

# Facilitating the energy transition

What Dutch municipalities can do now to facilitate their citizen's energy producing cooperatives



Bachelor thesis Social Geography, Spatial Planning and Environment (GPE)

Nijmegen School of Management

Radboud University Nijmegen, April 2019

By Brandon Timmer

Photograph on the cover through Energiecoöperatie Zuiderlicht

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## Summary

This study provides an addition to the literature on the energy transition from fossil energy to renewable energy in The Netherlands. There is a growing feeling under the population that the government does not do enough to protect its citizens from the dangers of global warming. This growing feeling results in the emergence of *energy producing citizens cooperatives*. These cooperatives, or at least the ones addressed in this study, mainly consist of private citizens who pool together their financial means to generate renewable energy. This is supported by several policies on the national level. These cooperatives mostly operate on the local level. Every municipality has a different view on these cooperatives and a different way of dealing with these initiatives. These cooperatives play an interesting role in the Dutch energy transition and are likely the result of the application of Rotmans' (2013) *transition management theory* on the national level. Because *socio-technical transitions* such as this one are very complex, researchers in this field are very hesitant to write recommendations for managing them. Rotmans is the most notable researcher to have written recommendations on managing transitions. His theory is based on the *adaptive cycle theory* by Gunderson & Holling (2002), the *multi-level theory* by Geels & Kemp (2000) and his own *multi-phased transition theory*. The therefrom following transition management theory describes the most constructive roles for a government in one of the four described stages of a transition. Rotmans describes the challenge of managing a transition as a *wicked problem*, as described by Rittel & Webber (1973): a poorly structured problem with a lot of uncertainty, characterized by complexity. Usually, policy makers use two kinds of policies to carry out plans: financial instruments and legislative instruments. Either tax or subsidize something or make it mandatory or illegal. Since a transition has of this complexity, Rotmans proposes new policy instruments to complement the existing policy instruments: a problem this complex cannot be addressed with the policy instruments used before. These instruments and the underlying transition management theory serve as the basis for the theoretical framework in this study.

The main question in this study is “*How can Dutch municipalities provide a constructive approach towards energy producing citizens’ cooperatives to advance the energy transition?*”, with the underlying main goal of: “*Making recommendations for a constructive approach of Dutch municipalities towards energy producing citizens’ cooperatives in order to advance the energy transition*”. To answer this question and achieve this goal, there is first done a literature study on the *structure visions* and elaborating documents regarding the visions on energy production of six Dutch municipalities. This provides a general insight to what extend these municipalities recognize energy producing citizens cooperatives at all. Next, the presence of cooperatives in these municipalities is summed up based on the *Landelijke Energie Monitor* [National Energy Monitor] (Schwenke, 2017). This is a yearly report regarding energy production in The Netherlands. Further research is conducted through the case studies of seven cooperatives, spread out over seven municipalities in total. Each cooperative studied in this case has undergone a one-hour interview with at least one respondent. This interview has an emphasis on the received support of the municipalities they are active in. This is branched out to the presence of the by Rotmans (2003) proposed policy instruments, how the cooperatives received those policies and what they found lacking in their communication with and support by the municipalities. The followed research method is the *multiple case study*, which is a form of *qualitative research*. For a relatively new field such as this with a lot of unknown factors, it is a fitting approach. The multiple case study provides the possibility to research several cases very thorough. This is supported by the choice for a *standardized open ended interview*: a form of interviewing that does follow a guide, but leaves plenty of

room for the interviewee to formulate their own answers and for the researcher to follow up on aspects that require it. This makes the interviews *agile*: if a subject has not been addressed fully, the interviewer can ask for further elaboration. This makes for a better understanding of the cases and allows the researcher to pick up on subjects or elements that have not been expected when preparing the interview.

The resemblance in answers is interesting. The most frequent found form of help is financial, either for starting up a cooperative or expanding it. In some cases this is an 'old policy instrument', but there are also cases where it is a 'new policy instrument'. The second most frequent encountered form of help is a municipality providing space for a cooperative to generate electricity. This is a new policy instrument, in lines of Rotmans' (2003) theory. Remaining are different policies in different places. In general, the policies in place were perceived as welcome and helpful. However, when asked what the cooperatives found lacking, the resemblance was just as striking. The municipality can be a hard to reach partner and especially communication was perceived to be slow, poor or non-existent. There is found an indication that the larger the municipality, the larger this problem is. In most cases is found that municipalities can take on a bigger, more leading and hands-on approach. This can all be due to the lack of one particular policy instrument that Rotmans (2003) came up with: the *transition arena*. A transition arena is a place where front-runners, government, knowledge institutes and other involved actors come together to discuss their goals and formulate a joined long-term goal and long-term agenda. This long-term agenda can then be back casted to smaller, more short-term goals. From this, policies flow in order to achieve the long-term goals. In this study, the front-runners would be the cooperatives and the government would be the municipality. None of the studied municipalities has implemented this policy instrument. By implementing this instrument, municipalities can take on the demanded leading approach. Throughout time, the role of governments in society has changed. From a *top-down* approach (*imperative governance*) to a more market oriented view in the seventies and eighties: the government took a huge step back in terms of ruling power. This approach did not prove to be without faults either: without a strong government, there could not be a good functioning market. Transition management theory and the therefrom following instruments are a response to this realization. Especially the transition arena is an important instrument in building up a strong government in order to let the market function well: it is a forum where there can be discussed about the possibilities and best implementation of new technologies.

Before it comes to this, there is another issue to be addressed: not every municipality sees the need for and possibilities of energy producing citizens cooperatives in their cities and towns. When a municipality does not aim to have this role of a strong government, they will not act in a way to become one. This harms the progress of the energy transition to renewable energy as a whole and the municipality in question misses out on an opportunity to become a front runner themselves.

## Preface

Hereby I present you my Bachelors thesis with pride. This thesis concludes my Bachelor on Social Geography, Spatial Planning and Environment at the Radboud University Nijmegen.

Whilst at first mostly attracted towards mobility issues and spatial planning, there has been a shift in interests for me. Environmental questions have proven to draw my attention more and more, with the current global events and challenges we as humans face. This has motivated me to do more in-depth research towards the problems there are to solve and how they can be solved. As a result, the biggest written piece of my formal education to date is on the topic of Dutch energy producing citizens cooperatives and to what extent they get the support of their local governments they need and deserve. The energy transition is not a small task as they have recognized and therefore they have joined their forces in what has become a bottom-up force of tens of thousands of individuals. A very impressive achievement. This research is my addition to this new and dynamic emergence.

I would like to use this preface to thank the people who have helped me achieve this milestone in my academic career. First of all my supervisor, Peter Ache. Without his patient insights and constructive views and advice on my written work I could not have achieved this performance. Furthermore I would like to thank my girlfriend Wieke Geels for all the mental support and advice on how to manage this project. Her parents Jennek Geels and Jacqueline van Aller may not be exempt from these thankful words. As fellow geographers and former classmate of Jan Rotmans, they were very eager to help me understand his theory and apply it in practice. Last but certainly not least I would very much like to thank all interviewees and other people I have spoken to on the path to completion. Your energy for the transition has inspired me to continue my efforts in this field and I could not have made my addition to the transition without all your thoughts, words and time.

Have an interesting read.

Brandon Timmer

Nijmegen, April 5<sup>th</sup> 2019

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## 1. Introduction

The landscape of energy production is ever changing. The first Dutch power plants were powered by steam, which later were replaced by coal power plants. Later, when the Dutch natural gas reserve was discovered, there was a transition to gas powered plants. Now, fueled by international agreements such as the Kyoto protocol and the Paris agreement, the Dutch society is at the forefront of the next shift in energy supply: from fossil to renewable. This change appears in a time where governments are not totalitarian rulers anymore when it comes to socio-spatial developments. Over the course of the last decades, the top-down plan making has made way for new forms of governance. The national energy supply has been largely privatized and governments on all levels now cooperate with companies and individuals when drawing out and executing plans for new apartment blocks, street decoration or when battling the vast amounts of water The Netherlands faces every day. This makes that the transition from fossil to renewable energy comes with a lot of challenges. There are many, many stakeholders present in this narrative and not all are equally willing to cooperate. In the early days of this transition, the national government took matters to hands and appointed several transition action groups and funded research regarding technological and social development, as well as new approaches to governance. One of these approaches is the Transition Management Theory written by Rotmans (2003). His theory is an approach unique in the world and the Dutch would have a premiere regarding the management of the energy transition (Rotmans, 2014).

However, somewhere down the line there must have been made a mistake. A growing group of concerned citizens felt like the Dutch government did not do enough to protect its citizens from the danger of climate change. This resulted for example in a law suit where Urgenda sued the Dutch government for not taking matters seriously and the judge ruled in favor of the accusers (Rechtspraak.nl, 2018). Another example is the growing amount of bottom-up initiatives. Citizens or smaller companies that try to do it their own way. Over the timespan of Rotmans' theory in 2003 and his review on the process in his 2014 book, the involvement of the Dutch government in the transition has declined, according to Rotmans: Where first there were hundreds of financially risky experiments, over the course of these eleven years most of them have been put on ice and only a few financially less risky have been kept alive. What remained were *proofs of concept* in the technological and economical field, with the major social experiments all gone. Along with this, the responsibility for changing the energy provision has partly been laid upon provinces and municipalities, along with several other responsibilities. As this brings a lot of new challenges for municipalities, one might expect that this development does not speed up the energy transition as a whole. Some municipalities do not see it as their main job to take part in the energy transition, while others simply lack the personnel to do so. Others do want to cooperate but are not sure how. This research paper addresses the latter. What can be done to help municipalities further the energy transition?

### 1.1 Main goal and questions

The energy transition has come to the point where citizens congregate in cooperatives to pick up the production of renewable energy. For this production, the cooperatives must work together with the municipalities they are located in. Since this field is relatively new for the municipalities and the number of cooperatives is increasing, it is very interesting to assess where things are going smoothly and where there is progress to be made. The main goal of this research therefore is:

*Making recommendations for a constructive approach of Dutch municipalities towards energy producing citizens' cooperatives in order to advance the energy transition.*

To achieve this goal, the main research question is:

*“How can Dutch municipalities provide a constructive approach towards energy producing citizens' cooperatives to advance the energy transition?”*

This research question brings us to the following sub questions:

- “How does a transition succeed?”
- “What role do cooperatives fulfill in the energy transition?”
- “What role does a municipal government fulfill for a cooperative?”
- “To what extent does the transition management theory by Rotmans (2003), intended for use on a national scale, apply to the local scale of municipalities?”

## 1.2 Societal relevance

One of the changes that comes with this transition, is the shift of a central energy service to more decentralized electricity generation. Where the majority of Dutch electricity is produced in 12 fossil fueled central power plants, the production of renewable energy has a far smaller energy output per square meter. This results in the need for so called decentralized durable energy production. In short, this means that instead of a handful big power plants, there will be thousands of smaller power plants and these thousands of smaller power plants need a much larger footprint to generate the same amount of electricity. This decentralized durable energy production is an important pillar in the Dutch energy transition (Sociaal-Economische Raad [SER], 2013, p. 79).

However, there is a growing number of citizens interested in renewable energy. These people will, for example, sign a contract with a supplier of renewable energy or take it a step further and use their own roof to produce energy through photovoltaic cells [PV], more commonly known as solar panels. This is not an option for everyone or does not stretch far enough for everyone. These people are in growing amounts uniting themselves in citizens' cooperatives (burgercoöperaties). These cooperatives consist of a group of people that together invest in a joint project like wind turbines or a larger scale PV installation. As of November 2017, there were 392 such cooperatives. An increase of more than 60 compared to 2016 (Schwenke, 2017). In November 2018, this grew with another 20% to 484 (Schwenke, 2018).

This indicates that there is quite the civil interest in renewable energy. These cooperatives mostly function at the local level of a single municipality. This means that almost every cooperative and every municipality has to reinvent the wheel concerning communication, funding and other means of support. Some municipalities are not that interested in the energy transition and keep a laidback approach, effectively blocking progress. On the other end of the spectrum there are municipalities that want the transition so bad, they are competing with neighboring municipalities. This, in the end, might slow the overall progress. A more collaborative approach might be better for the nationwide picture (Hufen, 2016). In between those extremes, there are municipalities that want to show their support, but don't really know how (Hufen, 2016).

### 1.3 Scientific relevance

As of right now, there is no proven holistic theory on managing transitions in general. Most transition theories, regardless of the field, limit themselves to describing instead of managing transitions. Scientists are reluctant to make recommendations for directing these processes, since these processes are extremely complex (Paredis, 2014). Regarding the energy transition in particular, the playing field in which this transition takes place is constantly changing. When the Dutch electricity source shifted to natural gas during the sixties, the government was, so to say, a more absolute ruler compared to now. Liberalization of the energy market has made the influence of the government on the nature of the energy supply a lot less direct. Another factor that there is no proven holistic theory on transition management, is that a transition like this takes at least one generation (Rotmans, 2014) and the theory covering transition management is younger than that. This means that no matter how well this theory is nested on other, more tested, theories some caution is well-suited.

As said, transition theory is very hesitant to make recommendations regarding political strategy to guide the transitions. Rotmans' (2003) transition management theory is considered the most important exception (Paredis, 2014). Rotmans' (2003) transition management theory is put into practice by advisory institutes who counsel the Dutch government (Algemene Energieraad [AER] & Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieu [VROM], 2004). In this theory there are different roles described for governments in different time periods of the transition. Since municipalities largely have to take matters in their own hands, whilst most of them will not have much experience with the guidance of energy production, it is very useful to see if they are keeping up with the schedule that Rotmans proposes. This also functions as an indication where we currently stand on the timeline of the transition and if the proposed schedule is approximately right.

Another interesting aspect to study, is how well Rotmans' (2003) theory intended for guiding transitions on a national scale, applies to the more local scale of municipalities in this research. The instruments applied are stacked, meaning: a cooperative active in a certain municipality has to adhere to and is able to profit from instruments on the national level, the provincial level and municipal level. As this study has the focus on the local municipal level, instruments on the other levels are more or less taken for granted. They are not analyzed like the municipal instruments. The focus lies solely on what municipalities can do and how constructive this is in addition to what is already there on other levels.

### 1.4 Reading guide

To answer the questions in paragraph 1.1, there will first be looked into Rotmans' (2003) theory on transition management in chapter two. This gives a good view of the way transitions are shaped and provides the basis for the conceptual framework in paragraph 2.2. After this, the roles for governments as proposed by Rotmans are highlighted. This provides an overview of the expected behavior when municipalities want to help the energy transition succeed and concludes chapter two. Chapter three explains the research strategy used in this research. This is accompanied by an overview of six municipalities of whom their vision documents are scanned for affinity with citizens cooperatives. After this, an overview of the cooperatives active in these municipalities is presented. This provides a basis for the case selection. To conclude chapter three, the methods used for data processing are disclosed. Chapter four continues with the outcomes of the conducted interviews. This is done in a geographically

clustered case by case approach. Paragraph 4.2 sums up these results, with first a part on the encountered instruments, followed by a part on which instruments cooperatives found lacking. The chapter concludes with a comparison of the so called *transition arenas* per municipality. Chapter five places these found results in existing literature to get a better understanding of what it means. Lastly, chapter six contains the conclusion of this research and discussion for further research.

## 2. Theory

The main theory followed in this research is Rotmans' (2003) transition management theory. Looking into his theory serves two purposes. The first is to thoroughly grasp the concepts of this theory and amend it for the purposes of this research. This is done by shifting the focus from the national level of the theory to the local level of this study. The roles for governments as proposed by Rotmans are laid out and commented upon in paragraph 2.2. Paragraph 2.3 consists of forming this information into the theoretical framework used in this study. That concludes chapter two. The second use is seen in chapter five. There, the usability and completeness of the formed theory is assessed.

### 2.1 Theoretical framework

As mentioned before, the most noteworthy theory regarding transition management in this field is written by Rotmans (2003). In his book *Transitiemanagement: Sleutel voor een duurzame samenleving* [Transition Management: key to a sustainable society], he states that the modern society is increasingly complex and changes ever faster. This makes it harder to gain insight in problems and address them in an effective way. The Dutch government has changed its approach from a top-down hierarchy with *imperative governance* to a more market oriented view during the seventies and eighties. The way in which this was done is not perceived as ideal either, as Geelhoed (2001) found: without a strong government, there cannot be a good functioning market. The following governmental approach has, among others, been described by Castells (1996). Castells (1996) has a vision of *The Network Society*: an approach where a government should take a more interactive role and has to look for new forms of governing. Among these new forms of governance, Rotmans (2003) also names *multi-actor governance* and *responsive governance*. Rotmans (2003) further states that these forms of governance, whilst handing back more control to governments, in themselves are not adequate to deal with the type of problem that comes with the energy transition. He describes the energy transition as a *wicked problem*, as Rittel & Webber (1973) address: a poorly structured problem with a lot of uncertainty, characterized by complexity. To deal with this lack of a fitting type of governance, Rotmans et al. (2000) coined the term *transition management* in the report *Transities & Transitiemanagement: de casus van een emissiearme energievoorziening* [Transition & Transition Management: the case of a low emission energy supply]. The potency of this form of governance has been recognized by advisory bodies of the Dutch government like the SER (2001) and the VROM (2002).

Rotmans (2003) explains that the concept of transition has its roots in biology and population dynamics (Davis, in Rotmans, 2003). In economics, the concept of transition is developed and used by people like Rostow (1960) and Boulding (1970). In innovation technology, Rotmans continues, the term transition is used in combination with technological revolutions, also known as socio-technological transitions (Geels & Kemp, 2000). However, these transitions are most of the time within one area of expertise and that is where Rotmans' theory differs. For spatial transitions of this scale there are numerous areas of expertise involved at different times in the process. This theory sees the need for an overlap and tries to put everything in the right place at the right time. Rotmans (2003) describes a transition as a change in society which takes at least one generation, or 25 to 50 years. According to Rotmans, a transition is the process of countless small and bigger steps that in the end look like a big

leap. In such a transition, there are countless actors involved. These range from companies and knowledge institutes to governments and individual persons.

A primary goal in transition management, is to influence the behavior of societal actors. Different from other forms of governance, transition management aims to alter the way of thinking in the long run. Short-term stimuli like pricing and lawmaking are used, but the focus is on fundamental changes in behavior through learning processes and learning experiences (Rotmans, 2003). Rotmans proposes several other new governing instruments to achieve these changes. These are covered in paragraph 2.2. New in transition management is the fact that the governance happens on different levels: individual actors on micro level, collective actors on the meso-level and multi-lateral actors on the macro level (Rotmans, 2003). What these levels mean, is further explained in paragraph 2.1.2. The combination of the long time scale, the precedent lack of effective instruments, the need for inter-disciplinary collaboration and the need to affect actors in these different scales, is what makes transition management such a complex theory.

Although transitions are not new, an effort to grasp the 'what', 'why' and 'how' is relatively new, as is the attempt to manage them. These theories are designed to try and direct transitions in a certain way, based on reflections and descriptions of previous transitions. Given that transitions take longer than these theories have been around, some caution is fitting with using them. Here, the theories are mainly a support to help understand what is happening and what are considered good circumstances for transitions to proceed.

Rotmans' (2003, p.16) transition theory describes three dimensions of transitions with three transitional concepts to form one model. These three dimensions are:

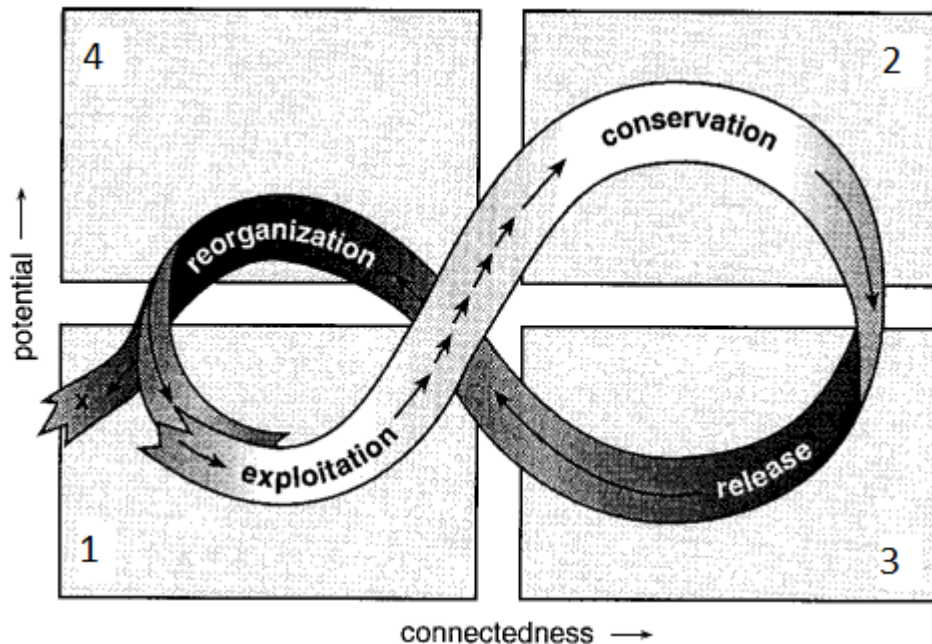
- Lemniscate, as described by Gunderson and Holling's (2002) adaptive cycle theory
- Scale, as described by Geels and Kemp's (2000) multi-level theory
- Time, as described by his own multi-phase theory (Rotmans, 2003)

These three theories are explained in the following paragraphs.

### 2.1.1 Adaptive cycle

The adaptive cycle is developed by Gunderson and Holling (2002) and might also be referenced to as the lemniscate concept. This is due to the shape of the drawn-out concept that resembles the Lemniscate of Bernoulli in the geometrical sense. This cycle is designed to describe four phases in the development of ecosystems. Rotmans (2003, p.19-21) draws parallels with the rise and fall of a used technology in society. These four phases for transitions are described by Rotmans as release, reorganization, exploitation and conservation. The upward trends in this figure between one and two and between three and four describe the rise of a new technology, use of resources or way of thinking. This can for instance be the normalization of using natural gas to heat Dutch homes in the 1960's. The downward trends in the figure between two and three and between four and one show the downfall of a technology, use of resources or way of thinking. An example of this is the Chernobyl incident in 1986 where a nuclear power plant exploded and after which nuclear power was rapidly decreasing in popularity as an energy source. The axis 'potential' can be seen as the maximum output a certain

technology or resource has. The axis 'connectedness' portrays the resilience or stability of a used technology or exploited resource. (Holling, 2001, p.394) So to use the previous examples: The largest part of Dutch houses is still heated with natural gas. This is seen in this figure with high used potential and high connectedness. At the moment, there is not a lot of perceived need to change – although this is coming. The Chernobyl explosion is an example of a too high pushed potential output for the current technology. The result is a worldwide disaster and a technology that is perceived as undependable. This in turn leads to a low connectedness: citizens, companies and governments have become suspicious of this means of energy.



5.

Figure 1 – Adaptive Cycle (Source: Holling, 2002, adapted)

### 2.1.2 Multi-level

The multi-level approach, as proposed by Geels and Kemp (2000), describes three levels on which transitions can prevail. It starts at the micro level, where new technologies, innovations and forms of culture and management emerge. These appear in the niches. The level above is the meso level. This is the level of regimes, dominant practices, rules and interests of actor groups. Changes on this level have definitively a lot of resistance, since involved actors want to see the current rules, practices and interests remain unchanged. The top level is the macro level. This is the level of politics, culture, world views and paradigms. For a transition to fully complete, it has to push through all the way to here and become a given fact. A simplified view of this is drawn out in figure 2, a more complex view is drawn out in figure 3. The latter really visualizes the steps forward and back (or, in this visualization, up and down) a transition endures on its way to succession to the macro-level. When the small arrows are seen as individual developments and the large arrow as the transition, it shows that there already is a long way ridden before a transition escapes the micro-level. After this succeeds, the transition can still crash down and not make it to the macro- or meso-level.

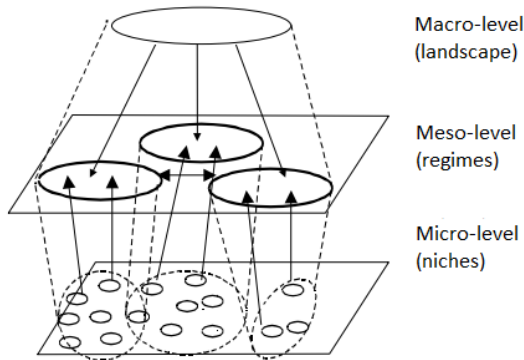


Figure 2 – Three levels of prevailing (Source: Geels & Kemp, 2000, edited for translation)

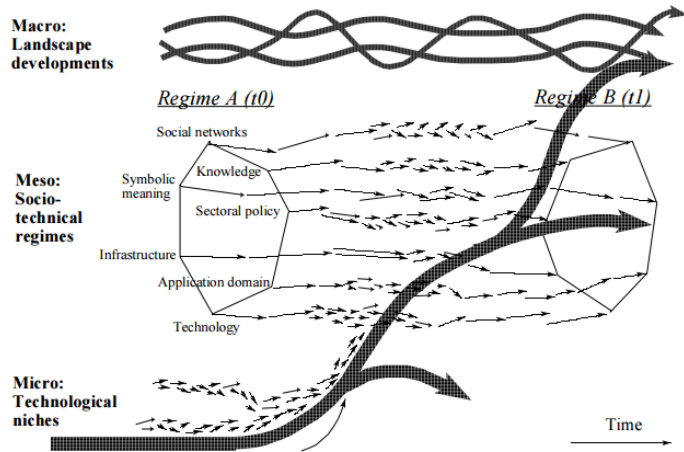


Figure 3 – Three levels of prevailing over time with examples of influences (Source: Geels & Kemp, 2000)

### 2.1.3 Multi-phased transition

The multi-phase view describes the four phases that transitions go through until they succeed (Rotmans, 2003). This progress is non-linear and can best be described as an S-curve. The four phases are predevelopment, take-off, acceleration and stabilization. This theory incorporates the multi-level theory and the adaptive cycle to create a more complete comprehension of the process. Since this theory is written as a guide for governments to help governments make transitions succeed, there are recommendations for governments included. Paragraph 2.3 describes these roles more extensively.

The predevelopment phase is a relatively long phase and the transition has not really started yet. However, below the surface several leaders will start experiments with new technology, logistical systems or the transmission or development of knowledge. Governments should take on a supporting role.

Following is the take-off phase, where the change is starting to break through. Involved sectors will pick up the successful experiments and the transition slowly moves to meso level and even macro level. More actors join in to avoid missing out on the opportunities the transition has to offer. Since the change is becoming more and more important, the short-term agenda is increasingly dictated by the long-term agenda of the transition. Governments should take on a facilitating role in this phase.

Next is the acceleration phase. The transition is pushing through to the macro level. Even more parties will recognize the transition and will start to join in. At this point, a lock-in must be averted to ensure a functioning market after the transition. Governments will have to take in an active role to formalize the transition and keep the change going. At this point, economical, juridical and institutional affairs need to be adjusted and governments must help here.

At last, there is the stabilization phase. This is the point where the transition has broken through on the micro, meso and macro level. This state could also be called a dynamic balance. On the broad scale of the transition there may not be any substantial changes, but there is always some wiggle room for change. The transition is completing and governments will have to secure the new structures and

refocus on the aspects of the transitional process. This state can serve as a basis for new transitions. In figure 4 below, the aspects of the multi-phased transition are combined with the multi-level aspects from figure 3 above. This results in an easy to understand overview of the basic elements of a transition.



Figure 4 – The four stages of a transition (source: Rotmans, 2003, through Chang et al., 2017)

## 2.2 The roles of the government

Now that the underlying themes of Rotmans' (2003) theory are established, it is time to take a look at what he proposes this means in practice. This paragraph first describes transitional policy instruments as proposed by Rotmans (2003) as an addition to regular policy instruments. Hereafter, the roles of the government as mentioned in paragraph 2.1.3 are described to greater extend.

### 2.2.1 Policy instruments

Rotmans (2003) sets apart traditional policy instruments from transitional policy instruments. As indicated before, regular policy instruments are not enough to secure a fulfilled transition and need an addition (AER & VROM, 2004; SER, 2001; VROM 2002). Regular policy instruments are mostly pricing policy and regulation, i.e. lawmaking. Transitional policy instruments cover a much wider range of governance. To give a very brief summary: the traditional instruments of financial and legislative possibilities are complemented with instruments aimed at building and sharing knowledge. Rotmans lists (2003, p.66):

- Transition arenas for creating and developing experimentation spaces (Rotmans, 2003). This is an experimentation space where different involved actors come to new insights regarding transition problem through social learning.
- Strategic niche management: experimentation with new technologies in an experimentation space (Kemp, Schot & Hoogma, 1998). An example would be the small-scale test of a new technology or process in a designated area or project.
- Uncertainty management: mapping of sources and types of uncertainty and how to cope with this (Van Asselt & Rotmans, 1996; Van Asselt, 2000).
- Policy laboratory: the simulation of a learning environment for societal actors (Geurts & Smits, 1997). Here, actors can work together on a computer system that simulates the effects of policies and gives room for discussion.
- Constructive technology assessment: aligning technological development with societal needs and wants (Schot, 1991; Schot & Rip, 1997).
- Monitoring instrument: for measuring aspects of content and processes of transition processes. An example would be *de Landelijke Energiemonitor*.
- Learning instrument: for registration and evaluation of different learning processes: doing by learning, learning by doing and learning by learning.
- New networks and coalitions, for example *het Innovatienetwerk* (the Innovation network).
- New arrangements: financial or organizational stimulation initiatives. An example of this is the *postcodeoosregeling*, an arrangement where there is a break on energy tax when people invest in shared renewable energy within a range of zip codes.

There are three important notes to give on this list. First, it is important to note that Rotmans' (2003) theory has been intended for use at the national (macro) level. Therefore, municipalities (micro and meso level) do not necessarily have to use all these instruments. For example, the *Landelijke Energiemonitor* provides a national oversight of most citizens cooperatives. This does not mean that it would not add value for a municipality to do their own monitoring. Second, as stated in paragraphs 1.2 and 2.1, Rotmans' (2003) theory has not been tested through time. Therefore the indicated roles and use of instruments are on a basis of expectation. Whether the roles in practice prove to be 'correct', is assessed in chapter five. How well the translation of macro to micro- and meso-level functions, is also

addressed in chapter five. Third, the instrument of the transition arena deserves a more elaborate explanation.

### 2.2.2 The transition arena

Before continuing onto the by Rotmans (2003) proposed roles for governments in different states of a transition, the transition arena instrument is elaborated further.

As stated in paragraph 2.1, the primary goal of transition theory is to alter the long-term thinking of actors on several different scales. This should be achieved through learning processes and learning experiences to create fundamental changes in behavior. From the several new instruments, the transition arena is the most important one. Creating a transition arena is the starting point of transition management. It is:

*'a protected innovation space where front runners can show their fresh visions and unorthodox plans safe and without worrying. Such an arena is a network that centers around searching, learning and experimenting, where radical breakthrough projects for the future can be discussed. An arena is a small, dynamic network; 15 participants is ideal. These are people from inside and outside the regime. Niche players with daring visions and ideas [...] but also people who want to shake up the regime from the inside out.'* (Rotmans, 2014, p.14-15).

Along with niche players and people from larger companies, representatives of governments, knowledge institutes and intermediates are part of the arena. This results in a long-term vision, as a dot on the horizon where the end-goal is placed. In this transition arena, visions of how to get there are discussed too and experiments are formulated. The outcome of these experiments will lay the foundation of new policy (Rotmans, 2014).

In the case of energy producing citizens' cooperatives, the foundation has been laid several years ago. The theory regarding transition management experiments describes ideal experiments as small scale (Kemp & van den Bosch, 2006), which is arguably not the case with energy producing citizens' cooperatives. With currently over 480 cooperatives (Schwenke, 2018), the scale is quite overwhelming actually. It is possible that the national *postcoderoosregeling*, which is partly the reason the number of cooperatives has grown so fast (Schwenke, 2017), is the result of such a transition arena. However, no concrete evidence of this has been found within the practical limitations of this research.

This does not mean for this research that the instrument of the transition arena as presented by Rotmans (2003, 2014), is not fit for use in this study. It is likely that this instrument has been used on the national scale and that the large number of energy producing citizens' cooperatives all over the country is the result. As this study focusses on the relationship between these cooperatives and municipalities, the transition arena instrument seems out of view at first glance. Municipalities merely face the practical consequences of this instrument: their municipality now has cooperatives. This is a passive role and they do not necessarily have to do anything at all. However, when a municipality celebrates the presence of these initiatives and names them in their plans, a more active role is in place. When the realization of their goals is dependent on these people, a passive approach is no longer fitting. To which extend this is true, is assessed in paragraph 3.2.1.

Within the instruments presented by Rotmans (2003) the transition arena is the most interesting one, even in this study. For each municipality in this research goes: they have citizens'

cooperatives active. All cooperatives in the country together might not be a small scale experiment, they sure are for each municipality. Especially when this municipality counts on these initiatives to materialize their goals. Therefore the use of the transition arena instrument is very relevant for these municipalities, as these cooperatives are the front runners in the transition arena and the municipality is the relevant government in this case. Throughout this study, the term transition arena is used rather broad. This is because of the importance of this instrument: it functions as the basis of policy and agreements between the municipalities and the initiatives. Most forms of communication between municipalities and cooperatives regarding their common trajectories for cooperatives and municipalities are seen as parts of the transition arena. The idea behind this, is as follows: the transition arena is, according to the theory, the ideal form of communication and agenda setting. Throughout the executing phase of this study, not one respondent indicated that a transition arena as described by Rotmans (2003, 2014) was present. This calls for a new, working definition of the transition arena. The working definition used in this study identifies a full transition arena, a partial transition arena and no transition arena at all. The full transition arena is compliant with the theory. The partial transition arena indicates that there is communication between the cooperatives and the municipality, however not in the actual form of the transition arena: for the communication to be an actual transition arena, they would need to include all elements mentioned above. When there is next to no communication at all regarding these subjects, the transition arena is lacking. This definition is chosen to stay in touch with the leading theory of Rotmans (2003), whilst maintaining flexible enough to apply the term on the studied cases.

### 2.2.3 The supporting role

During the pre-development phase, a supporting role of governments is the most constructive. Supportive means in this sense that a foundation is created for the actors to build a transition upon. A government should bring together the innovating parties and create the right circumstances for a renewal. This should also be an active role for governments in a transition: they need to draw out the outlines of what fits their end goals and what does not. To keep actors involved, a government constantly must translate their long-term goals to short-term goals. However, a government is not the one to start a transition, hence the supporting role. A government is mere the one to make it possible and has to level with the other involved actors. When a government pushes a transition too much, it might slow the transition down (Rotmans, 2003, p.84; Hufen, 2016).

### 2.2.4 The facilitating role

During the take-off phase, a government should take on a facilitating role. This means they are less dictating and letting loose. The actors themselves are picking up on the transition and society is largely accepting or appraising the changes. Governments need to monitor the changes and be aware of bottlenecks. They can relieve these by making new or changing old legislation and provide financial stimulus by granting funds or tax breaks (Rotmans, 2003, p.84-85).

### 2.2.5 The active role

In the acceleration phase, governments have to take an active role monitoring innovation and progress, spotting problems and further providing a legislative and financially viable climate for the relative quickly changing playing field (Rotmans, 2003, p.85).

### 2.2.6 The securing role

The securing role comes last. This is the point where the transition is complete or nearly so.

Governments should actively monitor ongoing processes and changes and further anchor the status quo in legislation (Rotmans, 2003, p.85).

## 2.3 Conceptual framework

The theories in paragraph 2.1 are adapted to the conceptual framework in this paragraph. This framework serves as the basis of this research. Due to complexity reasons, the *new instruments* from paragraph 2.2 are left out. Including these in the framework would result in a very messy in and hard to comprehend model.

For the sake of explaining the conceptual framework, all examples are based on PV. This is the most common use case for the citizens cooperatives. For other use cases, like wind energy or raising awareness for the energy transition, the basic principles remain the same.

As discussed in the first chapter, there is a rapidly growing number of citizens uniting themselves in cooperatives where renewable energy is produced. This is the *activation of actors* in the figure below (figure 6). This is the first of the three most important factors in this model. The other two are *(used) potential* and *connectedness*. This connectedness is the same as in Gunderson and Holling's (2002) model. These three together are the main pillars of the transition in this study: they describe how much of the energy production is produced in a durable way and how rigid (connected) the new means of energy provision is.

The *activation of actors* is the only factor influencing the *(used) potential*. No actors, no investments, no potential to be used. The *(used) potential* in turn affects the *connectedness*. The more renewable energy is produced this way, the more actors are involved and dependent on this energy and the more rigid the system becomes. The *connectedness* itself influences the *activation of actors* through an *urgency of change*, as coined by Geels & Kemp (2000). The more people are aware of the possibilities and that a transition is likely to happen, the more likely they are to participate in it. Or, in some cases, even hear of an alternative means of power which they were previously unaware of.

The *(used) potential* influences the *technological development*. The more money is spent on producing PV, the more money is available for upscaling factories, streamlining transport systems and doing research and development. This contributes to the *connectedness* and *financial possibilities*. PV with a lower price and higher output will become available. This influences *connectedness* and the *activation of actors*. Being part of the transition becomes more accessible and financially more viable.

The more actors become activated, the more pressure they can issue on the *position of the government* to help them achieve their goal. This can either be through *financial possibilities* or *legislative possibilities*. *Financial possibilities* could for example be subsidies or tax breaks. *Legislative possibilities* could be the cancellation of laws which make the transition harder to fulfill or accepting new laws that force or facilitate certain aspects of the transition to happen. These factors will in turn influence the *activation of the actors* again. Lastly, the *legislative possibilities* influence the *connectedness*. By removing restricting laws for example, the overall structure will become more rigid.

This conceptual model is on first sight more based on the adaptive cycle by Gunderson and Holling (2002) than on the other two theories that Rotmans lays at the foundation of his theory (i.e. literal use of words). In particular the part from step 1 to step 2 (figure 1). However, the arrows portrayed in this conceptual model, are similar to the arrows up and down in figure 3. They are all influencing the total state of the transition. Therefore, the three pillars of this conceptual model (activation of actors, (used) potential and connectedness) slide over the S-curves depicted in the

theories by Geels and Kemp (2000) and Rotmans (2003) in figures 3 and 4. This S-curve is also the part from 1 to 2 in the Gunderson and Holling (2002) theory (figure 1). The theories used here and as explained in paragraph 2.1 include the dimensions time, scale and progress in the energy transition. The conceptual model here does not explicitly include time and scale. Whereas the mentioned theories are dynamic, this is a more static representation. The conceptual model can be seen as a point on the *graph of prevalence* by Geels & Kemp (2000), so to say. See figure 5. The conceptual model in this study focusses on a certain point in time (now) and is a visualization of how the little arrows from various domains influence the prevailing of the transition.

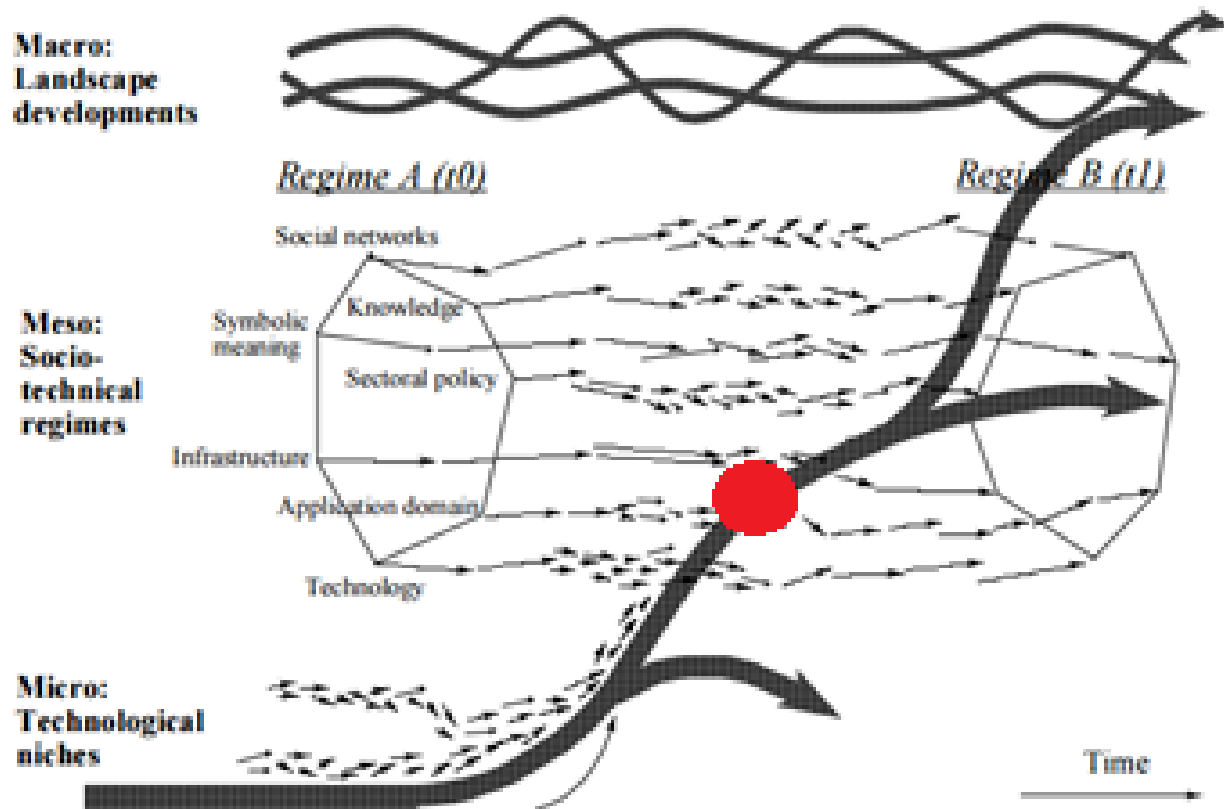


Figure 5 – The red dot indicates where the in this study used conceptual framework fits in the Graph of Prevalence (source: Geels & Kemp, 2000, edited)

In this research, the question is “How can Dutch municipalities provide a constructive approach towards energy producing citizens’ cooperatives to advance the energy transition?”. The three pillars mentioned earlier are perceived in this study as the main measurements towards a completed energy transition. Whilst all three are very important, a wicked problem like this is hugely complex and the focus lies mainly on the pillar *activation of actors* and the influence of the *position of the government*, with the last being the municipal government in particular. This puts this research largely in the micro- and meso-scale. Other parts of this conceptual model are there mainly for understanding the bigger picture and may get named, but are not an active part of this research. There of course other factors outside of this conceptual model of influence, but these too are not an active part of this research paper.

Currently, the energy transition is in the acceleration phase, breaking away from the technological niches (micro-level) towards socio-technical regimes (meso-level) and starting to move faster, as will be supported later in paragraph 3.2.3.

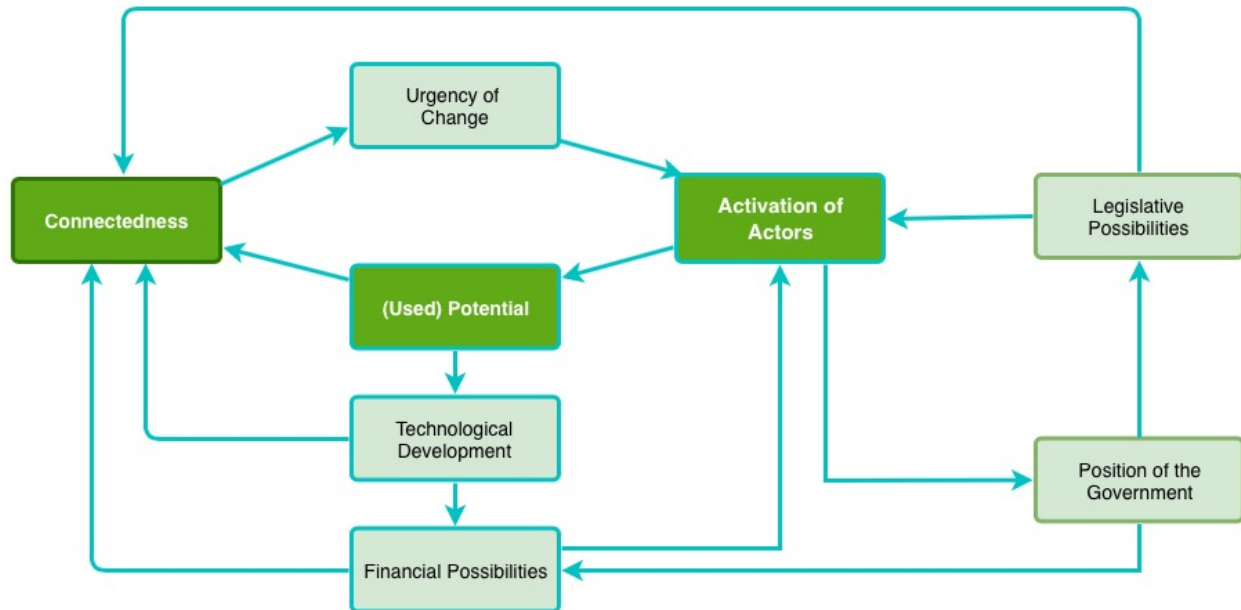


Figure 6 – Conceptual model. These are the relevant factors influencing the current state of the transition. The three pillars of the transition (connectedness, (used) potential and activation of actors) are the ones to be measured. The outcome is the state of the energy transition.

### 3. Research methodology

This chapter zooms in on the used research methodology in this paper. In the first paragraph, the used research strategy is disclosed. The second paragraph looks at which cases are relevant for this research. This is done by gaining an insight in municipal policy and matching this with the activity of citizens cooperatives in these municipalities. The last paragraph, 3.3, describes the way the gathered data will be analyzed.

#### 3.1 Research strategy

This paragraph describes what kind of research strategy is used in this paper. The central question of this research - "What is the most constructive approach of Dutch municipalities towards energy producing citizens cooperatives to advance the energy transition?" - is a very broad one. This has to do with the fairly new nature of this topic and the amount of aspects involved with answering this question. In first instance, this is circumscribed with sub-questions. However, this study has a more *explorative* nature: uncovering new aspects with a more in-depth approach. A question like this, with many aspects and unforeseen twists, is hard to answer right with quantitative research. One could call qualitative research more *agile* (Verschuren & Doorewaard, 2007). With qualitative research, the researcher attempts to get as close to the subject as possible: reconstructing the *actor perspective* plays a primary role (Vennix, 2011). Since this research is an addition to a specific element in the activation of actors in the energy transition, this approach suits very well. Where qualitative research has the advantage of being very thorough, the amount of time needed per respondent is relatively high (Verschuren & Doorewaard, 2007). This limits the researchers to just one or several respondents to base the results upon. Since a single case would not be enough to draw generalizable conclusions, the multiple case study would prove the most useful strategy here. This provides the opportunity to do an in-depth research with several respondents and compare their cases for the best external validity feasible within the possibilities of this research (Verschuren & Doorewaard, 2007). During the research, the hierarchic method is used (Verschuren & Doorewaard, 2007). This means that first all interviews are performed and afterwards the data is processed. This provides easier processing of the data and speeds up the research overall.

The cases are studied by the means of a standardised open-ended interview (Vennix, 2011). This provides a structured conversation between the researcher and the interviewee, whilst maintaining the opportunity for the interviewee to tell the whole story. In practice this means that the interview will start with some general questions about the interviewee and the case, followed by questions about the (former) presence of each policy instrument and how the interviewees have experienced this. For a complete overview of the interview, see appendix A.

#### 3.2 Cases

As said, this study follows the multiple case study design. Therefore, multiple cases must be selected. To get a proper insight in which cases are interesting and relevant, the next section will look into the approach of municipalities regarding renewable energy and citizens cooperatives in particular. Thereafter, an overview of citizens cooperatives per city is provided, to match the municipalities directives to the reality. From this comparison, the first cooperatives will be approached. An ideal situation for this research would be to interview all cases in a municipality and, as an addition, an interview with the municipality itself. Since the cooperatives are a lot alike in structure, legislation they have to deal with and goal, they are quite likely to know one another. This means that snowball

sampling for further interesting cases is a very viable option to gain better insights in the overall situation (Verschuren & Doorewaard, 2007). For the most comprehensive research results, a failed initiative would provide itself very useful: it would give a unique insight in what could obstruct an initiative to succeed. Since the LEM only registers producing or to be producing initiatives, snowball sampling would provide a very helpful tool here.

Throughout the research, it has become apparent that several cooperatives gave similar answers in the larger municipalities. To verify whether this remained the case in smaller municipalities, the scope has shifted from a complete, in-depth picture of just two municipalities to a focus on just the cooperatives' side of the story but distributed over more municipalities.

### 3.2.1 Municipalities' approach

To assess the stance of municipalities on the energy transition, the research will look at the so called *structuurvisies* (structure visions). These are documents written by the municipalities wherein they lay out their (spatial) plans for a coming timespan. In this assessment, the structure visions of Amsterdam, Arnhem, Den Haag, Nijmegen, Rotterdam and Utrecht are scanned. These visions serve as the basis for power grid operators to decide where their infrastructure should be reinforced due to a suspected emergence of decentralized energy production (SER, 2013, p. 84). An important note to this scanning, is that the huge rise in the number of citizens cooperatives is something of the last couple of years and the basis of this phenomenon is laid in the 2013 *Energieakkoord* (SER, 2013, p. 82). Therefore, structure visions written before this date are likely not to include these initiatives.

The structure vision of Amsterdam is looking at the period towards 2040. This document mentions specifically that the city needs solar panels on the roofs of houses and offices in order to achieve its energy goals. It also mentions that to realize this, current legislation needs to be adjusted (DRO Amsterdam, 2011, p.149). In further plans for renewable energy, the necessity of citizens cooperatives is described. The document *Schaalsprong Zon: uitvoeringsprogramma 2016-2018* [upscaling solar energy: program of execution 2016-2018] describes how Amsterdam aims to achieve a more sustainable energy supply (Gemeente Amsterdam, 2015). The municipality states that they will help the citizens cooperatives professionalize, help them find suitable roofs through the *Amsterdamse Dakendeal* [Amsterdam Roof Deal], help find temporary fields for PV, will continuously analyze their own legislation, try to change national legislation, will make roofs of municipal buildings available to citizens cooperatives and will help finance projects through the *Duurzaamheidsfonds* [sustainability fund] (Gemeente Amsterdam, 2015). The more recent *Routekaart Amsterdam Klimaatneutraal 2050: stap 1* [road map Amsterdam climate neutral 2050: step 1] is a step on the path of the plans of making Amsterdam climate neutral (Gemeente Amsterdam, 2019). These plans are not complete however and this first step is an invitation to the inhabitants of Amsterdam. It addresses the task of making Amsterdam more sustainable as one to be done together with its inhabitants. This document does not explicitly mention the role citizens cooperative, but cannot be viewed as a complete policy document. The resulting road map is planned for late 2019 (Gemeente Amsterdam, 2019).

The structure vision of Arnhem looking towards 2020 to 2040 does mention a transition in energy and the goal to become CO<sub>2</sub> neutral by 2040, but not specifically the need to involve individual or cooperating citizens in this (Gemeente Arnhem, 2012, p.44). In the more recent report *Energie made*

*in Arnhem 2015-2020*, the municipality states the urgency for more PV energy and the fact that not every household has the means to use these themselves. There is mentioned that five PV fields would provide a solution for this, but not with a clear mention of citizens cooperatives (Gemeente Arnhem, 2015, p.26). The 2017 update of this plan does mention the Rijn en IJssel Energie cooperatie – an energy producing citizens cooperative – on several occasions as in integral part to achieve their goals (Gemeente Arnhem, 2017)

The structure vision of Den Haag looking forward to 2020 does not mention any specific energy goals (Gemeente Den Haag, 2005). In more recent documents, there are goals mentioned for sustainable energy and beside from minor mentions of citizens cooperatives as small successes, they do not appear explicitly in plans (Gemeente Den Haag, 2015). The municipality has been providing subsidies for PV from 2011 to 2014 but has since stopped doing this. Reasons provided are the improved performance and reduced cost of PV and national subsidies that should provide adequate incentive to procure PV (Gemeente Den Haag, 2014, p.8). Another document shows something wholly different: the *Haagse Energieakkoord* [The Hague Energy Agreement] is an initiative of the municipality and has been signed by several cooperatives. In this document, plans are laid out to make the energy transition succeed (Gemeente Den Haag et al., 2018)

The structure vision of Nijmegen aimed at the period towards 2045 states the municipality wants to be independent from fossil fuels by 2045. It is written that they encourage citizens cooperatives and there is even a special project group from the municipality mentioned in the structure vision: Power2Nijmegen (Gemeente Nijmegen, 2013, p.31). However, aside from one relatively large project, there does not seem to be a big push for more of these (Gemeente Nijmegen, 2015, p.5).

The structure vision of Rotterdam looks forward to 2030. Rotterdam aims to half its CO2 output by 2025 and wants to achieve this, among other things, by switching to renewable energy. There is no specific mentioning of involving individual or cooperating citizens here (Gemeente Rotterdam, 2007, p.90). In the *Programma Duurzaamheid 2015-2018* [Sustainability Program 2015-2018], the municipality recognizes the possibilities of the large number of flat roofs it has and mentions collective PV Projects (Gemeente Rotterdam, 2015).

The structure vision of Utrecht for the period towards 2030 does not make any explicit mentions of energy (Gemeente Utrecht, 2004). In the more recent *Energy Agenda* (Gemeente Utrecht, 2015), there is set a goal for energy preservation and production and local initiatives are mentioned. However, citizens cooperatives are not mentioned. The municipality thinks there are not enough roofs available for the necessary energy production and mostly aims at bigger projects. In addition to this agenda, there have been multiple dialogues between municipal officers, citizens, corporations and other actors. This resulted in the *Regietafel Energietransitie Utrecht* [Directing Platform Energy Transition Utrecht], which can be best described as a transition arena on municipal level. Apart from a knowledge institute, all elements are there (Gemeente Utrecht, 2017).

These documents give a broad indication of the standpoints of these municipalities. The least involved appears to be Rotterdam. They do recognize the possibilities of rooftops and the need for an energy transition, but do not name citizens cooperatives. All other municipalities are in some way or another embracing the citizens cooperatives. Nijmegen has a very large one, but does not seem to push

for more. The Hague has a formal agreement with their cooperatives, which aims at a fruitful collaboration. Arnhem has made a cooperative an integral part of their plans and Amsterdam has several financial aides at the disposal of cooperatives. Last but certainly not least, Utrecht has incorporated the instrument of the transition arena in their plans.

### 3.2.2 The presence of citizens cooperatives

According to the LEM 2017, there are 17 cooperatives active in the afore mentioned cities (Schwencke, 2017). Data of the LEM 2017 is used, whilst LEM 2018 does not come with the complete oversight of all cooperatives in the country that the LEM 2017 does (Schwencke, 2017, 2018). Of these, there are five in Amsterdam, two in Arnhem, five in The Hague, one in Nijmegen, one in Rotterdam and two in Utrecht. To assess the applicability on this research and get a first impression of how they function, there will now follow a brief overview of the cooperatives per city. The information is mainly based on their own websites. Where available, this is complemented with sources that mention these cooperatives.

#### Amsterdam

According to the LEM 2017, Amsterdam has 5 citizens cooperatives. The first is Amsterdam Energie. This is indeed a citizen's cooperative that provides PV space for people with not enough roof space. The cooperative is linked with om, which is a cooperative between 35 citizens cooperatives and acts as the official energy supplier. The website is oriented at current and potential members of the cooperative and does not contain public information about (dis)agreements with the municipality or other organizational matters. The second cooperative is Zuiderlicht. They too provide PV space. As official energy supplier, they are linked with Greenchoice. There is little information about (dis)agreements with municipalities, but there are protocols from member meetings. According to these, there are plenty new possibilities for shared roofs and there is plenty of interest, too. The third is Cooperatie Ecostrroom.nu. This is a provider of PV space and is expanding. There is no mention of (dis)agreements with the municipality, aside from arrangements with the Duurzaamheidsfonds Amsterdam (sustainability fund Amsterdam). This fund provides loans for sustainable projects and is not accessible for individual citizens.

The fourth and fifth are Onze (Amsterdam Noord) Energie and NDSM Energie. Both are currently not producing energy. They aspire to produce wind energy, but their locations are not viable due to provincial legislation. The municipality of Amsterdam is working with them to help change this legislation (Trouw, 2016).

#### Arnhem

The LEM 2017 mentions two citizen's cooperatives in Arnhem. The first is Rijn en IJssel Energiecoöperatie. At the moment, they have one project with shared PV space and one more project with wind energy is being set-up. Their official energy supplier is GreenChoice. Disagreements with the municipality are not being discussed, but they do organize collaborated events (Rijn en IJssel Energiecoöperatie, n.d.). The second is SpijkerEnergie. They do not provide PV space yet and only assist in other efforts (SpijkerEnergie, n.d.).

#### The Hague

The municipality of The Hague counts as much as 7 cooperatives. One of these, Langebeesten Energiek is not yet producing energy. They are trying to make this happen in collaboration with Zon op Nederland (Zon Op Nederland, sd). The other 6 are all based on neighborhoods. These are Vogelwijk Energiek,

Buurtenergie Statenkwartier, De Groene Regentes, 070 Energiek and Cooperatie Groen Hofzicht. At least two of these have om as their official energy supplier and at least one has Eneco. The assessment of these cooperatives is difficult, since there are cases where a project from a cooperative splits off as a new cooperative. The LEM 2017 does not appear to be complete on this information, too. These cooperatives all work tightly together by spreading knowledge about companies and financial and technological possibilities.

The available data point to a smoothly running collaboration with the municipality. All these cooperatives but one (Cooperatie Groen Hofzicht) have, on initiation of the municipality, signed the Haagse Energieakkoord in which plans are laid down to make the energy transition in The Hague succeed (Gemeente Den Haag et al., 2018). On top of that, the cooperatives all mention the existence of several fundings from the municipality, e.g. Klimaatfonds Duurzaam Den Haag and Duurzaamheid door Haagse Wijken. The cooperatives Buurtenergie Statenkwartier, de Groene Regentes and Langebeesten Energiek all have the agreement of the municipality to use certain roofs that The Hague owns (De Groene Regentes, sd).

### *Nijmegen*

The first citizen's cooperative in Nijmegen is NovioVolta. Their website does not contain any recent developments, although they aimed to produce energy in Nijmegen in 2018. There is no sign of this yet. They do however produce energy in Beuningen. Once again, this is in the form of providing a shared roof for PV space. The official energy supplier lined with NovioVolta is Huismerk Energie. Other than that, the cooperative is only linked to HOOM, a national cooperative aimed at energy preservation. The municipality has supported NovioVolta by assigning them a project in 2013 and organizing an event in 2014 (Novio Volta, n.d.). On top of that, the municipality has the program Power2Nijmegen which aims at all sorts of energy projects (Power2Nijmegen, n.d.). Another project that is supported by Power2Nijmegen, is the citizen's cooperative Windpark Nijmegen-Betuwe. This cooperative has invested in four wind turbines and is currently producing energy. They too are aligned with Huismerk Energie as their official energy supplier. They are not part of a bigger cooperative (Windpark Nijmegen-Betuwe, n.d.).

### *Rotterdam*

According to the LEM 2017, there is one citizens cooperative in Rotterdam. Blijstroom is a citizen's cooperative with one active project and one more in development. The official energy supplier is Qurrent (Blijstroom, n.d.). Again, there is not a lot to be found on (dis)agreements with the municipality, apart from collaboration with Roadmap Next Economy. This is a joint composition of Rotterdam and The Hague on different subjects, with sustainable energy as one of these (Roadmap Next Economy, n.d.).

### *Utrecht*

The LEM 2017 speaks of two cooperatives in Utrecht. The first, Lomboxnet, has no information on being a citizen's cooperative. It currently acts as a company in smart grids and is therefore not relevant in this research (Lomboxnet, n.d.). The second is Energie-U. Energie-U provides PV space and panels as a citizen's cooperative. They state several different official energy suppliers for different projects. The most recent is om. They make no reference to (dis)agreements with the municipality (Energie-U, n.d.).

### 3.2.3 Current state of the energy transition

For determining the current state of the energy transition, the theory from paragraph 2.1 and 2.2 will be compared with the information in paragraphs 3.2.1 and 3.2.2. As seen in the LEM 2017, the number of citizens cooperatives has greatly increased over 2017. The fact that these cooperatives are becoming increasingly popular alone is a good indication that the technology for decentralized durable energy production, e.g. PV, is becoming ready for mass adoption. This counts for both the practical and the financial point of view. Becoming is a very important word in that sentence: state and municipal subsidies do help in this increasing popularity. However, when looking at The Hague for example, there is to be seen that a municipal subsidy is no longer deemed necessary. This is an indication that the financial aspect of the technology is growing more mature. The growing number of citizens cooperatives is also made possible because renewable energy is not yet available on a large scale. So, whilst the technology is becoming more cost-effective, large energy companies have not yet made a definitive sway towards these new technologies. This can be explained by two factors: first, the national government has made agreements with the big energy companies in the favor of more traditional power generation and killed off the financially most risky transition experiments. This is due to a short-term view, as argued by Rotmans (2014, p.153). What happens now is perceived way more important than what happens in the next 30 years. This is exactly what a transition does not need. The second factor has been foreseen in the theory by Rotmans written in 2003 and confirmed in his review in 2014: the current leaders in the field, i.e. the big energy companies, want to make the most out of their invested money. Therefore, they tend to invest in proven technologies as long as they can, in order to secure their yearly profits.

Based on these data, there is evidence that at the micro level the technology is there to use and a rapidly growing amount of citizens is taking this chance, at least partly made possible by tax breaks, subsidies or special arrangements. The macro level however is not budging yet: the big energy suppliers are still conveying business as usual, supported by the national government. The large number of policies aimed at promoting renewable energy is a sure sign that the meso-level is tagging along. This is supported by several energy companies that identify themselves as sustainable. This points in the direction of the energy transition being in the acceleration phase, as has been assessed by Rotmans (2011) in his report *Staat van de Energietransitie in Nederland* [State of the Energy Transition in The Netherlands].

### 3.2.4 Respondent selection

The original idea to this research was to compare two cities, for example Nijmegen and Amsterdam. Nijmegen because it has one of the largest cooperatives in the country with just over 1,000 participants and Amsterdam because it has a lot of energy producing projects divided over several cooperatives. Throughout the research, several new respondents came into the picture from outside these cities. As they proved to be an interesting addition to the respondents, the focus has been broadened and they were included in the study. This results in a scope that is fully focused on the side of cooperatives, but in an as wide range as possible.

As citizens' cooperatives have varying degrees of professionalization, assessing who is responsible for what from the outside can be difficult. Let alone personal contact information on a publicly available channel. The first respondent was found through attending a lecture during the Radboud University sustainability festival *Groene Week* [Green Week], where a lecturer of the University

mentioned he was contacted by a citizens cooperation to share a University roof with them. After the lecture, communication information was shared and NovioStroom's Paul Eijkman replied positively. The second respondent was found through the same lecturer of the Groene Week. This time not after a lecture, but in personal contact at an event organized by Windpower Nijmegen. This led to an interview with Els Sonnemans, who had been connected with Energierijck in Berg en Dal. After this interview, she stated that Arjen Vernhout and Jos van der Lint would be able to provide more current information, as she herself was not active with the cooperative anymore. They replied positively too and gave a simultaneous interview. The event organized by Windpower Nijmegen also laid the foundation for a contact with Windpower Nijmegen itself. This event was in an orienting part of the research, therefore a concrete appointment was not yet made. This appointment came with another event by Windpower Nijmegen and their spin-off Burgers Geven Energie. There, a more concrete lead was found. An important note: Windpower Nijmegen is the largest cooperative in this research and has undergone several changes in board, with people flowing in and out of it. This is the only cooperative where an interview with a respondent has been rejected in favor of a more suitable respondent. This was made possible through the organogram on the Windpower Nijmegen website and earlier personal contacts. Otherwise, an interview with a less suitable respondent might have been the result. A proposed respondent by the cooperative was Sjon Debie, a current board member of Windpower Nijmegen. However at the time of the foundation, he was not in a position where he would have had contact with the municipality: he was connected through the project from the side of the municipality. Exactly the point of view that was not the focus of the research anymore. The more appropriate respondent was Volkert Vintges. This concludes the first part of the respondent selection. This part is mainly made possible with the snowballing technique. Talk with one person, who points the researcher to the next.

The next part is exclusively cold contacting. The idea of comparing to Amsterdam was still there. Four out of the five Amsterdam cooperatives had been contacted, out of which two replied. The fifth was not contacted since NDSM Energie has a pure focus on entrepreneurs, which places it out of the scope of this interview. Frank van de Boon of Zuiderlicht and Joris van Vuure of EcoStroom have been interviewed. Lastly, Bas van Nistelrooij of the Nijmegen cooperative NovioVolta and Jaap Schoenmaker of the Wijchen cooperative Energiecooperatie Leur have been contacted and agreed to an interview. An overview of all respondents in a table:

*Table 1 – Respondents in this study*

<b>Names</b>	<b>Cooperative</b>	<b>Municipality</b>	<b>Origin of contact</b>
Paul Eijkman	NovioStroom	Nijmegen	Snowballing
Els Sonnemans	Energierijck	Berg en Dal	Snowballing
Arjen Vernhout & Jos van der Lint	Energierijck	Berg en Dal	Snowballing
Volkert Vintges	Windpower Nijmegen	Nijmegen	Snowballing
Frank van de Boon	Zuiderlicht	Amsterdam	Cold contact
Joris van Vuure	EcoStroom	Amsterdam	Cold contact
Jaap Schoenmaker	Energiecooperatie Leur e.o.	Wijchen	Cold contact
Bas van Nistelrooij	NovioVolta	Nijmegen	Cold contact

### 3.3 Data processing

This chapter explains the methods of data processing used in this research. Verschuren & Doorewaard (2007) describe three methods of conducting interviews: written, over the phone and face to face. This research chooses the face to face approach to have the best interaction and possibilities to ask further questions with and of the respondents. The interviews are recorded with a recording device and notes

are made on paper. The latter prove useful for structure during the interview and the recordings are transcribed to written words, wherefrom the results for the research are drawn. The next step in processing this data is coding the interview (Vennix, 2011, p.265). First, a codebook is made with expected indicators for the several instruments mentioned by Rotmans (2013). Then, with the help of the software *Atlas.ti*, the transcripts are coded. Before the actual coding starts, a codebook is made with expected indicators for the used instruments. The coding itself is done with an open view for new indicators, as to shut no leads out. In practice, the indicators on beforehand prove next to useless due to the complex nature of this theory. The instruments mentioned by Rotmans are too intricate and intertwined to rely on simple indicators. The identification of the instruments in most cases is based on multiple sequential sentences. These are added to the codebook. The coding process is done multiple times per interview. First a rough coding, followed by one refinement to gain the best insight in the perceptions of the subjects. These results will be compared to the theory and municipal documents for a conclusion to be drawn. This process is called *triangulation* and very important in qualitative research, due to the low number of respondents researched (Vennix, 2011; Verschuren & Doorewaard, 2007). This increases the external validity of the research.

## 4. Interview outcomes

This chapter goes into the results of the conducted interviews. To get a coherent and complete picture, the cases are, where applicable, grouped per municipality and ordered by maturity. Here, maturity at first means if the cooperative has completed any energy producing projects and at second the actual age of the cooperative. Each cooperative is first described as how they operate and have come to life and thereafter follows a part on to which extend the expected policy instruments as described in paragraph 2.3.1 have been relevant for the cooperative. This is in the best way possible divided in the different phases a cooperative undergoes: the phase leading to the founding of the cooperative, the phase of making plans for the energy producing initiatives, the phase of executing these plans and the 'ongoing' phase, where a cooperative does or does not make plans for a new energy producing initiative. Each case ends with which missing instruments they described and how they could or could have benefitted from those.

### 4.1 Cases

As written above, the studied cases are presented per area of operation and arranged by maturity.

#### 4.1.1 Amsterdam

##### *Zuiderlicht - overview*

Zuiderlicht is the first Amsterdam cooperative to be discussed. The first project and foundation both happened in 2013. From the beginning, there has been one self-employed involved with the projects on a paid basis. The first project was a small one with only 7 PV panels, but in 2018 alone they have completed 7 projects in total, mostly on schools. Collaborating with schools yields several bonuses: The children's parents prove enthusiastic to become members of the cooperative and the schools themselves can incorporate the PV in their lessons by explaining the how and why of sustainability. The latter is what they call 'educational yields'. By teaching the children about the importance of renewables, a new 'coal free generation' is born. They view renewable as the standard and talk about it with their parents, raising awareness.

##### *Zuiderlicht - Relevant policy instruments*

When in the pre-foundation phase, the cooperative received a grant of €5.000,- from the borough of Amsterdam Zuid, where Zuiderlicht has emerged. This is a financial instrument. The grant provided the funds for the official foundation, arranging by-laws, opening a bank account, hiring expertise on how to start up and run a cooperative, print flyers, generate members and negotiate with an energy supplier.

Later, the cooperative has been supplied a roof for generating PV from the municipality. This instrument is a new arrangement. The municipality was not eager to provide the roof of a sports club, but through personal connections, there eventually was made an agreement. Zuiderlicht has the majority of their installations on school roofs and since these buildings are almost exclusively owned by the municipality, the instrument of the new arrangement is applied more often. In these cases, the cooperative is in the ongoing phase, with their first fulfilled project not being a municipal roof. This form of new arrangement does not always run very smoothly. Amsterdam has a large body of officers, each within different services, geographical allocations and specialties. For example: a project with an elementary school in Amsterdam Zuid requires contacts with different people than a project with a high school in Amsterdam Oost. Each of these buildings are overseen by different departments who do things differently and have different experiences that leads them to the choices they make. In terms of the

theory: there is not a clear trajectory that can be followed in this process. This can be attributed to the lack of a transition arena. The project with the elementary school in Amsterdam Zuid has different persons than the project with the high school in Amsterdam Oost. Interests of the service Sustainability – in this case: serving the energy transition – conflict with the interests of the service Real Estate Management: making sure their buildings are well maintained and looking out for the possibility that schools might move some day in the future. This conflict has been attempted to be resolved: a notion from the service Real Estate Management has been sent out to cooperatives. This notion has given insight in what steps to take in applying a plan with Real Estate Management. This would smooth the process for all parties and could be counted as the results of a partial transition arena. However, this notion has been revoked.

Lastly, there are three more financial instruments. These three also fall under the new arrangement instrument. The first is available for most sustainable ideas and is called Duurzaamheidsfonds (sustainability fund). This allows cooperatives to finance up to 2/3 of a project with money borrowed against 1.5% interest. This means that there are less members needed to fulfill a project, making them able to move on more quickly. As the 1.5% interest is lower than the return rate of PV installations, this also makes cooperatives financially more interesting for members. The second instrument has only been made available for four cooperatives, with Zuiderlicht being one of these. The cooperatives could be granted up to €50.000,- if they would be able to double their power output. This grant is not unconditional: it depends on actual realized potential and a project cannot be fully financed with this grant. The third instrument is no longer in use, but has been very interesting and was called Dak voor de Stad (Roof for the City). This arrangement provided a grant of €5.000 or more to businesses and organizations who would make their roof available to cooperatives for generating electricity. The amount granted would depend on the surface made available. The first and last instrument were not restricted to any phase of the cooperative and in this case fell in the ongoing phase. The second instrument was specifically targeted at Zuiderlicht and three other cooperatives and therefore has been exclusively for the ongoing phase.

#### [Zuiderlicht - Missing policy instruments](#)

What Zuiderlicht indicated to find lacking, is mainly to describe as the transition arena instrument, or at least the outcomes of such an arena, and the new arrangement instrument. Because of the several fundings, money is not the main issue. The main issue is space to build new installations. They would like to see a more active partner in the municipality. This can be done through actively designating their own roofs for cooperative development. Another helpful factor is an operable framework for collaboration between the municipality and cooperatives. The aforementioned notion sent out by Real Estate Management was a very good step in the right direction but, as it has been revoked, it does not exist anymore. It would however be of great value to the cooperatives. This could be contributed to through the upcoming Omgevingswet (environment law), which is expected in 2021. Zuiderlicht sees opportunities when new building plans require to incorporate cooperatives. In the nearer future, Zuiderlicht would like to weigh in with bigger projects. There are plans for larger solar farms or generation with wind turbine engines and if cooperatives could contribute, this would be a huge step forward. However, momentarily they are suffering from a reputational bias: cooperatives are seen as groups of volunteers and therefore cannot be professionals.

### *Ecostrroom - Overview*

Ecostrroom started out with their first project in 2012, which was completed in 2014. A very important goal for them is to achieve green targets as efficient, effective and profitable as possible. This works, as they claim to have the highest returns to their members of all cooperatives in the country: 8% over 2017. On top of that, they currently employ about 4 FTE workers: all paid. Ecostrroom works on the so-called 'Rabobank model'. This means that the main cooperative sets up project cooperatives which in principal run their own course from the main cooperative. They have the possibility to buy in tools and services from the main cooperative but are not mandated to do so. Each project cooperation has their own board with at least one member from the main cooperative, so ties are kept close. Currently, there are 9 such project cooperatives. These are not just in Amsterdam, but also in Diemen and Amstelveen.

### *Ecostrroom - Relevant policy instruments*

Every financial instrument that has been relevant for Zuiderlicht, has been relevant for Ecostrroom too. They too draw funds from the Duurzaamheidsfonds and have been making use of the Dak voor de Stad arrangement. The financial instrument of granting up to €50.000,- to four cooperatives was also relevant for Ecostrroom. Not only that, it was partly with the input of Ecostrroom that the outcome had to be 'measurable'. This indicates a partial transition arena: there has been a budget allocation and in dialogue with the cooperatives, policies are made. This is something they see more often in Amsterdam: on a political level, the municipality makes money available for certain projects, goals or ideals and thereafter there has to be made an arrangement with that money. This puts the cooperatives in a luxury, but sometimes awkward position.

Regarding communication with the municipality: Ecostrroom follows a different path with their projects and is less reliant on an agreement with the municipality for the execution of their plans. This means they do not deal with the Real Estate Management that much and rely less on changing points of contact within the municipality. However Amsterdam is still large and described as slow and opaque, this does make for a more positive view. When working together with the municipalities of Diemen or Amstelveen, contacts are more swiftly and results are achieved faster. The machine turning between the points of contact and the politics is a lot smaller and more agile. This makes for quicker planning.

Since Ecostrroom has projects in several municipalities, it is interesting to note the differences. Apart from the communication mentioned above, the main difference is in financial instruments. Where Amsterdam has a lot of money to spend with different arrangements, Amstelveen has to do with their own Duurzaamheidsfonds without any further additional measures. The municipality of Diemen has to do even without this. This makes it harder for cooperatives to secure all the finances necessary to realize a project. This also brings down the cost effectiveness of project. For this reason, Ecostrroom is holding off a project in Weesp. They do have plans there, but are waiting until Weesp has become part of the municipality of Amsterdam, which has more financial instruments.

### *Ecostrroom - Missing policy instruments*

Ecostrroom did not mention any specific instruments to be missing. The first thing that came up, was something they would rather see gone: De Zoncoalitie (sun coalition). This institution is subsidized by the municipality of Amsterdam and competes with the cooperatives. They help apply for SDE, a national subsidy, and pocket some of this subsidy. They would not add much of value on top of that, such as realizing the project itself like cooperatives do. What Ecostrroom wanted to see happen was more space available for installations. Just like with Zuiderlicht, the thing holding them back most is a lack of

expansion room. The municipalities, in particular Amsterdam, could contribute a whole lot here. These two elements could both be addressed in a transition arena.

#### 4.1.2 Nijmegen

##### *Noviostroom - Overview*

Nijmegen's first cooperative carries the name Noviostroom. The idea behind Noviostroom came about in February 2018 and the official founding was in September 2018. Being a new player, they run on a board of three volunteers and are nearing completion of their first PV project. The largest part has been allocated to members and a successful finalization seems certain.

##### *Noviostroom - Relevant policy instruments*

Being run by volunteers, the how and where of communicating with a municipality are very unclear. This makes the first start very hard. There have not been clear indications of municipal help for this cooperative. What did help massively is the foundation Burgers geven Energie (Citizens provide Energy). This foundation aims to share information between starting and running cooperatives. If there is a connection with the municipality, this is not a clear one. All instruments are lacking.

##### *Noviostroom - Missing policy instruments*

Noviostroom had high hopes for launching a cooperative in Nijmegen, Green Capital 2018. However when shifting to action, the municipality proves an opaque partner. The platform Power2Nijmegen reacts, but is not a pro-active partner in providing help or funding. The first lacking instruments here in the pre-foundation phase are the results of a transition arena and the financial instrument.

In further phases, the communication is still an important factor to improve. Every neighborhood has their own website and the cooperative has joined a couple to promote their cause. For their specific project however, around 10 would be relevant. A single contact for initiatives like these would prove very helpful in getting things started. Second, Noviostroom has gotten wind of some places where the municipality provides a database with suitable roofs for cooperatives. This is a very helpful tool that too can help cooperatives hit the ground running or expand. Lastly, an organization where cooperatives can organize themselves to make sure they are not competing with each other and distribute tasks is something that could balance the tasks. These three items are all new arrangements which could result from a transition arena, where the second item counts as constructive technology assessment and the last item also being a monitoring instrument and a new coalition.

##### *NovioVolta - Overview*

The second cooperative in Nijmegen is named NovioVolta. This cooperative has been founded in September of 2013, the same year as the original idea came about. NovioVolta is an exception in this research, as it did not initially focus on energy production but started out as a reseller of renewable energy supplied by Huismerk Energie. After this, Nijmegen approached them for an energy savings project. This yielded poor results since for this project, NovioVolta depended on rehabilitating volunteers, which made it very hard to finish the trajectory. The cooperative, still looking for projects, came into contact with the neighboring municipality of Beuningen, got funded a flex office by them, weighed in on their Energy vision and had regular informal contact on a broad range of subjects regarding energy and sustainability. Weighing in on the Energy vision brought them in contact with the waste energy plant ARN in Weurt, where NovioVolta started up their first collective PV project. This was 2016. This project however did not reach maturity due to lack of funding and public interest. In the

meantime the cooperative has been approached by several groups in Nijmegen to help with collective PV, but those all 'went dark' at one point or another. Either because the partnership would not work, or because NovioVolta did not hear back from them again. The cooperative has been disbanded at the end of 2018.

#### NovioVolta - Relevant policy instruments

In the pre-founding phase NovioVolta received a startup grant from Power2Nijmegen of €10.000,-: a financial instrument and special arrangement. This has been used for the founding, their website, office space and insurance. During plan making, Nijmegen assigned a project to the cooperative: another financial instrument. This is where most influence from the municipality of Nijmegen ends. Beuningen invites them in a partial transition arena: the cooperative weighs in on their energy vision and has a financial and special arrangement for NovioVolta: the cooperative gets an office, meeting space is made available, the municipality pays for some print works when needed and helps out in communication employees. This all to motivate the project on the Weurt waste energy plant and keep the cooperative in their partial transition arena. Lastly, the Beuningen has made use of the learning instrument by constantly trying to figure out how they could benefit from the cooperative and vice versa: a result of this partial transition arena.

#### NovioVolta - Missing policy instruments

All things that NovioVolta indicated as missing, can be accounted for due to the lack of a transition arena. First, the municipality of Nijmegen did not provide a handhold for the starting cooperative. NovioVolta was happy with the startup grant, but very unsure about what use Power2Nijmegen could be for them. As NovioStroom encountered more recently, Nijmegen is an opaque partner. Active use of the monitoring instrument, strategic niche management and constructive technology assessment could prove very useful here. When using these instruments, the municipality could distribute roles between the different initiatives and make them all as useful as possible. At this time, the foundation Burgers geven Energie could be the one to fulfill this role instead of the municipality, leaving the municipality exempt.

As was an issue for the Amsterdam cooperatives, NovioVolta encountered that municipalities tend to think that "a cooperative is an organization of volunteers and therefore should not have to cost money". Therefore the initiative cannot grow or hire the expertise to professionalize themselves. Relying on volunteers to execute plans makes the results very unstable, since volunteers have a lesser connection with the job at hand than paid workers and usually cannot spend as much time with the cause. All in all, this makes that cooperatives do not feel themselves taken seriously. This is reinforced by the facts that after contributing to the Beuningen energy vision, the name NovioVolta was removed from the final version and some other promises they made that have not come true.

A last mention of a hiccup in communication, was when the municipal officer in Beuningen that NovioVolta had regular contacts with was out of office due to medical reasons and he was temporarily replaced. This made the communications different and less regular. Although this is not particularly something to be addressed by policy makers, it is of influence to the functioning of a cooperative. Other initiatives mentioned it too: sometimes, achieving your goal or not seems to rely solely on the person you are dependent on for approval or other communications.

### Windpower Nijmegen - Overview

By far Nijmegen's largest cooperative is Windpower Nijmegen. Although it currently only has one energy producing project with a second in the making, this one project has 1.013 members and it produces 10 megawatts at peak power. This would be sufficient for 7.100 households. The cooperative came about after the municipality tried to approach this four wind turbine project with corporate partners but failed. Following in December 2012, Nijmegen tried a citizens cooperative approach and came into contact with the Gelderse Natuur- en Milieufederatie (Nature and Environment Federation of the province of Gelderland) [GNF], which took control of the project. Together they created the foundation Wiek-II which was the developing party of the project. They would yield the shell of a cooperative which was to be filled with citizens. This foundation had three main employees on a paid basis and was supported with various other experts in many fields. This resulted in the extremely fast conclusion of four operating wind turbines in December 2015. Currently, the cooperative is working on a 4.9 megawatts peak power PV field, which is scheduled to be built in 2020.

### Noviovolta - Relevant policy instruments

As this project is born out of a request by the municipality, there were a lot of instruments used. Communications were set up very smoothly, but is this counts as a partial transition arena is doubtful. In this case, it is better described as close project management. Contacts between Wiek-II and the necessary municipal officers and aldermen were quick and to the point. On top of that, there was made use of the *Crisis- en herstelwet* [crisis and recovery law], which sped up the process even more and can be seen as a special arrangement. To aid more, the municipality arranged the development plan both in workers and finances: another special arrangement and uncertainty management. Additionally, the municipality was for a major party financially accountable up until the point where the project was complete and the bank and members put their money in. A special arrangement and financial instrument. To complete the instruments in the pre-founding stage: as part of the request, the municipality had determined that the project should contain wind turbine engines and where they would be built. This is constructive technology assessment and uncertainty management.

In the plan making phase, the smooth communications continued: Nijmegen made a municipal officer of ground affairs available to aid in the process. Additionally, the municipality arranged for a wind speed measurement to calculate the yield of the turbine engines. This is uncertainty management. During the execution of the plans, the contacts with the municipality remained very close.

In the ongoing phase of the cooperative, the municipality pushes Wiek-II and the spin-off Burgers Geven Energie to stimulate other cooperatives in the region, a form of creating a partial transition arena. Another influence in this phase is the tender of 17 municipalities including Nijmegen for sustainable energy that the cooperative has won. This boost for Windpower Nijmegen is a form of the niche management instrument and constructive technology assessment. However a good step, it is noticeable that the municipality of Nijmegen is less enthusiastic on this project, as the exact location where the expansion in the form of a solar farm is up for debate and changes from time to time.

### NovioVolta - Missing policy instruments

In this interview, there were not a lot of missing instruments brought up. The main thing missing is the smoothness of the first project in the second project. Trajectories with municipal officers tend to be sluggish and where there were municipal officers designated to tread this sluggishness the first time around, the second project lacks this. Ergo: a proper transition arena is wished for.

### 4.1.3 Berg en Dal

#### *Energierijck - Overview*

The one founded cooperative in Berg en Dal is called Energierijck. There has been an initial attempt from the municipality itself to start up a citizens energy cooperative, but this did not succeed. Later on, two self-employed men who were already acquainted with and within the municipality filed a proposal to initiate a second attempt. In this proposal, they envisioned four PV locations throughout the municipality acting as one project. This was an important step, since the municipality exists since January 2015 and used to be three different municipalities containing 12 villages. Inclusivity is considered key in this plan, avoiding civil backlash. Furthermore, there was included that they would have meetings with the municipal body every 6 weeks to discuss progress and viability. On this basis, they were granted to have their estimated working hours paid out and would produce the outlines for a cooperative to be filled in with participants. This proposal was accepted in late 2016. Over the course of 2017, participants and viable rooftops were acquired and the formal foundation of the cooperative was on December 11<sup>th</sup> 2017. The four PV locations are to be put in use between December 2018 and April 2019.

#### *Energierijck - Relevant policy instruments*

In the pre-founding stage, the municipality supported the cooperative by paying the necessary hours to lay out the plans. This is a special arrangement as well as a financial instrument. From this phase to the plan making phase, there have been regular and swift communication with the relevant people in the municipality. This has most elements of a transition arena: a front runner has the space to think about their ideas freely and in dialogue with the municipality, relieving bottlenecks as they go. Additionally, there has been regular feedback every 6 weeks to address the feasibility of the project. This is an instrument for the municipality, but initiated by the self-employed in this project. In the plan making phase, the municipality came to the rescue when the owner of a roof pulled out of the agreement to use their roof. The municipality supplied an alternative. This is a new arrangement. Lastly, in the ongoing phase, the municipality has become a member of the cooperative and is buying its electricity.

#### *Energierijck - Missing policy instruments*

Regarding improvements in the process, there are two main things. First: projects like these are relatively new. Every municipality has to learn to help a cooperative at their best. Municipal officers and aldermen are not used to the concreteness of such projects. This could be addressed by inviting more actors to the talks in the transition arena. Second: there were municipal elections during the project. This resulted in a new alderman being appointed, who had to be filled in of his role. The momentum gained with the previous alderman was lost and this made the project sluggish at some point. Again: this is seen as a general problem when in a transition arena with municipalities, especially with policies that have not yet been stabilized.

### 4.1.4 Wijchen

#### *Energiecooperatie Leur e.o. - Overview*

The one cooperation in Wijchen is called Energiecooperatie Leur e.o. It is named after a small village within this municipality where their first project concluded. After this first project, they completed two more within the town of Wijchen. The first project came about after the board of a care facility in Leur wanted to become more sustainable in 2013. Several people wanted to help and stumbled upon a provincial contest which corresponded with their goals. The group applied and won, granting them a

startup fee. This project included generating electricity and that is where the foundation was laid. In 2015 the cooperative was founded and the first electricity was generated. In 2016 the second project was realized and the third came to life in 2018. As of right now, the cooperative is in debate about their future: stay with project like these, are move their focus to other branches like insulation or disconnecting homes from the gas grid.

#### Energiecooperatie Leur e.o. - Relevant policy instruments

The second and third project came about after the municipality had done feasibility studies. These plans were handed over to the cooperative and they could fill them in with their members. This is uncertainty management and constructive technology assessment from the side of the municipality. The municipality also bears the cost of researching whether a roof can support a PV installation or not. Again, this is uncertainty management. At the second project, the expected provincial subsidy was expired. The municipality jumped in and provided the financial support. This is a financial instrument. These instruments all came about in the plan making phase. The last mention of the municipality in this phase, is that of roof owner. The third project has been done on a municipal roof, which is a new arrangement. Over the lifetime of the cooperative, they have regular contact with the alderman on sustainability and other municipal officers. This indicates a partial transition arena. This contact ranges from participation in the sustainability vision to questions on PV to offering an energy coach training to members of the cooperative.

#### Energiecooperatie Leur e.o. - Missing policy instruments

There were no concrete missing instruments mentioned.

## 4.2 Results

This paragraph first gives an overview of the encountered instruments and compares them to the ones expected to have appeared. Paragraph 4.2.3 followings with a brief overview of the differences found in municipality size and how well transition arenas are set up. These results are further elaborated and in chapter 5.

### 4.2.1 Expected policy instruments

As a reminder, the in paragraph 2.3.1 named policy instruments are: Transition arenas; Strategic niche management; Uncertainty management; Policy laboratory; Constructive technology assessment; The monitoring instrument; The learning instrument; New arrangements and New networks and coalitions. As stated in paragraph 3.2.3, the energy transition is currently in the acceleration phase. According to the multi-phase theory as explained in paragraph 2.1.3, governments should take on an active role. As a refresher: governments have to take an active role monitoring innovation and progress, spotting problems and further providing a legislative and financially viable climate for the relative quickly changing playing field (Rotmans, 2003, p.85). To match the interview outcomes with the theory, the following part is again categorized by the phases that a cooperative goes through in the best way possible: pre-founding, plan making, plan executing and ongoing.

Pre-founding: The most encountered instrument in the pre-founding phase is financial. Out of the seven cooperatives, five have received financial aid in this phase. The cooperatives claim this to be extremely helpful for all legal necessities, making a name for themselves, doing research, and so on. Out of these five, two can be seen as a special arrangement or otherwise legislative procedure. Windpower Nijmegen had the municipality financially accountable until there was a project for investors to put their

funds and Energierijck had their working hours paid for by Berg en Dal. Other instruments seen in this phase were almost exclusive for Windpower Nijmegen due to the special nature of the project. These instruments are more special arrangements, a legislative instrument, another financial instrument and constructive technology assessment. The workers for Energierijck themselves initiated the uncertainty management and monitoring instruments. See table 2.

Table 2 – Pre-founding: Used instruments (source: author; N=8)

Cooperative	Municipality	Instrument	Form
Zuiderlicht	Amsterdam	Financial	Startup grant
Ecostrroom	Amsterdam	Financial	Startup grant
NovioVolta	Nijmegen	Financial	Startup grant
Windpower	Nijmegen	Financial / special arrangement	Municipality is financially accountable
Energierijck	Berg en Dal	Financial / special arrangement	Working hours paid
Windpower	Nijmegen	Special arrangement / legislative	Crisis- en herstelwet
Windpower	Nijmegen	Special arrangement / uncertainty management / financial	Make municipal officers available
Windpower	Nijmegen	Constructive technology assessment / uncertainty management	In the request, Nijmegen described wind turbines to be placed and where to do so
Energierijck	Berg en Dal	Uncertainty Management / Monitoring	Meetings every 6 weeks to monitor viability

Plan making: In the plan making phase, the most encountered instrument is, again, the financial instrument. This is partly because two of the seven cooperatives operate in Amsterdam: a wealthy municipality that likes to spend money on anything green. Besides the Sustainability fund (financial instrument and new arrangement) which provides a huge agility boost for Ecostrroom and Zuiderlicht, there are more new arrangements there. Most noteworthy, the grant of €50.000 each if they were able to double their capacity: a financial instrument, new arrangement and constructive technology assessment. Additionally, there has been the Dak voor de Stad arrangement, which provided a grant to businesses and organizations who provided space for cooperative electricity generation: financial instrument and new arrangement. Ecostrroom encountered a similar Duurzaamheidsfonds in Amstelveen. NovioVolta has had an arrangement with Beuningen where the municipality provided an office space for them, free of charge: a financial instrument. Windpower has the same financial instrument (and new arrangement) here as in the pre-founding phase: the municipality is largely financially accountable. Lastly, Energiecooperatie Leur has encountered a financial instrument with the municipality of Wijchen: when a provincial subsidy fell through, the municipality covered the gap.

The second most seen form of support in the plan making phase is providing a roof. The instrument here is a new arrangement. This form of support has been given to Zuiderlicht, Energierijck and Energiecooperatie Leur. The case of Zuiderlicht came to be after pressuring the municipality, but did not use further instruments. The case of Energierijck is more noteworthy, since the use of this roof was not planned: it was an emergency solution after another party dropped out of the agreement. The case of Energiecooperatie Leur has seen the most instruments at work with this support. The municipality of Wijchen has done feasibility research for their two roofs for cooperative PV and handed these projects over to the cooperative. This incorporates the instruments of uncertainty management, constructive technology assessment and strategic niche management in the case.

Windpower Nijmegen has also seen something similar as Energiecooperatie Leur: the municipality of Nijmegen used uncertainty management in the form of performing wind speed measurements to indicate financial viability for the project.

Lastly, NovioVolta indicated two instruments by the municipality of Beuningen in the plan making phase: they were asked to weigh in on the Energy Vision and had regular contacts on anything sustainable. A good example of the municipality actively incorporating the cooperative in their communications and a partial transition arena. By actively trying to figure out how they could help the cooperative and benefit from the cooperative, Beuningen made good use of the learning instrument. For an overview of these instruments, see table 3.

Table 3 – Plan Making: Used instruments (source: author; N=8)

Cooperative	Municipality	Instrument	Form
Zuiderlicht	Amsterdam	New arrangement	Making a roof available
Zuiderlicht / Ecostrroom	Amsterdam	Financial / new arrangement	Duurzaamheidsfonds
Zuiderlicht / Ecostrroom	Amsterdam	Financial / new arrangement / uncertainty management	Dak voor de Stad (withdrawn)
Zuiderlicht / Ecostrroom	Amsterdam	Financial / new arrangement / Constructive technology assessment / Transition arena	Grant for doubling capacity of Amsterdam's 4 largest cooperatives
Ecostrroom	Amstelveen	Financial / new arrangement	Duurzaamheidsfonds
NovioVolta	Beuningen	Financial / new arrangement	Providing an office and meeting space
NovioVolta	Beuningen	Transition Arena (partial)	Input on Energy vision and regular informal contact on anything sustainable
NovioVolta	Beuningen	Learning Instrument	Regular contacts and actively incorporating the cooperative in their decisions
Windpower	Nijmegen	Financial / new arrangement	Financially accountable
Windpower	Nijmegen	Uncertainty Management	Measuring the wind speed to indicate financial viability
Energierijck	Berg en Dal	New arrangement	When a roof owner dropped out last minute, the municipality provided an alternative
Energiecooperatie Leur e.o.	Wijchen	Uncertainty Management / Constructive Technology Assessment / Strategic Niche Management	The municipality has done feasibility research for cooperative PV and handed these projects over to the cooperative.
Energiecooperatie Leur e.o.	Wijchen	Financial	When the provincial subsidy failed, the municipality stepped in
Energiecooperatie Leur e.o.	Wijchen	New arrangement	A project has been completed on a municipal roof

Ongoing: As there are no instruments or arrangements in the executing phases that are not already discussed in earlier phases, we move on to the ongoing phase. This is the phase where a cooperative already has at least one energy producing initiative and is or is not planning another. In this phase, we mostly see a municipality as provider of a partial transition arena. Amsterdam proves to be a difficult partner in communications, as it can be very opaque in who you exactly need to speak to get what you want. They did address this by sending out a notion on how to approach a request for

cooperative energy on municipal roofs, but this notion has been withdrawn. This notion can be seen as part of the transition arena and in addition is a form of strategic niche management.

In the province of Gelderland, we see three examples of a partial transition arena. The first is in Berg en Dal, where the municipality keeps communications close as a member of the cooperative *Energierijck*. The other two are in Nijmegen, where *Windpower Nijmegen* has been pushed to do more for cooperatives in the region. The foundation *Burgers geven Energie* has come forth out of this and indeed is a platform that spreads know-how and information to starting and more advanced cooperatives. The third instance of a partial transition arena comes from more than one municipality. The city region Arnhem-Nijmegen has set out a tender which *Windpower Nijmegen* has won. As a result, this cooperative will be supplying electricity to 17 municipalities in the city region. This is also a form of constructive technology management and niche management. See also table 4.

Table 4 – Ongoing: Used instruments (source: author; N=8)

Cooperative	Municipality	Instrument	Form
Zuiderlicht / Ecostrroom	Amsterdam	Transition Arena (partial) / Strategic Niche Management	Notion on using municipal roofs for collective PV (withdrawn)
Windpower	Nijmegen	Transition Arena (partial)	Push for supporting other cooperatives
Windpower	Nijmegen + 16 other	Transition Arena (partial) / Constructive Technology Assessment / Niche Management	Windpower won the tender for providing sustainable energy for municipalities own use
Energierijck	Berg en Dal	Transition Arena (partial)	Member of the cooperative

#### 4.2.2 Missing instruments

In order to identify improvements, the cooperatives have been asked what they saw as missing. The resemblance in their answers, despite being spread out over seven municipalities in total, is very interesting. Every single recommendation that has been done, could be resolved with the introduction of proper transition arena's. This is not a huge surprise as this instrument is hugely important, but it does indicate strongly where there is progress to be made. The most heard improvement for cooperatives is the available space for energy generation. Both *Zuiderlicht* and *Ecostrroom* straight up declare the municipality should make roofs available and *Noviostrroom* indicates that a database on available roofs for collective PV would be very useful. This last proposal would incorporate the strategic niche management instrument. This resonates in the statements by *Zuiderlicht*, *Ecostrroom*, *NovioVolta* and *Noviostrroom* – with the last two also referring to the platform *Power2Nijmegen* – that the municipality is an opaque partner from which they find it hard to figure what they can and cannot do for their cooperatives. *Energierijck* and *Windpower Nijmegen* have similar statements regarding this subject: *Windpower* would like to be provided more help to get through the sluggishness of municipal organization in their recent PV project and *Energierijck* would like municipal officers and aldermen to have a better understanding of the concreteness of cooperative projects. *Zuiderlicht* adds that they would like to see an operable framework for collaboration between cooperatives and the municipality of Amsterdam, while they also would like to weigh in on (existing) plans for large scale renewable energy that is being planned by the municipality, corporations and other actors right now.

This last point leads to two other points made. The first is made by *Zuiderlicht*, *Ecostrroom* and *NovioVolta*: Cooperatives have a reputation of being amateurs and volunteers. Whilst partly true, this does affect the way municipalities deal with cooperatives. Both *Ecostrroom* (carried by paid workers) and *Zuiderlicht* (partly carried by paid workers) feel they could contribute more with bigger projects if they

would not carry the stigma of a volunteers organization. On the other hand, they do get municipal financing as described earlier. Especially Ecoström claims that, whilst happy with the support, it is not the best support they could get and even find it somewhat offending:

*“On the other hand, it gives the signal that we are pitiful amateurs who are doing something cute. You are not a legitimate organization and that is why there are these arrangements. In the end, this does not contribute to the consciousness that cooperatives can be a good organizational structure”*

This is emphasized by NovioVolta, who has done a project with the Municipality of Nijmegen. This project did not yield successful results, since it was reliant on rehabilitating volunteers for the practical implementation. The municipality did not allocate a large budget for this project, hence the implementation with volunteers. This project is not the only occasion where NovioVolta was expected to do things for little or no money, since they were running on volunteers anyway. This makes it very hard for a cooperation to professionalize and expand:

*“[Cooperatives] rely on volunteers a lot. Therefore, it is judged as voluntary work, so it is expected to be done voluntarily. That does not contribute to the development of the organization. If everything has to be done for free, it does not have value. If it does not have value, it cannot have added value. If you want to approach a serious question with volunteers, you will run into the limits of those volunteers.”*

In short, this stigma makes citizens cooperatives improbable to be invited to transition arenas as their work is not taken seriously. The second point it leads to, is pitched by Novioström: they would very much like to see an organization where cooperatives can organize themselves to distribute and balance task. This would lead to a professionalization of some degree since, for example, energy generation projects on a municipal level would go to the one cooperative and a project regarding a neighborhood going off the gas grid would go to another. This would also prevent unnecessary competition between the cooperatives. This proposal could flow from a transition arena and encompass the new coalition and monitoring instruments.

Lastly, there have been made three more points which again all could be addressed in a transition arena. The first is made by Energierijck but is more universal. They have noticed that after municipal elections and a new alderman steps forth, part of the built-up momentum is lost. This is due to the fact that this new person has to familiarize oneself with the tasks at hand and has to be filled in to the new situation. There does not seem a fitting solution at hand, but to build up the momentum again. However, when there has been established a more long-term agenda in a transition arena, this momentum would be lost less easily. The second point has been made by Novioström. What they would like to see is more accessible local (neighborhood) promotion. Nijmegen has several neighborhoods, all with their own websites. To promote their initiative, they would have to contact every single neighborhood administrator. A single point of entry would streamline this process. The last recommendation is done by Ecoström. They plead for the disbanding of de *Zoncoalitie* [Sun Coalition]. Again: This institution is subsidized by the municipality of Amsterdam and competes with the cooperatives. They help apply for the national SDE subsidy and pocket some of this. They would not add much of value on top of that, such as realizing the project itself like cooperatives do. An overview is placed in table 5.

Table 5 – Missing instruments (source: author; N=8)

<b>Cooperative</b>	<b>Municipality</b>	<b>Instrument</b>	<b>Form</b>
Zuiderlicht	Amsterdam	Transition Arena	Municipality to provide more roofs
Zuiderlicht	Amsterdam	Transition Arena	Operable framework for collaboration between cooperatives and municipalities
Zuiderlicht	Amsterdam	Transition Arena	Weigh in on (existing) plans for larger scale renewable energy
Zuiderlicht / Ecostrroom	Amsterdam	Transition Arena	More professional reputation as cooperative
Zuiderlicht / Ecostrroom	Amsterdam	Transition Arena	Municipality is an opaque partner
Ecostrroom	Amsterdam	Transition Arena	Disband sun coalition
Ecostrroom	Amsterdam (to lesser extend Amstelveen and Diemen)	Transition Arena	Municipality to provide more roofs
Noviostroom	Nijmegen	Transition Arena	More accessible local (neighborhood) promotion
Noviostroom	Nijmegen	Transition Arena / constructive technology assessment	Municipality could provide a database of roofs available for cooperative generation
Noviostroom	Nijmegen	Transition Arena / Monitoring / New Coalition	Organization where cooperatives can organize themselves to distribute and balance tasks
NovioVolta / Noviostroom	Nijmegen	Transition Arena	Municipality (Power2Nijmegen) could take a more leading role. Municipality is a very opaque partner
NovioVolta	Nijmegen & Beuningen	Transition Arena	More professional image for cooperatives. If something has to be done for free, it is not of added value.
Windpower	Nijmegen	Transition Arena	More help through the sluggishness of municipal organization
Energierijck	Berg en Dal	Transition Arena	Municipal officers and aldermen need a better understanding of the concreteness of such projects
Energierijck	Berg en Dal	Transition Arena	Municipal elections remove all momentum from the project

#### 4.2.3 Comparing municipalities' communication

In the paragraphs before, there has been a large emphasis on the transition arenas. Again, this instrument is one that should have a primary and leading role if a municipality wants to make the most of the energy transition and take an active role in this process. For this research to lead to a meaningful conclusion, this instrument must be observed more closely. This can only be done to a certain extent, since this focus was not intended from the start. The focus in this paragraph lies on the size of a municipality compared to how easy to approach a municipality is. This is an indication of how broad and deep their (partial) transition arena is. All counts of inhabitants are dated to January 1<sup>st</sup>, 2017.

An interesting case where the difference in how smooth a municipality can work along with a cooperative compared to its size, is the case of EcoStroom. They have described both their relations with Amsterdam and Amstelveen, respectively 854.047 and 89.870 inhabitants large (Centraal Bureau voor de Statistiek [CBS], 2019). Where they described Amsterdam as wealthy but inert, they described Amstelveen as much more agile and to the point. Zuiderlicht underlined the point of Amsterdam being slow and heavy. The other cooperative in this study which has experience with multiple municipalities is NovioVolta. They have dealt with Nijmegen and Beuningen, respectively 175.948 and 25.798 inhabitants rich (CBS, 2019). They were more elaborate in describing the differences and where they considered themselves "floating loose" from Nijmegen after they had received their startup grant, Beuningen actively tried to incorporate the cooperative in their municipality by all kinds of support. They even had regular and direct contacts with the alderman. The picture painted here is backed up by the other cases. NovioStroom found it very hard to reach the municipality of Nijmegen in a constructive manner and described it as opaque, a standpoint supported by NovioVolta. When we lastly look at the cases of Energierijck and Energiecooperatie Leur, active in Berg en dal (34.748 inhabitants) and Wijchen (40.847 inhabitants) (CBS, 2019), they too find that the municipalities were more open for discussion with the cooperatives. They both describe the municipalities as 'flat organizations' and come into direct contact with the aldermen. Where Wijchen practically hands projects to be set up to Energiecooperatie Leur, Energierijck benefits from other advantages which are hard to come by, if possible at all, in larger municipalities.

To sum it up, the data from this study indicates that the smaller a municipality, the more a municipality seems to recognize the potential a cooperative has to offer and the closer you can get to the people in charge. This makes for swifter plan making. On the other hand: larger municipalities, whilst inert and invisible, often do have more striking power when it comes to the financial side. In terms of this research, it appears that smaller municipalities use a more diverse pallet of instruments and larger municipalities mostly stick with allocating budgets. It is very important to note that this is based on a small number of respondents (eight), distributed over seven municipalities. Not nearly enough for a solid conclusion. To reach these, more in-depth research is needed regarding this particular subject.

## 5. Conclusion

In order to reach a structured conclusion, this chapter first repeats the goal, main question and sub-questions that this study addresses. Then, the sub-questions are answered one by one. After this, the main research question can be answered. Lastly, the discussion concludes this study. In the discussion, shortcomings of this study are addressed and recommendations for further research are done. The goal of this research is: *Making recommendations for a constructive approach of Dutch municipalities towards energy producing citizens' cooperatives in order to advance the energy transition.* To achieve this goal, the main question is formulated as:

*“How can Dutch municipalities provide a constructive approach towards energy producing citizens' cooperatives to advance the energy transition?”*

With the following sub questions:

- “How does a transition succeed?”
- “What role do cooperatives fulfill in the energy transition?”
- “What role does a municipal government fulfill for a cooperative?”
- “To what extent does the transition management theory by Rotmans (2003), intended for use on a national scale, apply to the local scale of municipalities?”

### 5.1 The succession of a transition

This part of the research has been viewed from a purely theoretical angle and serves as a basis of understanding the matter further researched in this study. The transition management theory of Rotmans has been applied and used as a guideline for this study. According to this theory, a socio-technical transition succeeds if a technology breaks through from the micro-level niches to the macro- and meso-level of the regimes like (inter)national governments and the established order of companies. To put it in terms of sustainable energy: the energy transition has succeeded when there has been achieved a balance where sustainable energy is the standard and other means of energy are a niche. To get to this balance from the niches, countless steps back and forth, up and down are set over a time-period of a generation, or 25 to 50 years. Rotmans transition management theory offers recommendations for governments to guide this process.

Right now, the energy transition is in the acceleration phase, as stated before in paragraph 3.2.3. This is supported by the enormous growth in citizens cooperatives as seen in the several LEM reports (Schwenke, 2017, 2018) and the development of the individual cooperatives. In this study, the main thing slowing down the expansion of cooperative decentralized energy production is the availability of places where energy can be produced. This is an indication of the development being supported by a lot of people who are willing to invest personal funds in something they perceive as right and are practically queuing to invest more.

### 5.2 The role of cooperatives in the energy transition

Whilst not addressed as such, the role of the energy producing citizens cooperatives is one mainly in the niches. It can be seen as a movement of people who disagree with the status quo and fits in line with the Urgenda law suit against the Dutch government. From a more practical point of view, citizens

cooperatives challenge governments from all scales to change their perspective, way of thinking and policies. These governments mostly acknowledge the need for a change in the status quo and have all kinds of goals, plans and policies to indeed make a change. So where there is a shared goal or vision, there is not yet a shared view on how to get there. These cooperatives ask for time, regulation and policies to achieve their goals, which lay at least partly in line with those of the governments. This process leads to a shared long-term agenda through dialogue. This is the learning that Rotmans names in his transition management theory. This learning and especially the creation of this long-term agenda is done in what Rotmans calls the transition arena: a place where front-runners, governments, knowledge institutes and corporate actors discuss possible trajectories. In this case, the citizens cooperatives are the front-runners and the governments are mainly the municipalities. This study shows that at the local level, these transition arenas are nearly always absent whilst cooperatives in most researched cases would be very willing to participate in them.

### 5.3 The role of the municipal governments for citizens cooperatives

This leads us to the role that municipal governments can provide for cooperatives. The introduction named the stances of not willing to help, wanting to help but do not know how and pushing too hard. Of course helping 'perfectly' would be a possibility, but this is first of all very unlikely due to all unknown factors surrounding transition management and even if this would be the case, it would be extremely hard to identify this on the basis of this specific research. Rotmans names four roles for governments to carry out, each associated with a certain state of the energy transition. As assessed in paragraph 3.2.3 and summarized in paragraph 5.1, the energy transition is at this point in the acceleration phase. This means that municipalities have to take on an active role, as described in paragraph 2.2.5. This role means a government has to actively monitor progress and innovation in order to remove restraints for further development as much as possible.

From analyzing the policy papers of the six municipalities in this paper, none of the municipalities can be placed in the category of unwilling. They all claim to make efforts in favor of a cooperative energy supply to some extent. This analysis further shows that only two municipalities claim to be as well on their way as Rotmans says they should be. Amsterdam states they continuously analyze their own legislation, try to change national legislation and help the citizen cooperatives professionalize. Utrecht does not specifically mention this, but does have the most important policy instrument in place: a transition arena. The transition arena can be used to actively monitor progress and innovation and has as goal to draw out a long-term agenda, from where new policies can flow. The previous literature research shows that two out of these six municipalities appear to be on track. The real world case studies have two aspects. The first aspect is how these papers and visions translate to concrete policy. The second is how well these actions are received by the citizens cooperatives.

The first aspect can be falsified for the municipalities of Amsterdam and Nijmegen. First Nijmegen, as this can be handled the most briefly. From their documents and visions, their focus appeared to be solely on the Windpower Nijmegen cooperative. As discussed, this cooperative came forth out of a wish of the municipality itself. There did not seem to be a large push towards more cooperatives, despite the platform Power2Nijmegen. The studied cases reflect this very well. Whereas the wind turbines of Power2Nijmegen were built in record time, the following solar farm project

endures a lot more bureaucratic inertness. Other cooperatives may or may not have gotten a start-up grant and had little to no aid from the municipality. NovioVolta, which emerged later than Windpower Nijmegen, has moved to the neighboring municipality of Beuningen and is now disbanded. Nijmegen is not on par with the proposed role by Rotmans both in theory and practice. On the contrary, Amsterdam is on par with the proposed role by Rotmans according to their visions and documents. Amsterdam is a wealthy municipality and this shows in the support they give to cooperatives. Both respondents indicate the municipality to be a generous supporter of green initiatives and this has helped the cooperatives to grow and professionalize at a higher pace than other studied cases. Amsterdam does analyze their own policies and tries to smooth collaboration over with the cooperatives by, for instance, releasing a notion on using municipal roofs for collective energy production. On top of that, they sued the province of Noord Holland over the legislation of building turbine engines: Amsterdam feels restricted in the amount of wind turbines they are allowed to place. This makes that the municipality of Amsterdam lives up to their promises. If this is enough, is discussed further.

The second aspect regards how the actions and policies are received by the cooperatives. This aspect is coupled loose from municipal plans and assessed on its own. With assessing this aspect, the relative timeline of a cooperative is more important than the absolute time. This choice is made to gain a deeper insight in how the process of developing a cooperative works and what works best in which phase. In the start-up phase of a cooperative, financial means were the most present forms of support and this is received very well. To get from an idea to an energy producing cooperative, there are certain costs up front of which it is not clear if they will make themselves back. If the set-up fails, the money is lost. Especially when looking at the voluntary nature of some cooperatives, this can be a big threshold before initiating such a project. The more money is made available, the greater the means to start with professional help. This helps the initiative to succeed in their goal. Without knowledge, it is harder to work towards your goal effectively. The second most present form of support is providing space for the cooperative to build their energy producing installation. In most cases: a roof to place solar panels. As this is what gives a cooperative its right of existence, this form of support is very well received. In most cases, this is a direct agreement: the cooperative uses a roof in municipal ownership. Wijchen went further in this and also had the feasibility studies done for the case of the cooperative. This stretches beyond what other municipalities do and sponsors the afore mentioned professionalization: the knowledge of how viable a roof is for a cooperative is already there and makes the task of the cooperative lighter. This is a form of uncertainty management and is seen in the case of Windpower Nijmegen too. All these actions and policies are generally well received. What is a lot less well received is to be described as poor, unclear or slow communication. Throughout this study, the backbone of a successful energy transition is the instrument of the transition arena and none of the municipalities in this study appear to apply this instrument. A lot of the practical problems encountered by the cooperatives can be addressed with a shared vision and in terms of the followed theory by Rotmans, this is best achieved through the transition arena instrument. The transition arena serves as a means of structure and takes away legislative uncertainties. This is underpinned in the later phases that cooperatives go through. Most available forms of help are financial and almost all perceived problems can be taken away through proper communication.



successful transition experiment for a higher scale in the multi-level theory: set it up for the regime level (Rotmans, p.160-162). The facilitation pillar is widely resonates through the respondents in this study. What they see as one of the most important limitations is the availability of space for energy production and an uncertain financial start. This pillar would address that issue. The stimulation pillar would help as well: with more public support, locations for decentralized cooperative energy generation would become less scarce. Whether the scaling pillar would be relevant for the cases in this study is doubtful. All in all the impact that cooperatives have, might be too little for now. Apart from that, the other two pillars are something a municipality could very well pick up to advance the energy transition.

## 5.5 What municipalities can do for cooperatives to advance the energy transition

With the sub questions answered, there is one last question to answer:

*“How can Dutch municipalities provide a constructive approach towards energy producing citizens’ cooperatives to advance the energy transition?”*

As has become clear throughout this study, two elements are key. The first key element is taking away insecurity from the cooperatives. The two main insecurities for cooperatives are the costs up front for the founding of the cooperative. It is a big step for people to invest their own money in something they perceive as good and want to do voluntarily. The second source of insecurity is a right to exist. The cooperatives in this study want to produce renewable electricity. If they have no place to do so, they do not have a right to exist. The first insecurity can be addressed through a direct funding in money or through an arrangement where the municipality pays for the first costs of founding a cooperative. The second insecurity has a lot more possible solutions and one is not necessarily better than the other. A solution could be that the municipality provides space on their own roofs for cooperatives to generate electricity. Another would be a database of companies or other organizations willing to share their roofs for cooperative energy generation, maintained by the municipality or an independent party. In order to secure this right of existence better, a municipality or an independent party could take on a distributing role as proposed by Noviostrroom. This would make sure that the cooperatives do not become too big of a competition for each other: an important feature in advancing the energy transition in the current stage. One can see this missing in Amsterdam right now: the Ecostrroom perceives the Zoncoalitie as subsidized competition. This might harm the energy transition as a whole in the long run. Proper agreements need to be made. How these elements are implemented, can best be decided through a transition arena.

The second key element is willingness. Municipalities in general did not ask for the citizens cooperatives to emerge. Municipalities must first recognize the value of cooperatives and be willing to spend the time of their municipal officers on interaction with and policies for the cooperatives. This could slow the energy transition as a whole and can put the municipality in question behind other, more willing municipalities. This is not something literally addressed in the used theory, but more an aspect of governance itself.

The goal of this study is to make recommendations for a constructive approach of Dutch municipalities towards energy producing citizens cooperatives in order to advance the energy transition. Based on the answers to the question above, the first recommendation is to recognize the role that energy producing citizens cooperatives can have for a municipality. They are the voice of people who want the system to change so bad, they no longer want to wait for governments to take these actions.

However, they are dependent on a strong and capable government. The national government has implemented policies that has led to hundreds of initiatives that operate on a local level. To advance the energy transition, it is time the local governments take on a more active role towards these initiatives. This leads us to recommendation two: communication. Communication is key. Without communication, there cannot be set out a joint path where both the municipalities and citizens cooperatives work together for the benefit of both. As Rotmans' theory is found to be highly applicable, this results in the recommendation among the lines of his theory: set up a transition arena where this joint path is set out. Come together to make a long-term vision where all actors know what the intentions of the others are and set a common goal. Find out how the actors involved can profit from one another, set a long-term agenda and translate this to more short-term goals. That way, everybody benefits and the energy transition in particular.

## 6. Discussion

This study has not been without its limitations. The focus has been laid on the point of view of the cooperatives and the point of view of the municipalities has been assessed based on a brief literature research. This gives no complete view of the situation and further research towards the point of view of municipalities is highly recommended. If municipalities see citizens cooperatives or not has been based on this literature too. This could be an important aspect of future research which highlights the point of views of local governments.

Case selection has limited itself to the geography of the cooperatives. From an explorative view, this makes sense: by limiting the amount of municipalities, the image of those selected municipalities can be drawn clearer with the same amount of interviewees. Throughout this research, it has become clear that there are huge differences in the cooperatives themselves: there appears to be a scale from voluntarily run to cooperatives that are highly professionalized. Further research towards the specific needs for cooperatives on this scale is recommended. This could be split out to three aspects: what the effect is of the amount of knowledge available within a cooperative, either because of previous experience in project management or attracted elsewhere; how big the gap is between the 'total amateurs' as volunteers are perceived and cooperatives with a more corporate mindset and lastly, how the image problem of a 'voluntary organization' affects communication with other actors. Another interesting subject for future research which has not been addressed in this study is to what extent governance can rely on volunteers for the execution of their policies. As the case of NovioVolta has indicated, this way of implementing policy can lead to problems.

During this research, the importance of the transition arena instrument became evermore clear. This was not apparent to the researcher at the start of this study. The resources with which a Bachelor thesis has to be written did not provide the means for this to be studied thorough enough. When conducting research, early decisions regarding what is and what is not part of the research are crucial for the quality and depth in which a subject can be analyzed with certain resources. Such a decision was not made in time, leading to the researcher finding out the importance of the transition arena after the primary data had been collected. This leaves the instrument of the transition arena on the local level as an interesting subject for further research.

Regarding the collection of primary data, there could have been made some improvements in the way this has been done. First, the interview guide could have been more compact. There were some general items on it which in practice would end up costing too much time. This adds up with an approach during the interviews that can be described as too polite. Some respondents get so carried away in their story that they say a lot, but not necessarily answer questions. This makes it even harder to gather the needed data in the agreed time slot for the interview. The researcher could have had a more assertive approach towards following the interview guide. Lastly, the categorization of the interview guide did not work out ideally in practice. There was a construction of phases that a cooperative undergoes, being 'founding', 'plan making', 'execution of the plans' and the 'ongoing' phase. The idea was to repeat these phases for each project, which ended up being a very unpractical way. A better categorization would have been 'up to the realization of the first project' and 'after the realization of the first project'. This would put the founding, plan making and figuring out the goal and identity of the cooperative in one piece and the more concrete projects in another.

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## Appendix A: Interviewguide

Beste [...]. Mijn naam is Brandon Timmer en ik studeer aan de Radboud Universiteit Nijmegen. Dit interview met u neem ik af voor mijn bachelor scriptie over burgerenergiecoöperaties. Het doel van mijn scriptie is inzicht verkrijgen in de samenwerking tussen burgerenergiecoöperaties en gemeenten. Bij voorbaat bedankt voor het deelnemen aan dit interview. We beginnen met een algemeen deel over u en de burgerenergiecoöperatie, die ik vanaf nu voor het gemak coöperatie zal noemen, waarbij u betrokken bent. Hierna gaan we het hebben over uw contact met de gemeente op dit moment. Hierop volgt een uitdiepend deel waarin we de ontwikkeling van de coöperatie chronologisch gaan bespreken en hierin natuurlijk een nadruk leggen op het handelen van de gemeente en hoe dat uw handelen beïnvloed heeft.

### **Introductie respondent/case**

Hebt u er bezwaar tegen als dit interview wordt opgenomen?

Wat is uw naam?

Bij welke burgerenergiecoöperatie bent u betrokken?

Wat is uw rol daarin? Is dit op vrijwillige, of op betaalde basis?

Hoe groot is het bestuur of het personeelsbestand van de coöperatie?

Hoeveel mensen hebben zich aangesloten bij de coöperatie?

Sinds wanneer bestaat de coöperatie?

- Was u er toen ook al bij betrokken? In dezelfde rol?

Hoeveel projecten heeft de coöperatie?

Hoeveel daarvan produceren energie?

Met welke partijen heeft de energievoerderscoöperatie te maken?

- Voor overleg
- Praktische zaken

### **Interactie met de gemeente**

Het volgende deel van dit interview gaat over het contact met de gemeente op dit moment, cq. de laatste tijd.

Hebben jullie momenteel veel contact met de gemeente?

- Hoe vaak?
- Over welke onderwerpen?

- Met een vast persoon of platform, of diverse partijen?
  
- Hoe ervaar je dit?
  
- Zou je de gemeente als competent beschouwen?
  
- En als welwillend?
  
- En in het algemeen behulpzaam?
  
- Zijn er zaken waarvan u denkt: dat zou de gemeente kunnen doen om ons beter te kunnen helpen?
  
- Is het contact met de gemeente altijd op deze manier verlopen, of is dat veranderd over de loop der tijd?

### **Chronologie**

Dit deel gaat dieper in op het contact met de gemeente over de loop van de tijd en hoe dit is begonnen, veranderd en hoe nuttig dit is geweest in algehele zin. Het chronologische deel van dit interview richt zich op de verschillende fases die de coöperatie heeft doorgemaakt. Deze fases zijn oprichting, planmaking, uitvoering van de plannen en de fase na de uitvoering van plannen. In het geval van meerdere projecten of deelprojecten, lopen we de fases door tot we vanaf de oprichting bij het heden zijn aangekomen. Hierna blikken we vooruit op de toekomst. Iedere fase begint met een algemene omschrijving door de respondent en daarna lichten we er specifieke zaken uit.

## **Oprichting**

Hoe is de oprichting van de coöperatie tot stand gekomen?

Wie waren hierbij betrokken?

Heeft de gemeente hier een significante rol bij gespeeld?

Heeft de gemeente hulp geboden bij het begrijpen of nuttig gebruiken van regelgeving? Zo nee, hebben jullie daar een andere partij voor geraadpleegd?

-Hulp bij het begrijpen of nuttig gebruiken van financiële zaken zoals belasting of belastingvoordelen? Zo nee, hebben jullie daar een andere partij voor geraadpleegd?

-Iets georganiseerd of voorgesteld met betrekking tot het samenbrengen van andere partijen die op wat voor manier dan ook te maken hebben of zouden kunnen hebben met de coöperatie?

-Op welke manier dan ook input gegeven over hoe jullie bepaalde zaken aan zouden kunnen pakken of wat zij van jullie zouden verwachten?

-Op enige manier geprobeerd om onzekerheden in kaart te brengen of weg te nemen?

-Gesproken over of geprobeerd om met speciaal nieuw beleid te komen voor jullie?

-Op enige manier geprobeerd specifieke inpassingen van jullie plannen te maken?

-Op enige manier geprobeerd om, samen of op zichzelf staand, bij te leren over dit soort initiatieven en de mogelijkheden ervan?

## **Planmaking**

Hoe is het maken van de plannen van de cooperatie verlopen?

Wie waren hierbij betrokken?

Heeft de gemeente hier een significante rol bij gespeeld?

Heeft de gemeente hulp geboden bij het begrijpen of nuttig gebruiken van regelgeving? Zo nee, hebben jullie daar een andere partij voor geraadpleegd?

-Hulp bij het begrijpen of nuttig gebruiken van financiële zaken zoals belasting of belastingvoordelen? Zo nee, hebben jullie daar een andere partij voor geraadpleegd?

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-Gesproken over of geprobeerd om met speciaal nieuw beleid te komen voor jullie?

-Op enige manier geprobeerd specifieke inpassingen van jullie plannen te maken?

-Op enige manier geprobeerd om, samen of op zichzelf staand, bij te leren over dit soort initiatieven en de mogelijkheden ervan?

## **Uitvoering van de plannen**

Hoe is het uitvoeren van de plannen verlopen?

Wie waren hierbij betrokken?

Heeft de gemeente hier een significante rol bij gespeeld?

Heeft de gemeente hulp geboden bij het begrijpen of nuttig gebruiken van regelgeving? Zo nee, hebben jullie daar een andere partij voor geraadpleegd?

-Hulp bij het begrijpen of nuttig gebruiken van financiële zaken zoals belasting of belastingvoordelen? Zo nee, hebben jullie daar een andere partij voor geraadpleegd?

-Iets georganiseerd of voorgesteld met betrekking tot het samenbrengen van andere partijen die op wat voor manier dan ook te maken hebben of zouden kunnen hebben met de coöperatie?

-Op welke manier dan ook input gegeven over hoe jullie bepaalde zaken aan zouden kunnen pakken of wat zij van jullie zouden verwachten?

-Gesproken over of geprobeerd om met speciaal nieuw beleid te komen voor jullie?

-Op enige manier geprobeerd om, samen of op zichzelf staand, bij te leren over dit soort initiatieven en de mogelijkheden ervan?

-Via bepaalde kanalen of instrumenten op de hoogte blijven van voortgang van de zaken? Bv. Productie, aantal leden, etc.

## **Nazorg**

Hoe is de nazorg van het project verlopen?

Wie waren hierbij betrokken?

Heeft de gemeente hier een significante rol bij gespeeld?

- Heeft de gemeente hulp geboden bij het begrijpen of nuttig gebruiken van financiële zaken zoals belasting of belastingvoordelen? Zo nee, hebben jullie daar een andere partij voor geraadpleegd?

-Iets georganiseerd of voorgesteld met betrekking tot het samenbrengen van andere partijen die op wat voor manier dan ook te maken hebben of zouden kunnen hebben met de coöperatie?

-Op enige manier geprobeerd om onzekerheden in kaart te brengen of weg te nemen?

-Gesproken over of geprobeerd om met speciaal nieuw beleid te komen voor jullie?

-Op enige manier geprobeerd specifieke inpassingen van jullie plannen te maken?

-Op enige manier geprobeerd om, samen of op zichzelf staand, bij te leren over dit soort initiatieven en de mogelijkheden ervan?

-Via bepaalde kanalen of instrumenten op de hoogte blijven van voortgang van de zaken? Bv. Productie, aantal leden, etc.