of the aims is to find out what cooperatives actually do to create this awareness. In the questionnaire, the respondents answered the question: “How does your cooperation mobilize non-members to get involved in the heat transition?”. The results are shown in figure 17 (read chapter 4.7 to understand how to interpret this figure).

How does your cooperative mobilize non-members to get involved in the heat transition?

Figure 17, Quantification of the answers to the question ‘How does your cooperative mobilize non-members to get involved in the heat transition?’ (own figure).

Only four stated to do nothing and three others claim to have an exemplary role which could generate media attention. The other cooperatives conduct activities which Viardot (2013) would call ‘educational communication’. Most of the energy cooperatives inform citizens through publications. There are differences in what kind of publications are communicated. The EigenWijkse Energie Cooperatie, Energie Cooperatie Buitenpost and
EC de Broekstreek for example use local printed media, whereas Cooperatie TexelEnergie and Energiecooperatie Endura send out a newsletter. Leudal Energie even take parts in a local radio show. Besides written publications to inform (non)members, twelve cooperatives organise events such as energy cafés and information sessions which are open for both members and non-members. Energiecooperatie Endura for example organised an energy café where experiences were shared on how to make your house sustainable. One of the information stands was manned by heat pump experts and with the help of VR the visitors could see what the impact on the landscape around the city would be when windmills are build.

Seven of the cooperatives provide non-members with energy advice via energy shops and/or coaches. Morgen Groene Energie, Best Duurzaam and 040energie for example, together with two other cooperatives, supported by seven municipalities in the Eindhoven region and the Province of Noord-Brabant, developed an online tool (SlimWonen+) which provides citizens with free energy advice and stories of people in your own town who already took action. This concerns both saving and generating energy. Besides, three cooperatives organise a physical energy shop together with the local municipality where citizens can come by for advice which is given by volunteers. The energy shops and SlimWonen+ help interested people with tenders and the choice for the right supplier for materials. Energy cooperatives have the ability to advice people with non commercial motives, but without the boundaries of a public organisation. This will be further elaborated in chapter 6.1.

Let us now turn to the question how energy cooperatives help their members in the heat transition. In the questionnaire the respondents answered the following question: ‘In which ways does your cooperative help its members in the heat transition?’ The coded answers to this question are shown in figure 18.
How does your energy cooperative help its members in the heat transition?

![Figure 18, Quantification of the answers to the question “How does your energy cooperative help its members in the heat transition?” (own figure)](image)

The cooperatives seem mostly involved with the provision of advice. At first with technical advice which 19 of the 33 cooperatives provide. Cooperative X for example provides heat scans to its members and has ‘Energy ambassadors’ who give insulation advice. Second, 13 cooperatives attempt to unburden its members by preselecting companies or products. Third, cooperatives give advice with the help of an Energy Information Shop (energieloket) or Energy Coach. The EigenWijkse Energie Cooperatie for example: “We work together with the municipal energy information shop by volunteering there twice a week together with the local housing corporation. We provide citizens with independent advice”.

From the questionnaire, it seems that the energy cooperatives are more involved with helping their members to make the ‘best’ choice individually, than improving the bargaining position collectively to lower prices as was suggested by Normark (1996). EC Drentse Aa organises joint purchasing of insulation materials, Amelander Energie Coöperatie for heat pumps and 040energie for both. Clearly the energy cooperatives that participated in this research were not as concerned with joint purchasing as could be expected from the literature.

The interviews give a similar image. Insulation is the only sure ‘no-regret’ investment in the heat transition according to Essent but the costs are the biggest barrier according to Stedin. Because of the enormous investment that insulation asks, people need to take their own pace and besides, banks need to come with financial solutions to support the investments. The high costs have two potential reasons. At first, as Enpuls reasons, there is
a shortage on labour market of installers, which means that the supply determines the prices. Second, as Duurzaam Den Haag explains, some people think that the many governmental subsidies and regulations drives up the price.

The representatives of Municipality X, Essent, Stedin, Duurzaam Den Haag en Netbeheer Nederland are all not familiar with any insulation projects initiated by energy cooperatives. Woudstra of Enpuls confirms the statement of Stoeldraaiers (2014) that the number of associates in many cooperatives is too low to effectively experience the advantages of collective purchasing: ‘Grunninger Power has a lot of members and is therefore able to create substantial impact, however often elsewhere the impact is limited’. Besides, ODE Decentraal, Duurzaam Den Haag and the Ministry of EAC state that insulation is a very complex matter which is different for every individual which means that collective purchasing is not always a possibility. At last, insulation is a less visible and therefore less appealing for investment than for example solar panels according to Duurzaam Den Haag. Both Duurzaam Den Haag and HIER Opgewekt acknowledge that the cheapest option is not always the right choice. Giving advice to help members make their own decision might be better.

According to HIER Opgewekt, energy cooperatives are more involved in energy saving which is more of an easy entry to the heat transition. Enpuls works with their Buurkracht projects to help citizens to mobilize each other to save energy. Accordingly, this market has to be created before market parties can seize the opportunities and the transition makes pace. Energy savings can help the grid operators lighten the burden on the power network, as Woudstra of Enpuls explains. Besides energy saving, Duurzaam Den Haag mentions a project of energy cooperative De Regentes in which a collective purchase of heat pumps is organised. Although the discount due to the collective purchase is limited, the bigger role of the cooperative is to unburden its members by making the choice for them so the real saving for them are the less hours of research to find the best heat pump.

Not only information is sent to society, it is also retrieved from the members of the energy cooperatives. The answers to the question “how is knowledge and expertise of members used in projects concerning the heat transition?”, are shown in figure 19. Only five of the cooperatives have not yet used their members’ knowledge and expertise in the heat transition. In the codes, a difference has been made between ‘ambassadors’ who are the storytellers of their experiences with new heat system to other members of the cooperative, and ‘representatives’ who represent the cooperative at a market or governmental party.
How is knowledge and expertise of members used in projects concerning the heat transition?

For the cooperatives which use the knowledge and expertise, this is done in different ways. EC Drentse Aa for example, works with neighbourhood teams which themselves organise information evenings. On the 18th of January 2018, team ‘Hart van Spierven’ organised an evening about heat pumps, which was well attended. Rijn en IJssel Energiecooperatie writes that the backgrounds of its members are used to set up new projects: “With keep constant contact with our (business) members and we keep setting up new cooperative projects. This means that members too can start their projects and that we facilitate this with permission of the general members meeting”. Members are also involved in work groups by four cooperatives. LochemEnergie sends out an open invitation to its members when it gets involved in a new subject so that experts can apply to be included in a work group. The role as a representative has a lot to do with the background of the individual. BrummenEnergie for example, writes that one of the members of the cooperative is also the director of the heat network in another city. Therefore, he is the representative for the cooperative concerning heat networks. The role of members to be energy coach, consultant or ambassador was discussed above already.

To conclude, based on the results of the questionnaire, energy cooperatives are mostly involved with the provision of information and advice for either members or non-members. By sharing stories of members who have experience in sustainability solutions and by using the backgrounds of its members to explore new subjects such as the heat transition, the cooperatives aim to gain new members. This is needed because it seems that energy cooperatives do not have the scale and bargaining position (yet) to organise
collective purchasing of insulation or heat pumps. The communication strategies and activities of energy cooperatives are very likely to cause broader awareness in society, according to the interviews.

5.2 Uniting agents of change

This research aims to build on Giddens’ structuration theory in which practices are shaped by rules and resources that are called structures. These structures own their existence and survival to a set practices. The ongoing process practices that create structures that on their turn reproduce the practices, can be breached by agents of change. These individuals have the resources to create new patterns of practices and therefore new structures (Inglis & Thorpe, 2012).

Hjorth & Bjerke (2006) agree with Giddens that individuals are needed to change the normality in society and argue that agents of change that aim to change normal everyday practices in life are called public entrepreneurs. These kind of agents of change have entrepreneurial characteristics but differ from business or social entrepreneurs in that sociality is the desired outcome. Public entrepreneurs facilitate new practices in organisational forms. Taken together, energy cooperative could play a central role in uniting agents of change which on their turn can collectively carry out the practices they desire and therefore create new structures.

In five interviews, the statement that energy cooperatives are at the moment almost solely for frontrunners is acknowledged. At Stedin, Van der Molen and Van Alphen do not often come across citizen initiatives, but when it happens, the initiators are very aware of the challenges of the transition. Also in the interview with Municipality X the interviewee gave its insights: “I think it surely is an issue for frontrunners, to self-organise and to be willing to accept another business model than the regular energy supplier, but I find it harder to compare this to the big crowd in the city who do not really care how it gets organised, but who will react financially”. Koekkoek of HIER Opgewekt agrees that the big crowd in society is not yet interested in taking part in the transition.

Enpuls compares the involvement in the heat transition with the theory of diffusion of innovation: “In this theory you have the innovators, the early adapters, early majority, late majority and laggards, and now we only have had the innovators and the early adaptors, in which a lot of energy cooperative people are”. According to Enpuls, it is essential for the transition that the interest in the transition moves towards the early and late majority to trigger interest from the market and therefore increase the pace of the transition.
With their project ‘Buurkracht’ they bring enthousiast citizens together to stimulate their neighbours to do something with energy saving. These projects indirectly create a market for products and services. Enpuls will eventually stop with this product when the late majority is reached because then the market can organise itself and costs will decrease. This strategy follows the notion of Grin et al. (2010, p. 22) about technological niches: “But such dedicated market niches do not always readily exist for radically new technologies. This implies that new technologies, markets and user preferences need to be co-constructed”. Essent seems to enter the market mentioned by Enpuls already. Interviewee Michaloliakos states that cooperatives includes individuals in the transition who have people in their networks that are interested in energy, but that Essent will take along the big crowd in society. Essent is even changing its business model towards the smart electricity products (E+) because it believes in this upcoming market.

The reason that Buurkracht (Enpuls) wants to create enthusiasm with the help of local frontrunners in a particular neighbourhood is that it believes that there is no singular message that would be appealing enough nationwide. Every target group has different norms and values and locals know best what is of issue in their neighbourhood and how to enthuse their neighbours. In line with Woudstra of Enpuls, Ten Elshof of the Ministry of Economic Affairs and Climate Policy noted that individuals have different motives to get involved with an energy cooperative: “It is a mix of motives and actions that are being undertaken, where the first is driven by the climate and want to take matters in own hands, the second could just think that it is fun to do things together, the third might be interested to be self sufficient in energy provision and the fourth might think that it is an easy way of saving money”.

To conclude, it seems that energy cooperatives are at the moment mostly appealing for frontrunners in the transition. These frontrunners have very different motives to get involved, but local values and norms bind them. From the questionnaire, we saw already in chapter 5.1 that cooperatives are keen on using the expertise on knowledge of their members, which could mean that the local experts in energy, heat or transition management are facilitated in an organisational form. It seems that the argument based on the theory in the beginning of the chapter is supported by the empirical data. Though, to place a critical note, the interviewees and respondents of the questionnaire argue from the cooperatives themselves, while the theoretical argument was made from the perspective of society. Therefore, it cannot be concluded whether the cooperatives contain the most knowledgeable or the ‘jet set’ of the frontrunners. Despite this critical note, it seems that the agents of
change or public entrepreneurs do facilitate organisational means through which new practices can be performed.

5.3 Resources for change

Building on the notion that energy cooperatives unite agents of change, this chapter look into how agents of change are created. To trigger agents of change, resources are needed that create a determination to change something in its surrounding. From the multilevel perspective, socio-technical transitions such as the heat transition, are the consequence of resonating developments in the micro, meso en macro level. As explained in chapter 2, the meso level contains the pressured regime, that will be changed. On the micro level, niches emerge and change fast to attempt to attack the regime. The macro level exists of slow mostly global developments which can emerge from theirselves or can be influenced by transnational organisation such as the UN or the WTO (Grin, 2010). In chapter 2.3 I argued from the literature study that both technical niches and macro developments provide entrepreneurial individuals in society with the resources that will turn them into agents of change.

First, I would like to explore the way in which landscape pressures influence the emerging cooperatives. Some trends were already described in the theoretical framework. At first climate change, which is a trend that gets more and more visible. Besides the local effects of fossil fuel mining, like the earthquakes in Groningen, are increasingly of issue. Second, localism, which is an economically broad trend most visibly in food. The desire to know where your food comes from and to buy locally is a trend that slowly diffuses to other sectors like fashion (Fletcher & Vittersø, 2018) and perhaps energy. Third, the dependence on regions in the Middle-East and Russia, which are perceived as unstable in society due to alarming news messages, seems to be no longer accepted. The MH17 crash for example makes people doubt Russia as a trusted partner.

According to the interviews, there are more macro trends that pressure society to make change occur. Van Steekelenburg from the Province of Zuid-Holland, for example, sees the emerging cooperatives as a movement against the fossil fuel regime. People realise that corporations such as Shell have good relations with influential (governmental) parties and would like to regain authority. The problem is that the employees at Shell are both the majority and have simply more capital to spend. Van Steekelenburg therefore sees energy cooperatives as a temporal movement to guide the current regime in the right direction.
Besides, the cooperative as a legal form is emerging in the economy according to Van der Linde of Duurzaam Den Haag: “We do not only have energy cooperatives, but also health cooperatives or maybe educational cooperatives. (...) We might get cooperatives that are not only energy cooperatives, but with a broader orientation”. As an example, Van der Linde points towards the upcoming Transition Towns. The international Transition Town Network had its roots in Devon, UK, and is described as a “community-led response to the pressures of climate change, fossil fuel depletion” (Aiken, 2012, p. 92. Transition and resilience are the conceptual underpinnings of the movement and the community is the means through which this is reached. The TTN is based on permaculture and resilience thinking (ibid.). According to the Dutch Transition Town website, there are about 20 transition town initiatives in The Netherlands.

Due to a background in energy, a expertise in the field of transition management, or other relevant experiences, the public entrepreneurs in energy cooperatives seem to be mostly people that are above-average aware of the macro level developments. According to De la Court of ODE Decentraal, initiators are often very knowledgeable and experienced people, we saw in chapter 5.1 that the knowledge and expertise is used by the cooperatives to expand their knowledge and influence. Also at Stedin, they see that initiators are mostly people that are already involved in the energy business. This background and expertise gives the agents of change access to more information which can provide more resources and rules that trigger action.

Second, let us dive deeper into the statement that technical niches trigger agents of change in society. Entrepreneurial citizens show that it is possible to develop technological innovations. Ten Elshof of the ministry names the island Texel as an example. One of the entrepreneurial cooperative initiator was inspired by technical innovations and applied the island at corporations to function as testing ground which has led to several investments in the local economy. The initiator himself now exports this idea and has a business to implement innovations in other areas in the Netherlands. Van Steekelenburg of the Province of Zuid-Holland talks about an ICT entrepreneur in Utrecht who developed an energy storage system using the battery of his electric car. His company is now the market leader in these kind of systems.

In chapter 6.2 the relation between cooperatives and innovations will be further explained but in practice, in spite of some examples, cooperatives lack the capital and willingness to directly get involved with commercial innovators. With the help of an organisation with financial power, cooperatives sometimes function as testing ground for innovations. Though, technological niches do point towards the possibilities of alternatives
for the current regime. By functioning as testing ground cooperatives show their interest in technological innovations and ss was stated before, the interaction between macro level developments and technological niches can make a transition possible. All in all it seems that the interaction between the two triggers agents of change.

Third, following Giddens’ theory, once a structure is created, it could provide the rules and resources for practices for more people. Uniting the agents of change in a cooperative could create the right setting to make the transition happen because the structures are already put in place. I argued already that one of the main roles of energy cooperatives is to create awareness in society, that energy cooperatives unite agents of change and that these individuals are motivated by macro level developments. Knitting these notions together could mean that the created awareness creates new pressure on society to trigger more agents of change. Examples like Van Steekelenburg’s Energy Parties which create ‘peer pressure’ and the notion of De la Court (ODE Decentraal) that energy ambassadors are very efficient in mobilising more people, are practical proof of the reproductivity of the agents of change.

To conclude, macro level landscape developments trigger agents of change to start with a energy cooperative. A combination of an entrepreneurial character and access to more resources due to a relevant experience or background make them see things in their surroundings that just are not right and make them take matters in own hands to change these. From the micro level, it seems that technical niche innovations trigger entrepreneurial citizens, but in general not the public entrepreneurs who are involved in energy cooperatives. The presence of technological niches though, show the possibilities to take action to change the regime. Therefore the interaction between landscape developments and technological niches is crucial to activate agents of change. Besides, once a energy cooperatives has been founded, it triggers more agents of change to take part in the transition. In a cooperative as a organisational form, agents of change facilitate the new practices and allows the emergence of new structures.

5.4 The power of local embeddedness

Giddens’ dualism of structure points towards the importance of two elements that form the boundaries of structures: time and place. These boundaries are all about the embedding of practices in an era and locality. In other words, people who share the same tacit knowledge in the same time of living, understand each other practices through the shared structures. The relevance of locality and the related local identity seem to be of importance in the case of energy cooperatives.
First, let us dive into the perception of local embeddedness by energy cooperatives. Most of the cooperatives that participated in the questionnaire confirmed that energy cooperatives can find the best solution to replace natural gas on a local level, as can be seen in figure 20. Only BECO does not agree: ‘At the moment it is not possible to cost-effectively execute the heat transition (...). Local energy cooperatives should achieve successes on short term, that is not possible yet with heat’. The others confirm that local embeddedness is one of the key qualities of energy cooperatives. In quotes from the code ‘Because of trusty relationship’, independent advice and the closeness to the citizens are often used, but also the lack of trust in commercial companies like Energie Gilze Rijen: ‘Close to the citizen and people know each other (no confidence in companies which are profit driven)’. Also the other codes like ‘Local ownership’ and ‘knowledge of the local situation’ point towards the importance of local embeddedness.

Why can energy cooperatives find locally the best replacement for natural gas (socially and technically), or why not?

![Figure 20, Quantification of the answers to the question “Why can energy cooperatives find locally the best replacement for natural gas (socially and technically), or why not? (own figure)"

Also from the interviews, local embeddedness appeared to be of importance. The process of developing a cooperative is unique for every locality so says ODE Decentraal. Mostly this depends on the people who initiate the project. HIER Opgewekt agrees: ‘One person is more pointed towards the societal benefits, where the other prioritises the financial part, in this way other cooperative and projects emerge’. Besides, Enpuls emphasises that the confidence and trust is based on the fact that people know each other from their personal lives. Therefore the unique process loses its power when it crosses the borders of the locality.
The local embeddedness and the exploited tacit knowledge does not mean that intercooperative learning is impossible. In the interviews, a distinction between what elements are replicable and what not was made. De la Court of ODE Decentraal emphasised the learning process of the sector which is fed by the willingness to share information. Many practical things such as website design, administrative systems and communication techniques are shared between cooperatives and therefore experiences are cumulative. This exchange of knowledge is also confirmed by the representatives of HIER Opgewekt and Duurzaam Den Haag, which were (partially) founded to facilitate this exchange nationwide and locally. Because of the open knowledge and the lack of commercial interest to keep that knowledge hidden, cooperatives are increasingly able to speed up their processes. This replicability of some features even provokes commercialisation, since consultants gather this knowledge. According to ODE Decentraal, this is not a desirable situation, but clearly this is a point of discussion. Van Steekelenbrug of the Province of Zuid-Holland and founder of 070energiek thinks that this commercialisation is very much needed and could accelerate the transition.

A consequence of the local embeddedness of energy cooperatives is that their foundation can be based on very different interpretations of solutions and that conflict is more likely than agreement. Van Steekelenburg (Province of Zuid-Holland) explains from his experiences in The Hague how conflicts between cooperatives and with governments can slow down the transition. The province has very concrete plans to develop a heating network between Rotterdam, The Hague and Leiden, which would be fed mostly by the residual heat of the Port of Rotterdam. Some energy cooperatives in The Hague did not agree with the province that this heat network was the right solution and signed a manifesto (Haags Manifest). Other cooperatives, like 070energiek of which Van Steekelenburg is one of the initiators, are in favour of the heat network which was proposed by the province. These local different views, which are all based on local experiences, expertise and knowledge, on how to approach the transition ultimately slows down the entire process.

To summarize, the local embeddedness of energy cooperatives is its strongest power. By applying local knowledge in finding solutions for their neighbourhoods and using social networks such as a local sports club to engage people in the transition on a personal note, the energy cooperatives are a trusted party. These social networks, trust bonds and tacit knowledge have their boundaries though, which makes cooperatives dependable on place. When cooperatives go beyond their boundaries, they lose their privileged position. The tacit knowledge of energy cooperatives could locally raise awareness and the pace of
transition, but could also lead to conflict about how to handle the transition. In this conflicts, the scale of cooperatives plays a role, this will be further elaborated on in chapter 6.

5.5 Concluding remarks

Giddens (1984) theorized in the structuration theory our practices are shaped by structures which on their place shape our practices again. Some individuals are able to change the patterns of our practices and therefore create new structures in which these practices are embedded. these individuals are called agents of change. More specifically, Hjorth & Bjerke (2006) distinguish public entrepreneurs, which are entrepreneurial individuals who aim for sociality and facilitate new practices in organisational forms.

I argued before in this chapter that energy cooperatives are the organisational forms in which public entrepreneurs unite as agents of change. In many interviews was confirmed that energy cooperatives consist of frontrunners in the transition and that the big crowd is yet to be reached. By sending out newsletters, advertising in local newspapers, and organising information events for example, energy cooperatives are creating more awareness in society. In this way, the organisational form facilitates new practices by providing new structures to society. The facilitating of practices and uniting character of energy cooperatives, creates new markets for products and services which is necessary to diffuse the innovations.

The frontrunner in the heat transition are triggered by two essential developments. First, the interaction between macro level developments and technological niches. I argued that the frontrunners are in general knowledgeable people with either professional experience or a great personal interest in the energy sector, sustainability thinking or other related sectors. Due to this background, the frontrunners have access to an above-average amount of knowledge from macro level developments and technological niches. The macro level developments trigger agents of change that something needs to be changed and the technological niches show them that change is possible. Second, agents of change reproduce themselves. As described, the energy cooperatives provide society with information and advice, providing them access to the resources that triggered the agents of change. This awareness in society creates new agents of change that will carry out the story.

At last, I explored the notion of Giddens that practices and structures are bounded in time and space. The frontrunners that are united have different motives to be included. This depends on the resources which they have access to and their personal interest. For example, a technical engineer might be interested to in the technical innovations that make
his or her house self-sufficient, whereas a climate activist is driven by global warming. The binding element between the frontrunners is their locality. The trust bonds created by local social networks and tacit knowledge such as local sentiments towards technical solutions make that the frontrunners are locally on the same page and that people are triggered to become a frontrunner on a personal note. Though, this privileged position has its boundaries. When the borders of an area with a shared identity is crossed, the energy cooperative is a market party like all others.
6. Cooperatives as representatives of society

This chapter explores the ways in which energy cooperatives represent society. It investigates the relation between energy cooperatives and the state and the market. This division is based on the triangle state-market-community, to which De la Court referred in his interview. The triangle is a simplistic differentiation between organisational entities, see figure 21. Basically, entities get labeled on their state of formality, business motive and public/private ownership, but the boundaries are fuzzy and arguably the entities that are named in the model cannot be looked upon as singular entities. Brandsen et al. (2014) combined this triangle with literature on the third sector. This non-profit, but formal and private sector which contains examples like NGO's, hospitals and universities, seem to be missing from the original state-market-community division. Therefore, the third sector was placed in the middle of the triangle. Since legally founded energy cooperatives can be considered as formal organisations, they fit the third sector criteria. On the other hand, the energy cooperative is very much based on the community entity, and therefore Helleman (2016) for example considers them within the community entity.

![Figure 21, Triangle of organisational entities (Brandsen et al., 2014, p. 752)](image)

According to De la Court, governments regularly bypass the organised citizen as a entity besides the market and government in policy-making. Energy cooperative as a group of organised citizens, bring this entity back. Also Van der Linde of Duurzaam Den Haag sees a role for energy cooperatives as representatives of citizens: “The ideal situation is that a sort of ‘radical’ corporate representative from Essent for example, a radical advocate for citizens and a radical activist from Greenpeace for example go in consultation at the municipality and than the municipality can make its choice, so basically the cooperative
plays a role in the representativeness of the citizen”. Woudstra of Enpuls also recognizes the triangle, and takes it a step further in that the community moves itself to the third sector because certain services and products are missed in the market and state supply: “In that triangle, citizens are moving because they see that what the government and corporations offer, does not fulfill their needs, and therefore they take matters in own hands”.

The next three subchapters deepen out the overlapping and complementing relation between energy cooperatives, the state and the market.

6.1 Energy cooperatives and the state

6.1.1 Interaction in practice

This chapter explores how cooperatives interact with governmental bodies. This interaction is based on the following question from the questionnaire: “How does (or did) your cooperative influence heat transition policy?”. The results are shown in figure 22.

![Figure 22. Quantification of the answers to the question “How does (or did) your cooperative influence heat transition policy?” (own figure)](image)

In regard to policy influences, energy cooperatives choose different ways of being active. Fourteen of the 33 cooperatives are not deliberately influencing policy. Those who are, are mostly involved in consultation and informing, which is mostly on initiative of the cooperative itself. *Duurzaam Roerdalen* for example, handed over a manifesto with ten action points to the municipal council, *040energie* provides the municipality with information about heat pumps and *Energie-U* interferes with the plans for local heat networks. In some
cases, this leads to concrete projects or agreements. *Energie-U* co-creates a municipal heat vision for Utrecht and *Best Duurzaam* has a covenant with the municipality for example.

At the ministry and HIER Opgewekt they see that cooperatives are a politically broad supported form of organisation. It fits lots of political agendas. Besides Eneco acknowledges that in local coalition agreements, sustainability is in many cases one of the most important subjects. It seems that the political willingness is there to give more room to energy cooperatives, which could mean that cooperatives are less motivated to take initiatives themselves. Thijs de la Court of ODE Decentraal explains that energy cooperatives are not intended to put much energy in lobby activities on national and local level. According to De la Court, the voluntary hours of well educated and talented initiators of energy foundations have to be spend locally on projects as possible. Besides, according to Marco van Steekelenburg of the Province of Zuid-Holland, the lobby of some regime actors is so powerful that cooperatives can hardly compete with those. This latter notion is more of issue at the national level than the local level.

Summarizing, the lobby of energy cooperatives at different government levels is ‘opportunistic’, as De la Court of ODE Decentraal calls it. Voluntary and useful hours of dedicated and experienced initiators should be used locally in projects instead of lobby. The political will to engage with energy cooperatives is presumed to be high, therefore an active lobby is arguably not needed. Helping local governments to set goals, on the other hand is more common.

6.1.2 Complementing the state entity

Energy cooperatives and governmental organisations are both non-profit organisations which serve society. According to Van Steekelenburg of the Province of Zuid-Holland, energy cooperatives own their existence to the lagging behind of governmental bodies. This seems to be in line with the statement of Woudstra of Enpuls that energy cooperatives are founded because society misses something in the market or government, as described above.

Due to the desire of society to organise public functions themselves, energy cooperatives can complement the government. The knowledge and expertise could in some cases actually be higher in energy cooperatives than at municipalities, according to Van der Linde of Duurzaam Den Haag. This reflects in the results of the questionnaire in which five of the cooperatives act as advisor for the government (see chapter 5.1). Besides knowledge and expertise, the complementing role of energy cooperatives can be traced back to a fundamental difference with governmental organisations according to Koekkoek of HIER.
Opgewekt. Although energy cooperatives are nonprofit, they are private organisations instead of public. This means that energy cooperatives can help citizens further through the customer journey: “In many cases we see that there is a political decision to not intervene in the market as municipality (…). An energy cooperative is in fact a form of entrepreneurship and has the quality to link the societal goal of sustainability which other market parties lack, with the journey a citizen has to go through until the house is sustainable, which is something municipalities cannot do”.

According to HIER Opgewekt, it is important that municipalities admit that energy cooperatives can complement their work. At Municipality X, this idea seems to have landed: “That’s why we have decided that all the tasks which we will not execute on short term ourselves, are available for the city. This means that local initiatives can also use our municipal roofs for solar panels”. The municipality has a (small) budget to finance these initiatives. There are some more examples of municipalities that embrace the work of energy cooperatives. Some founded an energy shop together with energy cooperatives for example, as some of the cooperatives mentioned in the questionnaire. Eneco mentions that many municipalities demand a minimum percentage of cooperative ownership when new solar or wind parks are developed. The involvement of energy cooperatives does not only raise public support for the project, but also represents a bottom-up movement which is in general a celebrated fenomenon by the government.

The overlap between government and energy cooperatives can also cause friction. The difference between public and private ownership for example, can cause a ‘language’ problem, according to De la Court of ODE Decentraal. A municipality can have the opinion that they are very open to cooperative developments, while the cooperative initiators think that they need to do much more. Also, cooperatives sometimes do not effectively use the handles that are offered by the government. Both energy cooperatives and municipalities need to work on this ‘language’ problem. HIER Opgewekt for example, facilitates these learning processes. On a more practical note, HIER Opgewekt mentions an example in Utrecht where both a local energy cooperative and the municipality provide energy advice to citizens. In this case, the municipality could have funded the cooperative to provide this service. The dedication of the mostly voluntary energy ambassadors would even mean a cost reduction and besides, the cooperatives can go much further in advising and unburdening citizens than municipalities.

To conclude, energy cooperatives and municipalities overlap in their societal function but both have their qualities. Energy cooperatives are private enterprises and can therefore lead citizens through their customer journey without the profit perspective that commercial
parties would have, and municipalities have the organisational and financial capacity to develop professional projects. Besides, the municipality (or province), has the overview of what technical solution might be more effective in a broader regional perspective. This will be further elaborated in the next chapter.

6.1.3 Balancing localism and the overview

As pointed out in chapter 5, local embeddedness is the power of the cooperatives. Cooperatives are able to translate local sentiments into a solution that fits the local needs and which is public supported. But as Martijn Artz of Netbeheer Nederland mentions, sometimes cooperatives have too much focus on a singular solution which is not the most efficient when looking broader than the area in which the cooperative is active. Also at Stedin, they are aware that cooperatives are often not able to include everyone in the neighbourhood or town: “You have to do it together in a neighbourhood, or whatever defined area, and it is undesirable that people miss the boat. This is societal undesirable, but also for the people who are about to miss the boat”.

There needs to be a balance between a bigger organisation who has the overview of the total power distribution of the city or region and the bottom-up ideas that emerge from society according to Municipality X, Essent and Duurzaam Den Haag. Also Stedin puts emphasis on this balance: ‘You should try to get some unity per neighbourhood, (...) because the situation in which three persons in the same street choose individually for either all electric, a heat network and sustainable gas, is not societal desirable.’ In other words, the costs would be significantly higher or the solutions could technically not exist next to each other. Besides, the transition needs to be handled collectively. If some people in a neighbourhood found a cooperative, but some of their neighbours are not a member, this is not desirable for society nor for the individual. Though, the ideas of cooperatives and from society are needed to create the public support and mobilisation that is needed.

Most of the interviewees agreed that there needs to be a balance between certain regime players such as grid operators and municipalities who have an overview of the broader region and energy cooperatives who enable civic engagement and mobilisation. To get these all the parties in line with each other however, seems to be a very complex task. As I argued before, market parties and cooperatives have fundamental differences, and also the relation with local governments can be tense when looking for broad solutions. Even between cooperatives, differences in opinions are big. However, there needs to be a balance between what solution is desired locally and what solution fits the region’s challenges best to
complete the transition. As Netbeheer Nederland and Stedin mentioned, every citizen needs to be included.

According to Van Alphen and Van der Molen (Stedin), a clear plan is needed to make the heat transition tangible: “(...) so that we have a map of the neighbourhoods in the Netherlands with what it from a societal perspective should be. So then the choice for an energy system is made, but municipalities have the possibility to change this decision. (...) We see that all stakeholders need clarity, but all for different reasons. We [as a grid operator] need it because we do investments that last for decennia, installers, banks, but also citizens”. Consultant agency Over Morgen has developed a tool (Warmte Transitie Atlas) that creates such an output as Van Alphen and Van der Molen plead for. As a member of the expert panel, Daniel van Staveren of Over Morgen explained the tool in one of the informational conversations prior to the interviews. This tool is aimed to calculate the heat solution per district based on the lowest societal costs for the implementation of this technology. Additionally the WTA brings forward the most favorable areas to start projects for the coming years. An example is shown in figure 23.

Figure 23, Heat transition Atlas of Dordrecht (source: Over Morgen, n.d.)

To summarize, local embeddedness is a key quality of energy cooperatives, but this can also be a barrier to see the optimal technical solution in broader perspective for the
whole neighbourhood or city. Also, social exclusion of individuals with a less active social network is lurking. A balance in plan making between local representation and parties with a broader overview is needed. A kind of zoning plan with optimal technical solutions can offer clarity and useful input in the negotiations.

6.2 Energy cooperatives and the market

6.2.1 Collaborate with local business

Besides the interaction with society, energy cooperatives interact with local businesses. The chapter is based on what cooperatives do concretely. In the questionnaire, the respondents of cooperatives answered the question “How does your cooperative collaborate with surrounding businesses?” The results are shown in figure 24.

How does your cooperative collaborate with surrounding businesses?

![Bar chart showing the collaboration methods with surrounding businesses](image)

Figure 24, Quantification of the answers to the question “How does your cooperative collaborate with surrounding businesses?” (own figure)

With regard to businesses, there is already noted that unburdening members by giving them advice about which business is trusted, is a important activity of energy cooperatives. The results in figure 24 give a somewhat more specific answer to what kind of businesses are selected. Nign energy cooperatives deliberately choose local businesses to collaborate with to stimulate the local economy and because of personal bonds. This overlaps somewhat with the unburdening and preselecting of businesses, especially as LOPEC puts it: “For collective solar panel roofs, we have inquired a number of regional companies which were chosen on criteria as service, guarantee, price and environmentally friendliness”. It also overlaps somewhat with obtaining knowledge and advice, since this
comes in some cases from businesses or employees from these businesses that are member of the cooperative. \textit{EC de Broekstreek} for example mentions that they are a tight and interconnected community in which people know where to find someone with the needed knowledge. Cooperative X even founded a local energy network with businesses.

Some of the cooperatives actually set up projects with local businesses by for example use their roofs to exploit solar panels. This mostly involved the ‘Postcaderoos regeling’ in which postal codes around the place of a solar park profit (further explained in chapter 3.1). \textit{Vereniging KempenEnergie} engages with businesses to develop energy service products: “We visit people at home and hear and see what is needed. In consultation with businesses we develop a service product for that. A service product is more than selling a device”. The project to develop service products is still in progress and there are not yet concrete examples.

That price is not the most important motivator for energy cooperatives to do business with a corporate was also pointed out by Van der Linde of Duurzaam Den Haag: “I do not think that people choose the cheapest option per se. Collective support that because if a bigger group of people puts confidence in something, the others will follow. Plus, it enhances the social cohesion in a neighbourhood when people have the feeling that they belong to a group which is doing the same. Costs are not the most important factor in this”.

From the interview with De la Court of ODE Decentraal, it appears that collaboration with local businesses is an important feature of energy cooperatives. De la Court takes LochemEnergie as an example. The current director is in his professional life a manager of a big company. Not only can he use the knowledge and experience from this job, he can also use his professional network to select roofs on which solar panels can be placed for example. This local knowledge diffusion is essential for energy cooperatives.

The desire to keep capital in the region goes further than only collaboration with local businesses. De la Court states that many energy cooperatives set up a regional fund in which the cooperative’s revenue is saved. This money is used to support local sport clubs, nature conservation and new energy generating projects for example. When looking upon energy cooperatives as groups of customers, they very much engage in the trend of localism. According to Purtik et al. (2016) it is important that localist organisation engage in social learning. Although not specifically asked for, it is remarkable that in non of the interviews and questionnaire answers, collaboration with other localist parties has come up. When looking at the emergence of healthcare cooperatives and local food initiatives, it is very likely that links can be made.
To conclude, energy cooperatives in general seek collaboration with local businesses to stimulate the local economy and because of the local social networks that create bonds of trust. The price of products is not the ultimate criterium, trust and services are just as important, if not more important. Energy cooperatives react to the trend of localism with the local collaboration, but seem to fail to engage in social learning from other localist initiatives in healthcare or food for instance.

6.2.2 Energy cooperatives and innovation

Some of the literature used in this research was based on innovation studies. Moore’s (1991) chasm theory, for example, which states that the step towards adaption by the early majority is the danger zone for technical innovations. Van der Schoor & Scholtens (2015) argue that local community energy initiatives form a grassroots entrance for citizens to engage in innovations and Bidmon & Knab (2018) theorized that the role of business models could be to intermediate between niche innovations and the regime. This chapter explores how energy cooperatives are involved in innovation.

About half (17/33) of the participating energy cooperatives in the questionnaire stated not to be involved in technical innovations, as can be seen in figure 25. Cooperative Y for example is ‘founded to provide the citizens of [name of city] with the tools for a more sustainable life, it is not our ambition to innovate ourselves’. Other cooperatives like Morgen Groene Energie and Brummen Energie are in fact involved with technical innovations in the generation of electricity, but not (yet) in heat.

![Image of a bar chart showing the involvement of energy cooperatives in technical innovations.]

**Figure 25. Quantification of the answers to the question “How is your cooperative involved in technical innovations?” (own figure).**

78
Nine of the sixteen other cooperatives function as testing ground for technical innovations. LochemEnergie for example has piloted a project with a grid operator and a technical university to implement a smart grid system and LOPEC partners with 17 parties including a university, Gasunie and NAM to design a heat network. Three of the cooperatives invest in research, like Energie Cooperatie Hooghalen which studies how to make Hooghalen energy neutral, and three work together with startups. Best Duurzaam sets up these collaborations through the Enexis project Buurkracht. Amelander Energie Cooperatie claims to develop technical innovations itself, but these innovations have another scope than the heat transition (shared electric cars for example).

The interviews confirm that technical innovation and energy cooperatives is not a common combination. According to Eneco, Essent, Duurzaam Den Haag and Stedin, the role of cooperatives in technical innovations is limited. The latter experiences that sometimes individuals are willing to try innovations in their homes, but that collective testing is rare. Municipality X underlines that statement: ‘These kind of things are mostly initiated by the frontrunners’. HIER Opgewekt also admits that technical innovation in the heat transition is rare within energy cooperatives, and only for the frontrunning cooperatives. Saving energy is more of a grassroot entrance. According to Eneco, cooperatives lack the capital to bring innovations on the market.

The function as testing ground for innovations, is commonly mentioned in the interviews. The Ministry of EAC for example started eight years ago a pilot project with smart grid systems. Since anyone could apply to run such a pilot project, the expectation was that mostly innovative businesses would participate in the project, but surprisingly three energy cooperatives applied too. The strength of these pilot groups was that the willingness to participate in this innovations was very high, which makes cooperatives a trusted partner. The other way around can pilot projects attract investments for the region which stimulates the local economy. Besides the smart grid project, HIER Opgewekt mentions that some cooperatives apply for the regulations for experiments at the RVO (Netherlands Enterprise Agency). However, just like noted in the outcomes of questionnaire, these innovations are only partially relevant for the heat transition.

The collaboration between energy cooperatives and startups is controversial according to ODE Decentraal. Startups may have the best intentions and very good products ‘but they do it from a market proposition (...) so I won’t cooperate with them because eventually I have to sell myself’. The democratic and societal aim is fundamentally different from commercial parties. HIER Opgewekt too mentions that the mission of the startup is an important feature that could determine whether the startup and cooperative can help each
other. The limited scale of energy cooperatives can be an advantage to develop innovations because it reminds the maker of what is really needed according to HIER Opgewekt, but for startups the small scale is a barrier to work with energy cooperatives. Ecovat for example aims at big organisations with more capital for sales. Netbeheer Nederland too mentions that startups struggle to pilot their ideas and find bigger partners with investment power to partner up with.

To summarize, energy cooperatives in general are not yet as far involved in the heat transition that they develop innovations themselves. Whether they do not have the means to do so, is questionable since some are involved in innovations around subjects in which they are involved for longer times like electricity. If a energy cooperative is involved in heat innovations, it mostly concerns a function as testing ground. It seems that a partnership with a big actor such as a ministry or a grid operator is needed for such a role, since a collaboration both from the cooperative and startup perspective is not very fertile.

6.2.3 Mutual dependence between cooperatives and market parties

We saw that the fundamental difference of being a private enterprise instead of a public organisation, meant that energy cooperatives could complement the government in its work. But the energy cooperative is not a commercial enterprise like the other market parties. Its non-profit character mixed with its local embeddedness make the energy cooperative a trusted partner for citizens which, as argued before, offers something that is neither offered by state nor the market.

According to De la Court of ODE Decentraal, there are other fundamental differences between market parties and cooperatives. At first, how they look upon citizens. He takes the nationwide cooperative for energy saving Hoom as an example: “The fundamental difference is that Hoom addresses the citizen in its totality, so also as a proactive thinking and acting citizen. Energy suppliers address them mostly as consumers, they look upon the citizen as consumer who has to purchase a product. This is a big difference, when you are involved with Hoom, you are more involved with the process”. Second, according to De la Court, the market works in a classic capitalist way in which money is extracted by investors and shareholders, while in cooperatives this money is collectively and democratically reinvested in the area. Although some of the energy cooperatives are legally a private limited company (besloten vennootschap), money always revolves into society from this civil initiatives. Third, cooperatives are democratic organisations, unlike commercial corporations.

The fundamental differences between cooperatives and commercial market parties, make the collaboration in some cases problematic. From the cooperative perspective, the
commercial character of market parties can be a barrier for a fruitful collaboration, because their lack of societal consideration by the market is sometimes the reason the cooperative was founded in the first place. We saw already that the commercial character of startups can be a barrier for collaboration for example. Ten Elshof of the ministry acknowledges that the level of collaboration with market parties very much depends on the ideological approach of the people involved.

From the perspective of the market, collaboration can be problematic because of the lack of professionalism on the cooperative side. This has partly to do with the scale balance that cooperatives need to find, as earlier explained. Although grid operators are on the boundary of state and market, the example of Artz of Netbeheer Nederland illustrates the problems with cooperative professionalism: “You want something were you can build upon and not a collaborating party with whom there is no progress or further arrangements because the director is ill that day. This is the other side of the coin, how do you make arrangements with the cooperative and how do you make sure that these are met?” Veeger of Ecovat acknowledges that besides the trustworthiness of cooperatives, knowledge and expertise is a condition for collaboration. According to De la Cour of ODE Decentraal, there is more conflict than collaboration between cooperatives and the market when taking the developers of wind and solar parks into account. Though in the end, the market en cooperatives need each other.

De la Court states that the market will serve the cooperatives, which is confirmed by Woudstra of Enpuls: “The market will play an important role in innovation because innovation is not yet developed by cooperatives. They, as it were, collectively purchase innovation on the market or in collaboration with the market”. Michaloliakos of Essent adds that the market and cooperatives exchange their qualities: “So cooperatives purchase from the market and the market, let’s call it ‘purchase’, purchase information and public support at the cooperatives”.

Essent itself is the perfect example to illustrate this notion. The CEO of Essent, Patrick Lammers openly rejects heat networks in an article in Het Financieel Dagblad (Financial Times) because of its monopolistic character and the fact that the sources for these networks such as waste is not green and likely to decline in mass with other developments like the circular economy (Lammers, 2017). Michaloliakos mentioned that Essent collaborates with energy cooperatives in the aversion to heat networks. Essent focusses in its new business model on smart electronic devices, or the E+ market as they call it. In the end, this is what Essent has to offer in return of their support to refuse heat networks. Also at Eneco the exchange of public support and products is experienced, but on
a bigger scale. The inclusion of energy cooperatives in the development of windparks is a fruitful collaboration to realise public support for the windmills and to invest some of the profit locally in return. Although these collaborations are mostly demanded by local governments, Eneco has good experiences with these.

To summarize, in spite of the barriers that fundamental differences between commercial market parties and energy cooperatives form, the two need each other to utilize each other qualities. The market needs the public support for their projects and the demand for innovative products while the cooperatives need the investment and innovations from the market.

6.2.4 Diffusion of the cooperative business model

According to Bidmon & Knab (2018), business models can be niche innovation themselves. Jonker (2014) argues that new business models that include multiple value creation are very much needed to make it through the transition. The emerging cooperative as a business model could mean that regime powers get inspired to change their business model. In this chapter the influence of the emerging cooperatives on business model innovation in the regime is explored.

The participating energy cooperatives in this research were asked the following question in the questionnaire: ‘Did you experience that commercial parties take over the cooperative model, if so please explain how?’ A clear majority (25/33) of the cooperatives answered negatively, see figure 26, of which BECO and Leudal Energie pointed towards the fundamental differences between commercial and cooperative business models. The latter answered: ‘These are completely different models: commerce vs civil initiatives’. Morgen Groene Energie makes a difference between the electricity and heat sector: ‘We experienced it in terms of electricity, but not with heat. Maybe because we’re not involved in heat yet.’ Four cooperatives emphasised that commercial parties do not take over the model, but that they do adjust themselves to make collaboration with cooperatives possible, like Rijn en IJssel Energiecooperatie: ‘Our business members do not take over the model, but do function in it’. Lochem Energie claims that they do influence the agenda of commercial parties and Amsterdam Energie experiences that commercial parties offer lower prices than the cooperatives to ‘do not give us a chance’.

Only one of the 33 involved cooperatives experienced a diffusion of the cooperative model. Cooperative Y answered the following: ‘Some companies or self-employed people found a cooperative to qualify for subsidies and regulations. (...) After the introduction you
would not hear anything from them, (...) but they get a lot of media attention which creates uncertainty about the cooperative sector’. The last cooperative did not answer the question.

**Have you experienced that the cooperative model diffused to commercial parties? If so, how?**

<table>
<thead>
<tr>
<th>Description</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>No, not experienced</td>
<td>25</td>
</tr>
<tr>
<td>No direct diffusion, but corporation adjust to the model</td>
<td>4</td>
</tr>
<tr>
<td>Yes, via Greenchoice</td>
<td>1</td>
</tr>
<tr>
<td>Yes, corporations misuse regulations meant for cooperatives</td>
<td>1</td>
</tr>
</tbody>
</table>

*Figure 26, Quantification of the answers to the question “Have you experienced that the cooperative model diffused to commercial parties? If so, how?” (own figure)*

From the interviews appeared that business models in the heat sector, and energy sector as a whole, are about to undergo a tremendous change. Essent, Stedin and Ecovat emphasised the structural changes that about to happen and ODE Decentraal, Duurzaam Den Haag and the Ministry of EAC agree that every actor involved is still trying to find its position, the latter said the following: ‘Well, this heat transition is such a complex matter, everybody is seeking how we will organise it’. Enpuls and HIER Opgewekt agree that energy suppliers have to change their business model, simply because selling energy is not profitable enough anymore. Both Essent and Eneco spoke about this change.

Essent is developing a new business model and has begun to put its own organisation in transition: ‘Essent undergoes a giant transition from electricity and gas supplier to E+ products like heat pumps, insulation, solar panels, smart home products. (...). Suddenly you have to become very innovative and that requires such different characteristics of people that you will need a completely new workforce and that is what happened at Essent in the past years’. This change of business model has to do with the structural changes, but not directly with the emerging cooperative model. It is a change of business model because the revenues on E+ products are simply better than on the sales of energy. The collaboration with energy cooperatives mostly result in wind energy projects in which the local government demands a part to play for cooperatives and in the aversion to
heat networks. Essent supports energy cooperatives both reject the monopolistic character and the mostly fossil energy input of heat networks.

Eneco has clearly chosen a different direction and collaborates with cooperatives more directly: ‘That is a clear bottom-up movement and we see that it is important to be in touch and to maintain a good relationship’. The energy supplier works together with a cooperative of cooperatives (Om Collectief) for the energy supply of The Hague, so Eneco involves cooperatives in their new tenders. Besides, Eneco is the energy supplier for many energy cooperatives which means that the administration is in the hands of the cooperative and Eneco eventually makes sure that the energy is delivered at home. This is a difference with for example Greenchoice (another energy supplier) who also does the administration for the cooperatives. Note however, that this is only about electricity. In the heat networks that Eneco operates, the opportunities for an open supply system are studied, but this is very complicated. Eneco can help energy cooperatives who are making a strategy how to uncouple their neighbourhood from gas by researching the opportunities for a heat network.

From these stories the collaboration between energy suppliers and cooperatives seems fertile and there seems to exist some kind of interdependency. ODE Decentraal argues that market parties need cooperatives for their legitimacy, but Eneco and the Ministry of EAC emphasise that cooperatives need market parties as well. Some factors make the collaboration between market parties and cooperatives difficult. At first, the fundamental differences between commercial and cooperative models. According to ODE Decentraal there is more tension between the two than collaboration. But according to the Ministry there are many differences: some energy cooperatives do not want to have anything to do with commercial parties and some have more open attitude when commercial parties have complementary services and from the side of commercial parties this is similar’. Second, commercial parties will not get involved as long as it is not profitable according to Enpuls. Before a fertile collaboration can develop, a market has to be created.

To conclude, it seems that the structural trends have caused business model changes at the regime players. These changes have not per se been caused by energy cooperatives, but by a number of trends that are happening in society and the economy. The sharing economy for example is upcoming, but on a whole other note, just selling energy is not a sufficient business model anymore according to Essent. The substantial majority of the cooperatives in the questionnaire are not consciously trying to change the business models in at corporations. All in all, energy cooperatives might be part of certain macro level developments that make corporations want to change their business model, and some of the regime parties like Eneco or Greenchoice make place in their business model so that energy
cooperatives fit in, but overall the direct influence of energy cooperatives on the business models in the heating sector is very limited.

6.3 Concluding remarks

Economic systems can be diverted into four entities: state, market, community and the third sector. Balancing on the community and third sector entity, energy cooperatives represent citizens in their interactions with state and market. This representation on an organized level is needed because society seems to miss something that is neither offered by state nor market. Energy cooperatives have the ability to lead their members through the customer journey in a more profound way than governments are allowed to, but without the commercial motives that market parties are driven by.

Municipalities and energy cooperatives are both motivated by societal goals, but where the municipality is a public organisation and therefore limited to intervene in the market, energy cooperatives are able to lead their members to the full customer journey. As stated before, one of the core activities of energy cooperatives is to advise and unburden its members and energy cooperatives are very knowledgeable. A close collaboration in for example energy shops between municipality and energy cooperatives has proven to lead to cost reductions and more expertise. However, the energy cooperative lacks the overview of the bigger picture and is criticized by thinking too much in individualist technological solutions. Besides, social exclusion can be reinforced when a neighbour that lacks the social network in the neighbourhood is not included in the cooperative activities.

Market parties and energy cooperatives share their private character, but differ in their aim. This difference between a societal and commercial aim brings along barriers for collaboration. From the perspective of the commercial market parties, cooperatives can lack the professionality to be a trustworthy business partner and the capital to invest in innovations. From the perspective of energy cooperatives, commercial market parties are in the basis too capitalist and are aimed to exploit the cooperative if they have the chance.

Although collaboration seems to be rigid between energy cooperatives and the market, the two need each other to exchange innovations and public support. The public support is needed to create a market for technological niches that are emerging from the market and these technical niches are one of the resources that inspire agents of change as we saw in chapter 2.3. This makes the interaction between the market fundamental to bring the transition to a success, but also collaboration with the government is of importance since many of the energy cooperatives lack the capital or scale to purchase the market innovations. With the help of subsidies or enlargement of projects, the government can in
this way compensate the elements of a low professionality and low capital that are seen as shortcomings from the market perspective.
7. Energy cooperatives: heat regime of the future?

In this chapter, I aim to take a glimpse into the future of the energy cooperatives. In the interviews and questionnaires I asked all the respondents to give their opinion on the potential roles that energy cooperatives might have. In spite of the lack of a crystal ball, some relevant information was provided.

7.1 Balancing scale and professionality

In the chapters above, two conflicting arguments were given. First, it was stated that many energy cooperatives need a bigger scale to collectively purchase products and services that concern the heat transition. Woudstra of Enpuls confirms this: “Beware that you need thousands of customers if you want to do something with the price”. Second, an argument was made that local embeddedness and small scale are the core quality of energy cooperatives. Many interviewees put emphasis a balance between both small and big scale as well.

Closely linked to the scaling issues is the often named lack of professionalizing in the cooperative landscape. At Essent for example, frustration with the voluntary character of cooperatives is sometimes experienced: “People just do this on a saturday afternoon besides their work. To be a serious partner in developing a windpark for example, requires much more”. The question is whether energy cooperatives desire to take this next step to professionalise. According to Artz of Netbeheer Nederland, the volunteers often do not want to carry these responsibilities and Woudstra of Enpuls mentions that a hired professional threatens the local character of the cooperative. Besides, according to Van der Linde (Duurzaam Den Haag), the problem is that energy cooperatives struggle with finding funding to hire some professional hours.

Some of the cooperative giants in other sectors have raised the fear of becoming too big. De la Court of ODE Decentraal names two example: “Frieslandcampina left their cooperative roots far away (...). You can easily lose yourself. Look at Rabobank, you can easily grow from a emerging cooperative power into a market party”. ODE Decentraal has had a discussion with the Rabobank about were in the process the cooperative got lost, which was a discussion that the direction of Rabobank found interesting as well: “They told us that when they were in the growth process, there was a shortage of knowledge on cooperative processes and business cases”. De la Court pleads for more cooperative education: “There are very little cooperative business studies in business education. So
when we become professional and bigger, we have to contract people who are educated as marketeers and business managers from a market thinking perspective (...). We need to bring change to the educational environment as well.”

Van Steekelenburg (Province of Zuid-Holland) sees an opportunity for cooperatives to form the new regime in creating cooperatives of cooperatives. A nationwide coverage is needed according to Van Steekelenburg, and for instance Samen Om has created opportunity to become ‘the Rabobank of energy land’. At Eneco they see this opportunity as well and therefore they work together with Samen Om. This collaboration has proven its value in the successful tender at the The Hague municipality. Samen Om will provide 10% of the energy from cooperative sources.

To conclude, if energy cooperative want to play a central role in the new energy regime, professionalisation is needed. To prevent a outweigh of the local embeddedness as core quality of energy cooperatives, and to prevent a loss of their cooperative roots, there needs to be a balance in scaling and the professional character of cooperatives. Cooperatives of cooperatives have proven to be a successful concept, but to grow bigger without becoming another market party, new people need education from a cooperative perspective besides a commercial perspective.

7.2 Energy cooperatives as (con)temporal movement

The respondents in both in the interviews and the questionnaire were asked how they see the role of energy cooperatives in the heat sector in the future. Since the respondents do not have a crystal ball at their disposal, predicting the future is of questionable relevance. The question whether they see energy cooperative as a temporal means to reach a bigger goal or as contemporal new heat regime though, puts the role of energy cooperatives in perspective.

In the questionnaire, the 33 cooperatives have very different views on this matter, see figure 27. At first, ten cooperatives think that their business model will be the future of the heat provision. KempenEnergie for example links this to the fact that energy systems are likely to be decentralised in the future. Haags Opgewekt states that professionalizing is a precondition for a successful future for energy cooperatives. Second, nign respondents think that both market parties and cooperatives will exist. EC de Broekstreek thinks that in rural communities with a profound social cohesion, energy cooperatives will be the future. In big urbanised areas market parties will provide the heat. Third, eight respondents think that there is no role for energy cooperatives in the future. Enerzjy Kooperaasje Garyp for example argues that energy cooperatives are not the same as energy providers, and points
towards the temporal role of energy cooperatives due to self sufficient systems of energy generation. Most energy cooperatives which do not see a future for themselves in the future agree with the fact that the temporal role of energy cooperatives is not a bad thing. Brummen Energie though brings has a less optimistic view and fears that “commercial parties swim as sharks around us waiting to attack when our role becomes substantive”.

**Do you think that energy cooperatives are the future of our heat provision?**

![Bar chart showing responses to the question](chart.png)

*Figure 27, Quantification of the answers to the question “Do you think that energy cooperatives are the future of our heat provision?” (own figure)*

The interviewees were very divided on the subject as well. On one thing everyone agreed: it is totally unpredictable what the upcoming regime will look like. Michaloliakos (Essent) and De la Court (ODE Decentraal) agree that there will be a very diverse set of actors in the playing field. The former pointed out that the market and cooperatives are very complementary to each other, but the actors need to find their place. This will happen in the coming few years. The latter thinks that the energy cooperatives as a collective will have a lot of influence on the market, but that it can never become the new regime on its own. Also Ecovat and Stedin underline the likely diversity of concepts in the new regime. More specifically for energy cooperatives, at Municipality X, they think for small scale solutions, energy cooperatives will become a serious actor

At the province and the ministry, energy cooperatives are rather seen as a means to reach a bigger goal. Van Steekelenburg (Province Zuid-Holland) takes the perspective of his own founded energy cooperatives and states that he is in figure of speech rather done with it today than tomorrow. Ten Elshof (Ministry) thinks that all forms that can bring the transition further need to be embraced. Since energy cooperatives seem to bring the transition in a
next stadium, this could be an important actor in reaching the goal of a sustainable heat provision.

Woudstra of Enpuls agrees with Ten Elshof that energy cooperatives might not be the only organisation form which brings the transition into a higher gear: “I think energy cooperatives are in many cases the right carriage for the transition, but other emerging organisation forms are interesting as well. There are neighbourhood corporations for example, health care cooperatives, associations, social enterprises, these are all legal terms of things can be organised and executed very locally”. Woudstra continues his argument by stating that action groups are needed to change regimes. These action groups can pressure big corporations to change their business model. This might even require a new legal form of organisation: “A new form of collaboration is emerging. Possibly, we need a separate legal name for those which respects the initiators who just want to change their direct environment, for which they do not need a limited company [BV or NV]. And maybe not a cooperative either, this too brings unwanted administration”. Stedin confirms that energy cooperatives are not the only ones that request action: “Often it is not called a energy cooperative, but it is just a number of parties that want to throw their weight behind it”.

To summarize, it is very unclear what role energy cooperatives will play in the future. Fact is that only a small amount of the respondents expect that energy cooperatives will be the main heat providers of the future. The majority, including respondents of energy cooperatives themselves, think of energy cooperatives as either the solution for small scale energy systems or as a kind of action group or movement from society to pressure the regime to change business models and policy. Note however, that ‘action group’ or ‘movement’ might not be a aptly term. As Woudstra of Enpuls argues, we might need a new legal form to do right to the movement.

7.3 Concluding remarks

Earlier in this research, I already mentioned that there are a lot of differences between energy cooperatives. Not only do they opt for different technical solutions and have different motivations to get involved in the heat transition, they also are very divided on the role they should play in the future regime. Some think that they will grow into the main heat providers of the future, but some see themselves as a temporal producer of change until the regime has adapted its business models to other standards.

If we think of the energy cooperative as a temporal movement from society dedicated to change business models of the regime, there might be a task for the government to facilitate this process. In the end, energy cooperatives aim for a similar goal which was
stated in the energy agenda of the ministry of economic affairs and climate policy: CO2 neutral households in 2050. Energy cooperatives can be one of the vehicles through which society changes its habits, but professionality is needed to do make clear for market parties what demands are currently not answered by supply and therefore influence their business models. With programs like ‘De Energieke Samenleving’ (the energetic society) in which citizens are stimulated to organise themselves, action groups or movements like energy cooperatives might need a different legal status. In practice, energy cooperatives choose many legal organisation forms, which might be a sign that there is no perfect fitting option.

If we think of energy cooperatives as a contemperal heat provider for the future, there is one central issue that cooperatives have to look into in the near future: How to balance professionalizing and scale with local embeddedness? If energy cooperatives can find the right scale to implement technological systems like heat networks or to purchase individual all electric solutions collectively, the prices of these systems could fall. Besides, if energy cooperatives can hire some employees to give their organisation a more profound basis, market parties and municipalities would be more eager to collaborate in big projects. On the other hand, as was argued earlier, the power of energy cooperatives is their small scale and personal connection with their members. Therefore, professionalisation or scaling could put the local identity of energy cooperatives at danger and could consequently turn the cooperatives into ‘just another market party’. In order to find a balance and to grow into a more mature sector, the cooperative legacy needs to be included in business education, according to De la Court of ODE Decentraal.
8. Conclusions and recommendations

In this research I aimed to understand how society organises itself within the heat transition in the Netherlands by researching the role of energy cooperatives. The heat transition is young and drastic and therefore a prominent debate in the media. My aim is to contribute to this debate. Besides, from a perspective of human geography I aim to contribute to the scientific debates on sustainable transition literature and to place this in a post-Giddensian world. The research is based on a literature study, semi-structured interviews with twelve representatives of relevant organisations and a qualitative questionnaire which was filled in by 33 energy cooperatives.

In chapter one I described a number of subquestions that were aimed to explore the field. In line with the aim to explore the field of the heat transition and cooperative involvement, the conclusions go beyond an answer to these subquestions. Therefore, I structured the conclusions around the main dimensions of the conclusions of this research. By going beyond the original subquestions, I aim to provide a higher level of understanding of the role of energy cooperatives in the heat transition in The Netherlands.

8.1 Energy cooperatives as the voice of society

With an eye on climate change and the corresponding international agreements, the Dutch government has decided that natural gas is not a desirable heating source for households in the future. The ministry of Economic Affairs and Climate Policy stated in the Energy Agenda that by 2050 every household has to be connected to a CO2 neutral heat source. Since only 6,3% of the Dutch households were gas free in 2016, and there is not yet a designated technological solution that will replace natural gas, this is a major challenge. In terms of the transition theory, I argue that the regime has been opened up by the Energy Agenda which makes room for technological niches to fill the gap.

Meanwhile, a bottom-up movement to change the energy provision in The Netherlands is triggered by a number of developments: The need for a different heating source became directly tangible with the earthquakes in Groningen, but also indirectly by events in the middle east and Russia like the MH17 crash which put the energy dependence on these areas at question. These sudden tangibility of macro level developments created awareness and in combination with upcoming technological niches that showed that generating energy and heat individually or in small groups is possible, made some entrepreneurial citizens (frontrunners) stand up to change their energy supply. Until that
moment, it seemed that state and market actors were not going to offer desired solutions. Instead of waiting on the regime to change, society organised itself in energy cooperatives. In only seven year, the number of energy cooperatives in the Netherlands has grown from about twenty in 2010 to almost 400 in 2017 (Schwencke, 2017).

Although the energy cooperatives are a relatively new phenomenon, the cooperative form of entrepreneurship is historically anchored in the Dutch (rural) economy in sectors such as agriculture and banking and could therefore be a reproduced from of entrepreneurial practice in the energy sector. Besides, it fits the movement of new business models that are more socially and ecologically inclusive which might be paradoxical in an increasing individualist urban society. These differences between emergence of energy cooperatives in a rural and urban context need more research, as suggested in chapter 8.7.1.

The results of this study show how energy cooperatives might complement state and market parties. Energy cooperatives can be classified as a third sector party, which is close to the community entity. It has the characteristics of being a formal, private and non-profit organisation. At first, this means that is has a legal status which differentiates the cooperative from society. The legal status is needed to get apply for subsidies or to realise projects for example. Second, the private character provides the cooperative to lead its members through the customer journey more profoundly than a governmental organisation which in many cases make the political decision to not intervene in the market. Third, because of the non-profit character of energy cooperatives, they would go in directions which commercial parties are not interested in and enable a sense of ownership over the energy production. Eventually, this study suggests, energy cooperatives can create new markets by doing so which triggers commercial parties to follow.

The interaction of energy cooperatives with state and market actors is essential for the heat transition. The market offers innovation and capital, energy cooperatives offer public support and a market and the state offers capital and a broader overview of suitable solutions. In spite of the importance of these exchanges, there are frictions. For idealistic reasons, energy cooperatives are in general cautious to collaborate with commercial partners for instance. In their choice of business partners, local businesses in the personal social networks are preferred because this ensures that local capital is preserved locally. In this way, energy cooperatives are engaged in the trend of localism, which could also be a reason for neighbours to join the cooperative.

Market parties on their turn experience a lack of professionalism from cooperatives. Also, energy cooperatives are accused of thinking too much in individualist solutions, while a broader overview is needed. Although in many examples the balance is unconsciously and
incrementally formed over time, it can sometimes lead to heated debates within a city or area in which governmental bodies and energy cooperatives oppose each other, and eventually a delay in the transition. In policy making, the municipality needs to find a balance (figure 28) between providing local authority over their energy provision to energy cooperatives that have the tacit knowledge, and the overview which presumably provides society with a more (cost) efficient solution. The public support for the eventual technological solution and the corresponding investments is at stake.

8.2 Connecting layers of the heat transition in society

In this chapter I dive deeper in the statement that energy cooperatives unite the frontrunners in the heat transition. These frontrunners are above-average aware of the technological niches and macro level developments, because of their professional live or personal interest for example. Besides the interaction between macro level developments and technological niches, frontrunners are triggered by other frontrunners in their surroundings. Energy cooperatives raise awareness for their cause by organising events, advertising in local media, giving energy advice, etc. Because energy cooperatives act on a local level, locals sentiments and tacit knowledge is shared which creates trust bonds. This trust bonds combination with the non-profit character, make the success of cooperatives.

The importance of local social networks and tacit knowledge seems to proof that in a post-Giddensian landscape, the relevance of place is still of issue. Looking at the heat transition from a Giddensian perspective, frontrunners are the agents of change that aim to create new structures that provide society with the resources and rules for new practices. They facilitate these practices and the creation of structures in energy cooperatives. According to Giddens, structures are delimited by time and space which contain the tacit knowledge that individuals share. This tacit knowledge could be the local sentiments towards technological solutions or the attitude towards sustainability.

The small scale and local networks are on one hand the strongest power of energy cooperatives since this provides the opportunity to effectively put new structures in place, but
on the other hand, it is a barrier to grow into a sector of relevance in the new regime. The relevance of place brings along that energy cooperatives are geographically bounded to an area with which they have a shared identity. Beyond the the boundaries of this area with a local identity, the energy cooperative loses its privileged position. This has several implications. First, energy cooperatives often lack the number of members to organise collective purchasing in such numbers that the prices of goods and services are reduced, which is in other sectors the function of cooperatives according to Normark (1996). Second, as argued before, the professionalism of the organisation is sometimes considered to be too low by market parties to collaborate. Third, the strong motive to represent local sentiments can lead to friction finding a solution for the broader area, as was explained before.

Besides the barrier to grow as a sector, the basis of social networks and tacit knowledge on which energy cooperatives are build can lead to social exclusion when some of the neighbours are for some reason not able or willing to become a member of the cooperative.

Overall, the energy cooperative seems to connect four different layers in society as is visualized in figure 29. This visualisation is inspired by the layer approach which is widely used in spatial planning. The layer approach distinguishes different functions of a geographical area which resemble the layers. Although it is a simplification of a complex network of relations, it provides a helpful overview (Hagens, 2006). Applying the layer approach to the role of energy cooperatives in society, results in four layers (starting from the bottom of the model):

1. The frontrunners (or agents of change) which are spread through the region and need, in Giddensian terms, a social institution to facilitate their new practices to form new structures that reproduce their new practices in society.
2. The possible technological solutions which contains the alternatives for natural gas that fit the specific location and the convictions of the united frontrunners.
3. The local identity which contains the intangible means through which people in an specific area understand each other like local sentiments and tacit knowledge, but also for example income and level of education.
4. Physical geographical elements, which include for example the year of construction of houses and building density.
8.3 (Con)temporality of energy cooperatives

The role which energy cooperatives will play in the future regime is very unclear. Not only is the transition too young to make a prediction, cooperatives and experts have different views on the goals which energy cooperatives serve. Some think of the energy cooperative as a temporal movement from society dedicated to change business models of the regime. Until now, the interviews and questionnaire proved that regime players are adapting to the upcoming energy cooperatives because they acknowledge that they need the public support and the consumer market that cooperatives can create. Though, a movement towards a cooperative business model seems not of issue until now.

If we think of energy cooperatives as a contemperal heat provider for the future, there is one central issue that cooperatives have to look into in the near future: How to balance professionalizing and scale with local embeddedness (figure 30)? If energy cooperatives can find the right scale to purchase the needed innovations and to include enough people to make the system work, the cooperative business model can be a serious player in the next regime. There are some examples of cooperatives of energy cooperatives that manage the balance well between using the bigger scale of the umbrella cooperative to professionalize, and the small scale local individual energy cooperatives to remain close ties with the local sentiments.
8.4 Visualising the conclusion: conceptual model

The conclusion is summarized in a new conceptual model (figure 31). This model is an updated version from the one proposed in chapter 3.5. Important to note is that this model is far from complete, and is just to give an indication of the underlying interactions. There are many elements of great influence that are not included in the model and other interactions that occur which are not explored. Therefore, the model is not a blueprint of how the heat transition works nor what the role is for energy cooperatives, but it is just an overview of the main conclusions in this research.

The relations are all shortly explained below the model, but a few general remarks need to be made. First, I decided to not include the term ‘new regime’ in the updated model because it is seemed very unclear how this will be shaped. To illustrate, if a new affordable and sustainable technology enters the market that will form the new regime, this model would have no role in shaping that. Besides, the results of this research showed that not every energy cooperative aims to replace the energy regime and energy cooperatives are not the only organizational form in which society tries to influence the regime. Second, I separated the regime into the state entity and the market entity because the results of the empirics showed that the interaction of energy cooperatives with market or state actors are in the basis different because of fundamental organisational differences.
1. Landscape developments and technological niches interact with each other. The presence of both, which shows that there are solutions for the problems that society experiences, makes people aware that they could take matters in own hands.

2. Awareness of landscape developments and the technological niches that can offer solutions for these, create that entrepreneurial citizens (agents of change) stand up in society to change their direct surroundings.

3. The agents of change unite themselves in an energy cooperative to form the resources and rules (structures) that facilitate and enable new practices.

4. Via their social networks and tacit knowledge, agents of change create more awareness in society. They organise local information events for instance. This awareness could eventually trigger new agents of change.

5. Because of its private ownership, energy cooperatives can complement municipalities in its public role and can advice citizens more comprehensive and cost efficient. The state provides subsidies and keeps the overview over the city.

6. Because of the overview over the city and the represented local sentiments, the interaction between energy cooperatives and municipalities results in a balanced technological solution.

7. Because of policy recognition and subsidies from the state, the cooperatives have ability to professionalise.
8. Although fundamental differences in the aim of the organisations, commercial parties and energy cooperatives need each other. The market and the energy cooperatives ‘exchange’ indirectly innovation with public support for new projects.

9. The market parties make room for the energy cooperatives on the market and adapt their business models to facilitate the actions of cooperatives. This adaption can both be considered as a business strategy to reach new markets and gain public support, as a moral act to recognize the movement from society.

10. Although energy cooperatives are cautious to collaborate with commercial parties, they need them for their services and products. Mostly, energy cooperatives make the localist decision to prefer local businesses.

11. As was concluded from the questionnaire and the interviews, energy cooperatives often function as testing ground for technological innovations from the market.

8.5 Broader implications

Although the focus of this research was on the energy transition, the conclusions might be translated to other theoretical issues or practical situations concerning ‘change’. ‘Change’ in this sense, can be interpreted in the broadest way imaginable: from stopping climate change, to changing the strategy of the corporate you work for, to founding a community garden in your neighbourhood. One of the main messages of the conclusion of this research is that Giddens’ structuration theory is still relevant in modern society: to create change in your environment, you need to create the structures through which this change is facilitated. A connection between agents of change that understand each other through time and space is essential to create these new structures. The network of agents of change can be considered as a social institution.

In practice, this means that initiators of change in society need to go beyond the well-known statement of Gandhi: “Be the change you wish to see in the world”; this is only the first step. The make change occur it is essential to create a network of people that desire the same change. This network needs to be connected in time and space, in other words, the initiators need to meet each other regularly to make their ideas vivid and to provide a ground for other people to join their movement. Energy cooperatives are one example of how this network is locally organised in the energy sector, but all kind of action groups, NGOs, lobby groups, associations, new departments within bigger organisations etc. could potentially facilitate a network of agents of change.

For future research, the conclusion implies that any study that aims to analyse societal change, should dive into the networks of people who initiate this change and how
these are geographically organised. Whether online communities can function in the same way as physically organised networks, needs further research (see chapter 8.7.1).

8.6 Critical reflection

Like all others, this research has its limitations. The constructivist approach in this research implies that there is no single truth, which means that whatever we define as truth, is labelled that way because of our interpretation. Consequently, everything that I wrote in this research is has been my interpretation of things I have read, seen or heard. If another person follows the same path of information, this person may find different conclusions. Therefore I want to make the remark that this research is both enriched and limited by the way I interpret information.

The actuality of the subject is a major contribution to the relevance of this research but means that the subject is relatively young. The heat transition has just been started, which means that research is almost forced into a exploratory character. This is helpful to get grip on the subject and to understand the constructions, but as Yin (1999, p. 43) states as a typical problem with holistic research designs such as this one: “The initial study questions may have reflected one orientation, but as the case study proceeds, a different orientation may emerge, and the evidence begins to address different questions”. An example is that sometimes I got distracted from the original aim of the research to define the role of society, because of the complexity of the emerging technological issues in which the interviews got tangled up (mostly because of the enthusiasm of the respondents about new technologies, which shows their dedication and passion for their job). The general understanding of the technological solutions is a precondition to interpret the words of the interviewees, but the societal meaning is more relevant. Therefore I steered the interviews to the societal implications when the technicalities came up.

In the empirical part of the research some limitations have to be noted. At first, in selecting the interviewees it was hard to select the ‘right’ ones. For instance, why interview Essent and Eneco and not Nuon and Greenchoice? Naturally I can justify the selected respondents, but it is harder to justify why other relevant actors were not included except for reasons concerning time limitations. In the selection, the choice has been made to select an as broad and relevant set of respondents as possible.

Second, the answers of the interviewees very much depend on the function they hold. A sales manager could have a different view on collaboration with energy cooperatives than an asset manager. Here too, the aim was to select a broad set of respondents to get an overview of the views on energy cooperatives. Therefore it is important to not see the
interviewees as a representative of a whole sector. The respondents of Stedin and Enpuls for example both work for a grid operator, but have very different functions in their organisations. Future research should focus more on the function of employees to discover the differences in their lines of thought.

Third, in the interviews and the questionnaire, certain concepts could be tangled up. Some of the respondents in the questionnaire for example, answered the questions keeping the broader energy transition in mind instead of the heat transition. I tried to trace down as many of this confusions as possible, but some may have slipped through which might influence the results of this research. In some of the interviews there was some confusion regarding the words ‘Cooperative’ and ‘Corporate’ in which the latter in practice is used to refer to housing corporations in The Netherlands. The note that crucial concepts are used in different contexts, even by the experts whom I interviewed, points again to the complexity of the heat transition and the belonging public debate.

At last, energy cooperatives are not the only societal organizations that aim for a change in the heat or energy provision. Because of the actuality and societal relevance of energy cooperatives, the choice to focus on this particular form of organisation was the most logical. Other research might look into other forms of civil involvement in the energy transition.

8.7 Recommendations

8.7.1 Further research

In the beginning, I wrote that this research will probably ends up with more questions than answers regarding its subject. When looking at the updated conceptual model, this notion certainly proved its truth. Every relation in this model could be researched more profoundly and therefore this chapter of recommendations for further research could be unending. Having noted that, I provide a shortlist of subjects that in my view are the most relevant for further research.

At first, the geographical foundation of energy cooperatives. My conclusion that energy cooperatives have geographical boundaries certainly needs further consideration. It would be very helpful for policymakers and cooperative initiators for example if we could be able to define the boundaries of energy cooperatives. In a quantitative analysis, correlations could be found with demographic data. But relations with less tangible features such as social cohesion or social networks could be relevant as well. Researching the geographical
foundations of energy cooperatives has its scientific relevance for transition and other post-Giddensian studies as well.

Second, the role of energy cooperatives could be coupled to diversity studies. According to De la Court of ODE Decentraal, many of the energy cooperatives start with the ‘same’ kind of initiators: middle-aged, white men with jobs on higher management levels. To apply this notion to my own research, although there were some age differences amongst the interviewees, it is remarkable that only one of the twelve interviewees was not a white man. Woudstra of Enpuls mentioned that he experiences that energy cooperatives become more lively when a woman is one of the directors. Diversity might be the magical word for the heat transition management.

Third, it could be very relevant to investigate the role of energy cooperatives in the light of broader localist trends. As mentioned before, energy is not the only thing that has recently become more ‘local’. Also food, health care or even in some cases money (new local currencies) have been increasingly organised locally. What can energy cooperatives learn from these other sectors? Is it possible that these different localist organisation merge in one local cooperative that provides society with local products and services?

Fourth, building on the last recommendation and based on a comment that was made during my presentation of the initial results on the Outside Inc. conference in September 2018, future research may look into the connection between energy cooperatives and online but geographical based communities. For example, according to the website of ‘Stichting WABP’ (Foundation for Whatsapp neighbourhood crime prevention groups), more than 8500 neighbourhoods have set up a Whatsapp group to inform neighbours when something odd or suspicious is happening in the street. Potentially these online communities involve a similar radius of neighbours and attract a similar kind of ‘active citizen’ as energy cooperatives.

Fifth, from a historic perspective, the cooperative movement in The Netherlands has a predominantly rural character, with agricultural cooperatives such as Rabobank and FrieslandCampina as well-known examples. These cooperatives were founded to fill the gap of missing facilities in the more socially collective rural areas. Now, we both see an emergence of energy cooperatives in rural and urban areas. Hypothetically, in provinces with relatively many energy cooperatives (Groningen and Friesland, which are predominantly rural) this might be a historically reproduced reaction to a disagreement with the market and government, and in urban area the emerging new business models such as energy cooperatives could be part of a movement towards an inclusive and sustainable economy as described by Jonker (2014) and other progressive economists. A focussed analysis on the
differences between rural and urban mechanisms in the formation of energy cooperatives could test this hypothesis.

At last, a research amongst energy cooperative members to explore their motives would be a good way to see what drives them to change their surroundings. It could test my hypothesis more profoundly that agents of change are motivated by the awareness that is created by other agents of change.

8.7.2 Policy recommendations

In advising policymakers, at first I want to follow the representatives of Stedin in this research who stated that a clarification is needed. A map of possible technical solutions would help the (heated) local debate amongst energy cooperatives and municipalities a lot, and therefore the pace of the transition is likely to be increased. Some of the municipalities have already embraced the *Warmte Transitie Atlas* tool developed by Over Morgen, like Drechtsteden (see figure 23).

Second, I want to emphasize the possible need for a different legal status for private non profit organisations like energy cooperatives as has been suggested by Woudstra of Enpuls. The existing energy cooperatives choose different legal forms which could be a sign that none perfectly fits their needs. This new legal status could perhaps be combined with other new forms of entrepreneurship. *Social Enterprise NL* for example lobbies for a legal status for social enterprises, like in the UK.

Besides these recommendations for policymakers, I want to bring to the attention that the investments individuals have to make to make their homes sustainable are considerably high. Especially for households with lower incomes, the costs are relatively high. Therefore, I follow the recommendation of the representatives of Stedin that banks or governmental bodies need to come up with financial solutions that support the investments.

8.7.3 Recommendations for energy cooperatives

Giving the advice to energy cooperatives to find a balance between professionalism and local embeddedness is too easy. This is a balance that is not quantifiable and which differs per location. It is advisable though, to engage in research to better understand this balance. As was suggested before, the geographical boundaries for energy cooperatives is for instance a element that can be better defined. Since the cooperative sector lacks the means to hire professional research facilities, it could start lobbying at universities to attract students in search for a subject for the master or bachelor thesis.
The collaboration with education needs to be sought in more ways to keep bring the cooperative sector to the next level. New talents in business studies need to understand the cooperative values and approach in order to prevent the fast growing energy cooperatives from growing into just another commercial party. This line of thought should be broadly shared within the cooperative sector, so not only amongst energy cooperatives but big players like Rabobank, FrieslandCampina, DELA, AgriFirm and all other big cooperatives should support the lobby. Intercooperative and intersectoral collaboration is needed to bring cooperative thinking to the next level.

Besides collaborations with education and cooperative colleagues, I follow the advice of Purtik et al. (2016) that it is important that localist organisation engage in social learning. Although not specifically asked for, it is remarkable that in non of the interviews and questionnaire answers, collaboration with other localist parties has come up. When looking at the emergence of health care cooperatives and local food initiatives, it is very likely that links can be made.
Bibliography


Seyfang, G. & Smith, A. (2007). Grassroots innovations for sustainable development: Towards a new research and policy agenda. *Environmental Politics*, 16(4), 584-603


Appendix A: Qualitative questionnaire

De rol van energiecoöperaties in de warmtetransitie
We gaan van het ouderwetse. Dat betekent dat in 2050 alle huizen in Nederland op een duurzame manier verwarmd worden, en dat is een grote uitdaging. Het aantal energiecoöperaties is de laatste jaren exponentieel toegenomen en het lijkt of de burger het helt in eigen handen neemt. Maar welke rol spelen deze energiecoöperaties in de warmtetransitie? In dit onderzoek wordt getracht deze vraag te beantwoorden.

Het begrip energiecoöperatie wordt breed geïnterpreteerd. De definitie uit de Locale Energiemonitor wordt gehanteerd: “alle groepen burgers die zich in collectief verband organiseren (met een juridische rechtsvorm) met als doel om energie op te wekken, te produceren, te kopen of leveren en andere geproduceerde energiediensten te betrekken.”


Als tegenprestatie voor uw deelname krijgt u een digitale kopie van het onderzoek toegestaan!

Naam van uw energiecoöperatie

Uw naam

Uw mailadres

Warmtetransitie en coöperatieleden
Naam waar het kan voorbeelden of concrete situaties om uw antwoord toe te lichten

1. Op welke manier(hoe) helpt uw coöperatie haar leden in de warmtetransitie?
   ( ) door gezamenlijk locatietoerismeevenementen te organiseren
   ( ) door gezamenlijk warmteparken in te lopen
   ( ) door technisch advies te geven
   ( ) door gezamenlijke加热ijverf en afdrukken van gasbomen
   ( ) door in werking te treden

   anders:

   Toegevoegd:

2. Hoe wordt de kernide en functie van de leden van uw energiecoöperatie benut in projecten in de warmtetransitie?
Technische innovatie
Om de transities te voltooien moeten technische innovaties aan de man worden gebracht. Denk aan innovaties voor warmteopwekking en -opslag, maar ook aan bijvoorbeeld smart grids.

Noem waar het kan voorbeelden of concrete situaties om uw antwoord toe te lichten.

3. Op welke manier(en) is uw coöperatie bezig met technische innovaties?
   □ We ontwikkelen zelf bepaalde technische innovaties
   □ We werken samen met start-ups
   □ We fungeren als proeftuin voor bepaalde technische innovaties
   □ We investeren in onderzoek
   □ We zijn hier niet mee bezig
   □ Ander:

   Toelichting:

Coöperatie als inspiratie
De invloed van energiecoöperaties op het warmtebestand
Noem waar het kan voorbeelden of concrete situaties om uw antwoord toe te lichten

4. Hoe heeft uw coöperatie invloed gehad op beleid rond de warmtetransitie?

5. Heeft u ervaren dat commerciële partijen het coöperatieve model overnemen, en zo ja hoe?
   Beïnvloedt u coöperatie op deze manier de warmtefactor?

   Toelichting:
Sociale rol energiecoöperaties

6. Hoe mobiliseert uw energiecoöperatie ook niet-leden in haar omgeving om zich te bewegen in de warmtetransitie?

7. Hoe wordt er door uw coöperatie samengewerkt met bedrijven in de omgeving?

Om bijvoorbeeld slagen met aanpakplannen te behalen of financiering te regelen voor projecten

Tot slot...

... drie optionele vragen waarin ik vraag naar uw visie op de rol van energiecoöperaties.

Waarom zorgt een energiecoöperatie op lokaal niveau voor de best passende oplossing als vervanging voor aardgas (snel en technisch gewenst), of waarom juist niet?

Denkt u dat energiecoöperaties de toekomst zijn van onze warmtevoorziening?

Welke rol van energiecoöperaties in de warmtetransitie is nog niet besproken binnen deze vragenlijst?

Wellicht speelt uw coöperatie een andere rol in de warmtetransitie dan de rollen die aan de hand van de voorgaande vragen aan bod zijn gekomen.
Appendix B: Participating cooperatives

1. Energy Cooperative X
2. Energy Cooperative Y
3. 040energie
4. Alkmaar Energie
5. Amelander Energie Coöperatie
6. Amsterdam Energie
7. BECO
8. Best Duurzaam
9. BrummenEnergie (Coöp EBEM ua)
10. Coöperatie EnergieKubaard
11. Coöperatie TexelEnergie U.A.
12. Duurzaam Roerdalen
13. EigenWijkse Energie Coöperatie
14. Energie Coöperatie Hooghalen
15. Energie Gilze Rijen
17. Energie-U
18. Haags Opgewekt
19. Leudal Energie
20. LochemEnergie
21. LOPEC
22. Morgen Groene Energie
23. Rijn en IJssel Energiecoöperatie
24. vereniging KempenEnergie
25. ZutphenEnergie
26. Zonnewoerenergie West-Friesland
27. Energiecoöperatie Endura u.a.
28. Energie Cooperatie Buitenpost
29. Energiecoöperatie Mei-inoar Grien
30. EC Drentse Aa
31. Enerzijj Kooperaasje Garyp
32. Cooperatie Hof van Twente op Rozen
33. EC de Broekstreek
Appendix C: Interviewguide

Bedankt voor de tijd en de moeite die u wilt nemen om mee te werken aan dit onderzoek. Het interview zal ongeveer een uur duren. Ik onderzoek de rol van energiecoöperaties in de rol van de warmtetransitie die recent is ingezet door het besluit van de overheid om de Groningse gaskraan dicht te draaien. Daarbij is een multilevel perspectief in acht genomen om een zo breed mogelijk beeld te krijgen. Partijen in de warmtsector op macro-, meso- en microniveau worden geïnterviewd. [bedrijf] is een belangrijk onderdeel in dit onderzoek omdat [reden]. U als [functie] heeft de juiste ervaringen om dit onderzoek verder te helpen. Vindt u het goed als ik in het rapport naar dit gesprek verwijs, of geeft u de voorkeur om bedrijfsgegevens en uw naam anoniem te laten vermelden? Daarnaast zou ik het interview willen opnemen zodat er geen informatie verloren gaat, is dat goed?

Inleiding:
- Wat is uw functie in het bedrijf?
- Hoe bent u betrokken bij de warmtetransitie?
- Waarom heeft u weleens contact met energiecoöperaties over dit onderwerp?
- Hoe ziet u de rol van energiecoöperaties in de warmtetransitie in het algemeen?

Energiecoöperaties in markteconomie
- In hoeverre helpen energiecoöperaties hun leden met isoleren?
- In hoeverre ken je voorbeelden van energiecoöperaties die een gezamenlijke aanpak of inkoop van isolatie organiseren?
- In hoeverre lukt het energiecoöperaties om de prijs van de omschakeling van aardgas naar een alternatief te drukken?

Energiecoöperaties en innovatie
- In hoeverre maken energiecoöperaties gebruik van technische innovaties die nog niet of nauwelijks in de markt bestaan?
- In hoeverre weten startups energiecoöperaties te vinden om hun innovatieve producten aan de man te brengen?
- Welke voorbeelden ken je van innovaties die dankzij energiecoöperaties groot zijn geworden?
- Zijn energiecoöperaties replicaerbaar naar andere plekken en waarom wel of niet?
- In hoeverre vindt u dat de kennis van energiecoöperaties zorgt voor het best passende antwoord op de lokale warmtevraag (technisch en sociaal)?
- In hoeverre veranderen energiecoöperaties business modellen in de hele warmtesector?
- In hoeverre worden ideeën of plannen vanuit energiecoöperaties opgepakt door beleidsmakers?

De sociale rol van energiecoöperaties
- In hoeverre creëren energiecoöperaties draagvlak voor de warmtetranstie?
  - Verhogen ze de bewustwording?
  - Welke invloed hebben ze op de sociale barrières?
- Hoe actief zijn de leden van energiecoöperaties betrokken bij de warmtetranstie?
- In hoeverre worden de persoonlijke capaciteiten benut van de leden?
- In hoeverre worden energiecoöperaties bijgestaan door bedrijven in de omgeving?
- In hoeverre weerspiegelen energiecoöperaties de lokale sentimenten die leven ten aanzien van de warmtetranstie?
- In hoeverre weten energiecoöperaties effectief gebruik te maken van de handvatten die de overheid biedt?

Marktpositie energiecoöperaties
- In hoeverre worden energiecoöperaties als serieuze concurrent gezien in de warmtesector?
- In hoeverre denkt u dat het coöperatieve model de toekomst van onze warmtevoorziening zal vormen?

Tot slot, zijn er relevante onderwerpen die we nog niet besproken hebben?

Bedankt voor dit gesprek, ik ben nu een stap verder in mijn onderzoek. Als u wilt kan ik u het uiteindelijke rapport toesturen. Naar welk e-mailadres zou u dit willen?
Appendix D: Justification of sampling interviews

HIER opgewekt
As a part of HIER Klimaatbureau (Climate Agency) HIER Opgewekt is a knowledge institute which stimulates the exchange of knowledge. On their website they state that “we share knowledge, connect, make energy initiatives visible and develop knowledge together with cooperatives and experts”. Besides events and communications, the local energy monitor is an important research output of the institute. This document contains facts and figures about the energy movement in society and is used by all kind of organisations which are involved in this research to base their strategies on. Because of its central role in the heat transition, this party needs to be included in this research.

ODE Decentraal
This is the branch organisation of energy cooperatives in the Netherlands. With their lobby and representation at the Dutch government in The Hague, ODE Decentraal aims at influencing policy decisions in the future. Recently, during the bargaining phase of the new Dutch climate agreement in 2018, ODE Decentraal joined the sector table of electricity (Rijksoverheid, 2018).

Netbeheer Nederland
According to Proka et al (2017), grid operators are an important partner for energy cooperatives, but the collaboration needs improvement. The two have in common that they serve a societal goal instead of a commercial. Netbeheer Nederland is the branch organisation of grid operators and has lobbying and representation as main an aim. Just like ODE Decentraal, Netbeheer Nederland joined the electricity bargaining sector table of the climate agreement (Rijksoverheid, 2018).

Enpuls
Enpuls is part of the grid operator Enexis. As can be seen in figure 32, this grid operator is based in the south and north-east of The Netherlands. The aim of Enpuls is to explore the future of energy provision by bringing together market parties, startups, universities and governmental institutions to develop ideas on four themes: Sustainable area development, energy flexibility, energy saving and sustainable mobility. All themes can be relevant in the heat transition, but energy saving in particular for the first hypothesis. According to several experts who are described in chapter 4.5, Enpuls together with Alliander DGO is one of the more progressive grid operator. Because one of the experts in the panel is involved in Alliander DGO, the researcher decided to invite Enpuls for an interview to prevent a certain ‘bubble’.

Stedin
Stedin is the regional grid operator mostly in the west of The Netherlands, including Utrecht, The Hague, Rotterdam and the concentrated industrial area Port of Rotterdam. The expert panel distinguished Stedin as a more conservative grid operator which keeps itself close to the core business of operating the energy networks. Therefore it does not have an
independent branch which is concerned with the energy transition like Liander has with Alliander DGO and Enexis with Enpuls. To ensure the diversity of respondents in this research, Stedin is selected to be involved instead of another more progressive grid operator.

Ministry of economic affairs and climate policy
This ministry is responsible for the clean energy policy in The Netherlands and the initiator of the energy agenda that enabled the heat transition. Other programs like the 'Energieke samenleving' (energetic society) are very much build on the principles of bottom-up action and a hands-on society. During the negotiations of the new climate agreement, the ministry has a prominently at the bargaining tables (Rijksoverheid, 2018). Because of the influential role of this ministry on the policy and market of energy, an interview was unavoidable and very much needed to realise a broad spectrum of respondents.

Province of Zuid-Holland
Containing two cities of the ‘big four’ in The Netherlands, the province of Zuid-Holland has the largest number of citizens. The Hague, Rotterdam and all other cities and villages in this province together have 3.6 million citizens and 1.7 million households (CBS, 2018). Besides, with the Port of Rotterdam, the province has a intensive energy system. Currently, plans are made to realise a project called 'De Warmterotonde' (the heat roundabout, see figure 33), which is a heat network fed with residual heat mainly from the Port of Rotterdam, but also from the Heineken factory in Leiden for example, which provides parts of Rotterdam, Dordrecht, The Hague, Zoetermeer, Leiden and municipalities in between with heat. Because of its large population and plans, the Province of Zuid-Holland is involved in this research.
Municipality X
This municipality is one of the big cities in The Netherlands: Amsterdam, Rotterdam, The Hague or Utrecht. Municipalities have a key role in the energy transition in providing local law and policy. The energy agenda sets goals for municipalities to reach for example. Proka et al. (2017) claim that many already include percentages of local input in new developing areas, which results in for example an 50% ownership of a windpark by local cooperatives. Because of the main societal goals of municipalities, cooperatives might have some overlap in goals and aims. Since municipalities are involved in the more practical aspects of energy cooperatives, it is needed to include them in this research.

Eneco
Eneco is labeled as one of the frontrunning energy suppliers (Van der Wilt et al., 2018) is and involved in several heat network projects in Rotterdam, Den Haag and other regions. Eneco adjusted its strategy to the emerging energy cooperatives and works as energy purchaser for collectives of energy collectives such as Samen Om. Because of this close relationship with the cooperative sector and its green image together with the fact that it is one of the oldest and biggest suppliers in The Netherlands, Eneco cannot be missed from this research.

Essent
On the other side of the spectrum, Essent as another giant under the energy suppliers has a less sustainable image. The Dutch consumer association (Consumentenbond) labeled Essent as a follower, just above the line of being a polluter (Van der Wilt et al., 2018). In contrast to this public image, the company is working hard on a transition of its business model. Essent is more and more involved in the markets of energy related products such as solar panels and smart boilers. Besides, the CEO of Essent, Patrick Lammers openly rejects heat networks in an article in Het Financieel Dagblad (Financial Times) because of its monopolistic character and the fact that the sources for these networks such as waste is not green and likely to decline in mass with other developments like the circular economy.
(Lammers, 2017). Because Essent has such different perspectives on the transitions than Eneco, the two bring interesting perspectives into this research.

**Duurzaam Den Haag**
As in many other regions and cities in The Netherlands, a foundation to realise the climate ambitions locally was founded in The Hague. Energy is only a part of its perspective, but the foundation certainly has an overview of what is being organised in society. The foundation serves the whole city instead of only a group of members of a selected neighbourhood. Besides, Duurzaam Den Haag facilitated the process of the Haags Warmtemanifest in which several cooperatives from The Hague formulated their strategy to find alternative heat sources together. Because of its city overview and practical knowledge, Duurzaam Den Haag is selected for this research.

**Ecovat**
To verify the innovation and cost reduction hypotheses, the experiences of a startup in the heating or energy sector can be fruitful. Therefore, the researcher followed Daniel van Staveren’s advice to include Ecovat in this research. Ecovat is a well-isolated underground ‘barrel’ in which water is stored. This water is heated on peak hours during sunny or windy days to store the energy. On days with energy shortages this energy can be used instead of purchasing gray energy from fossil sources. The system relies on local energy networks and has therefore high potential for neighbourhood initiatives when the costs of the system decrease. To explore the potential cooperation between Ecovat as a startup and cooperatives, it is selected to be involved in this research.
Appendix E: Coding scheme interviews

The interviews were coded in a total of 394 codes. These were collected into 63 codes, which are shown in the coding scheme below. Under the table, the name of the codes can be found.

<table>
<thead>
<tr>
<th>Municipality</th>
<th>0</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>ODE Denderlaan</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Eeklo</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Staden</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Dein</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Ecubt</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Numbere NL</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Pr. Zuid-Holland</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>

0. General role of energy cooperatives in the heat transition

1. A role of energy cooperatives in the heat transition is to translate global developments to regime action

   .01 Cooperatives are a trend in the whole economy
   .02 Cooperatives are bottom-up movement

2. A role of energy cooperatives in the heat transition is to bring technological niche innovations to the regime

   .01 Energy cooperatives make use of technical innovations

123
Collaboration between startups and cooperatives not common
Potential for startups to collaborate with cooperatives
Frontrunning cooperatives only can do something with innovation
Cooperatives make very little use of technical innovations

3. A role of energy cooperatives in the heat transition is to mobilize more agents of change that aim to replace the current regime
   A first step can be a stepping stone for more
   Individuals have different reasons to get involved in the transition
   Frontrunners as ambassadors
   Creating a market is essential to trigger mobilization
   Taking it from frontrunners to the crowd is a big challenge

4. A role of energy cooperatives in the heat transition is to unite agents of change to improve their bargaining position with the regime
   The role of energy cooperatives in the heat transition is to connect frontrunners
   Energy cooperatives organise collective purchasing
   Energy cooperatives seldom manage to lower the price of insulation by uniting customers.
   Cooperatives too small, scaling is needed
   Strength of cooperative is its small scale
   Saving energy more popular than insulation within the Trias Energetica
   Cooperatives struggle with their funding

5. A role of energy cooperatives in the heat transition is to use its local embeddedness to create public support
   The role of energy cooperatives in the heat transition is to unburden and advise its members
   Practical knowledge is exchangeable from cooperative to cooperative
   Energy cooperatives are able to remove the social barriers of renewable energy
   Geographical boundaries of energy cooperatives
   Backgrounds of involved individuals are of influence on the cooperative development
   Creating awareness role of cooperatives
   Role cooperatives in awareness limited
   Cooperatives can make or break projects
Surroundings profit from energy cooperatives

Big differences amongst energy cooperatives

6. A role of energy cooperatives in the heat transition is to represent society in the interaction with regime actors

Cooperative as legal form represents citizens as entity besides market and government

Cooperative and government get in each other’s ways

Cooperatives complement the government

Municipalities and cooperatives work together

Cooperatives lobby at the government in several ways

Cooperative lobby limited in comparison with market

Cooperatives and grid operators have some overlap

Cooperatives and market need each other, both have their qualities

Fundamental differences between market en cooperatives make collaboration hard

Cooperatives work together with market parties

Cooperatives need to be a reliable partner to work with market parties

7. A role of energy cooperatives in the heat transition is to innovate the business models in the heating sector

Cooperative model diffuses within the market

Energy suppliers are changing their business models for several reasons

All involved parties are trying to find their role

8. A role of energy cooperatives in the heat transition is to accelerate the diffusion of technical innovations

Cooperatives function as testing ground for innovations

Cooperatives develop innovations themselves

Cooperatives can handle faster than the market

Corporations support cooperatives as long as it offers something in return

Cooperatives innovate organisational factors

Cooperatives are not able to bring innovations to the market

9. A role of energy cooperatives in the heat transition is to form an alternative to the existing energy regime

It is likely that energy cooperatives will be the main heat providers in the near future.

Energy cooperatives will not be a replacement for the current heating regime
Cooperatives do not have the overview, therefore regime powers are needed.

The future of heating will be a collaboration between cooperatives and market.

The existing regime does not see the energy cooperatives as competitors.

Professionalizing cooperatives needed to have a significant role.

Professionalizing cooperatives could be a threat for their existence.

Cooperatives need to be understood broadly in society.

Future cooperatives depends on developments.

X  Not used