



**INTERACTIONS BETWEEN  
REGIONAL ENERGY  
COOPERATIVES AND THE  
ENERGY POLICY REGIME**

**A spatial analysis of Dutch  
energy governance**

Jasmijn Brouwer  
EES-2022-577

Master Programme Energy and  
Environmental Sciences, University of  
Groningen

---



university of  
groningen

faculty of science  
and engineering

energy and sustainability  
research institute groningen

## **ACKNOWLEDGMENTS**

During the writing of my thesis I have learned a lot about what it means to perform individual research. Since starting my master degree my attention was always drawn to the societal and political changes that are needed for a successful energy transition. When the opportunity arose to help Aamina and Esther with their research on Social Business Models for energy cooperatives I gladly took the chance. From there on I decided on my own research topic together with them.

I would like to express my gratitude to Aamina Teladia who functioned as my daily supervisor. She inspired me greatly and in addition to the academic part of our meetings I always enjoyed our lovely conversations. I would also like to thank Esther van der Waal for her supervision and emotional support during the process. Lastly, I would like to thank Henny van der Windt. I enjoyed our occasional meetings and your feedback has meant a lot to me and truly helped me improve my work.

Finally, I would like to thank my friends, my study mates, and my mother who have all continuously supported and motivated me this last few months.

## TABLE OF CONTENTS

1.	Introduction .....	6
1.1.	Problem definition.....	8
1.2.	Research questions .....	8
2.	Scope .....	9
3.	Theoretical framework.....	9
3.1	The Multi-Level Perspective and the Dutch context.....	9
3.2	Limitations of MLP .....	10
3.3	Enrichment of MLP.....	11
3.3.1	Niche dynamics.....	11
3.3.2	Policy regime .....	13
3.4	Framework application .....	16
3.4.1	Criteria for a successful niche and RECs .....	16
3.4.2	Criteria for a successful policy regime.....	17
4.	Research approach.....	18
4.1	RES region selection .....	18
5.	Results .....	19
5.1	Energy policy regimes .....	19
5.1.1	National energy policy regime.....	19
	RES programme .....	19
	Environmental act .....	20
	Financial policy instruments.....	20
5.1.2	Regional and local energy policy regime.....	21
	Solar energy and initiatives in the regions .....	21
	Provincial financial mechanisms.....	23
	Region selection .....	24
	Groningen.....	24
	Friesland .....	26
	Noord-Holland Zuid .....	27
	Gelderland.....	29
	Rivierenland.....	29
	Cleantech.....	30
5.2	Regional energy cooperatives .....	32
5.2.7	Inward-oriented activities .....	33

Niche network .....	33
Niche professionalisation .....	33
5.2.8 Outward-oriented niche activities.....	34
Partners .....	34
Role in policy regimes.....	35
5.2.3 Perceived energy policy regimes.....	36
6. Discussion .....	38
6.1 Policy regime analysis.....	38
6.1.1 Vertical nesting.....	40
6.2 Niche analysis .....	41
6.3 Framework .....	43
6.4 Suggestions for further research.....	43
7. Conclusion .....	44
8. References.....	46
9. Appendices .....	55
9.1 Appendix 1: visual depiction of solar placement norms.....	55
9.2 Appendix 2: overview of provincial financial instruments.....	55
9.3 Appendix 3: overview local policy regimes Groningen .....	57
9.4 Appendix 4: overview local policy regimes Friesland.....	59
9.5 Appendix 5: overview local policy regimes Noord-Holland Zuid .....	64
9.6 Appendix 6: overview local policy regimes Rivierenland.....	69
9.7 Appendix 7: overview local policy regimes Cleantech .....	70

## SUMMARY

The energy transition requires not only technological substitution, but also wider societal and political changes. The governing of an energy transition asks for polycentric governance, as regions and municipalities are asked to contribute to national climate goals. In the Netherlands the national Climate Agreement was formed, which introduced the Regional Energy Strategy (RES) programme. The RES programme is a policy framework that gives an incentive for the collaboration of regional and local policy makers on regional energy planning strategies, that contribute to the national renewable energy targets.

According to the Multi-Level Perspective (MLP) a transition is the result of interactions between three levels; landscape, regime, and niche. In the energy transition there is the energy regime and the associated energy policy regime. The energy policy regime is vital in guiding the energy transition as it can stimulate the development and diffusion of sustainable niches. The energy cooperative niche has the potential to influence the energy transition by integrating more sustainable energy practices into the incumbent energy regime. In the Dutch context this niche is especially important as the Dutch government has set goals for 50% local ownership of renewable energy on land. Regional energy cooperatives (RECs) are active in the provinces and regions and represent local cooperatives. RECs have the potential to influence the energy transition as they promote the cooperative movement and thereby gain political and societal support, which can speed up the diffusion of niche practices in the incumbent energy regime. This research aimed to contribute to the understanding of the spatiality of energy governance by analysing the energy policy regime across different spatial scales (national-regional-local) and how these regimes influence each other. Furthermore, the interactions between the different policy regimes and RECs were analysed to shed light on the role of RECs in the energy transition. This research entailed both desk research as well as semi-structured interviews with RECs representatives.

Findings suggest that the national policy regime influences the the regional and local policy regimes by setting national regulations and political norms that can be adapted in regional and local policy frameworks. Thereby, the national policy regime influences the normative roles in regional- and local- policy networks. Spatial differentiation was seen with regards to the roles of policy actors and the adaptation of national regulations and norms. The policy regimes are interacting with the niche through financial policy instruments that intend to shield, nurture, and empower the niche. Spatial differentiation was seen among the regions and municipalities with regards to the financial support they offered. While some regions and municipalities intended to aid professionalisation of the niche through nurturing policy instruments, this was not the case everywhere. This can lead to an uneven niche development between regions or municipalities. More uniformity of financial support is needed to ensure an equal niche development. RECs were found to play an important role in the regional energy transition. RECs form regional niche networks and strengthen these networks by facilitating knowledge and expertise sharing. Moreover, they have formed partnerships with societal, and sometimes industrial, and financial regime actors. RECs interact with the energy policy regime mainly on the regional level by taking part in the policy process of the RES, thereby ensuring their role in the regional energy transition.

## LIST OF ABBREVIATIONS

BZK: Ministry of Interior and Kingdom Relations  
ES: Energie Samen  
ESG: Energie Samen Gelderland  
ESNH: Energie Samen Noord-Holland  
ESR: Energie Samen Rivierenland  
EZK: Ministry of Economic Affairs and Climate Policy  
GrEK: Groninger Energie Koepel  
IPO: Inter Provincial Consultation  
MLP: Multi-Level Perspective  
PBL: Netherlands Environmental Assessment Agency  
PC-NH: Participation Coalition Noord-Holland  
RE: Renewable energy  
REC: Regional energy cooperative  
RES: Regional Energy Strategy  
RVO: Netherlands Enterprise Agency  
RVT: Regeling Verlaagd Tarief  
SCE: Subsidieregeling Coöperatieve Energieopwekking  
SDE: Stimulering Duurzame Energieproductie en Klimaattransitie  
SNM: Strategic Niche Management  
ÚK: Ús Koöperaasje  
UvW: Union of Water Boards  
VNG: Association of Dutch Municipalities

## OVERVIEW OF FIGURES AND TABLES

Figure 1: Visual representation of the MLP framework (Schot & Geels 2008)

Figure 2: Collective solar capacities in the RES regions (HIER opgewekt & RVO, 2022)

Table 1: Overview of main financial policy support instruments (Held et al., 2006)

Table 2: Provincial financial policy instruments

Table 3: Characteristics of the policy regimes on the three spatial scales

Table 4: Similarities and differences between regional- and local policy regimes

Table 5: Similarities and differences between the RECs

# 1. INTRODUCTION

To prevent further global warming, immediate measures need to be taken to reduce global greenhouse gas emissions (IPCC, 2021). International agreements have been signed by many countries. An example is the Paris climate agreement, which has a primary aim to keep global warming below 1.5 °C, (UNFCCC, n.d.). In order to reduce global greenhouse gas emissions, countries need to stir away from fossil fuels and introduce more sustainable and renewable energy (RE) sources in their energy systems. A change in the energy system requires not only technological substitution, but also societal and political changes. Societal changes entail habitual changes in energy consumption and a different view on energy production. Energy consumers are turning into energy producers by providing their own energy supply through solar panels or small wind turbines, on their own house or through collective projects. Changes in the political status quo and thereafter in policies are required to facilitate the diffusion of sustainable energy in the energy system, while political support for fossil fuels needs to be out phased.

An energy transition is an example of a so-called socio-technical transition. A popular approach in transition studies is the Multi-Level Perspective (MLP). MLP states that during a transition interactions between three analytical scales (landscape-regime-niche) take place that result in technological substitution with a more sustainable alternative (F. W. Geels, 2002; F. W. Geels et al., 2017; F. W. Geels & Schot, 2007). The landscape represents the context in which societal actors interact. The incumbent regime represents the alignment of processes and activities that keep a specific technology in place. Niches are nurturing spaces for innovative technologies that are being developed and try to disrupt the incumbent regime. In a transition, landscape pressures disrupt an incumbent regime and thereby give room for innovative niche practices to challenge the regime and introduce more sustainable alternatives into the social context. In an energy transition, climate change and the associated supranational climate agreements present landscape pressures that disrupt the incumbent energy regime of a country. Niches of RE practices, like energy cooperatives, receive space to challenge the energy regime and introduce more sustainable ways to energy production.

Within the energy regime there is the energy policy regime, which encompasses the alignment of the activities of societal actors within policy networks, embedded into the context of regulations and normative roles of a country's energy sector (Schot & Geels, 2008; Smith & Raven, 2012). As the energy regime is pressured by the landscape, so is the energy policy regime. As a result of exogenous pressures, energy policies are shifting away from fossil fuel support towards policies that stimulate more RE deployment. Energy policies are thus moving away from internal regime support towards niche support. Different financial incentives, such as Feed-In Tariffs (FITs) and Tradable Green Certificates (TGCs), are commonly used by policy makers to stimulate investments in RE projects (Held et al., 2006). The energy policy regime is vital in guiding the energy transition as it can stimulate the development and eventual diffusion of niche practices. To diffuse niche practices political support of powerful policy regime actors is required, who can bring about the necessary changes in the regime (Smith & Raven, 2012).

Substantial research has been performed on the governance of sustainable socio-technical transitions e.g. (Pollitt, 2012; Roberts & Geels, 2019; Smith et al., 2005; To et al., 2018) Governing an energy transition calls for a need of polycentric governance (Jordan et al., 2015). While national governments are setting up programs to contribute to international climate agreements, provinces and municipalities are asked to contribute their share as well. Scholars are trying to comprehend the spatial implications of governing an energy transition e.g. (Bulkeley, 2005; Coutard & Rutherford, 2010; Gailing & Röhring, 2016; Hoppe & Miedema, 2020; Mattes et al., 2015; Van Dam & Van Der Windt, 2022). Often a national government sets incentives that are followed by local authorities that adapt the national policies to fit the biophysical and social context of a place. However, an intermediary level between the national and local is more often introduced to handle the spatial complexity of governing an energy

transition: the region. Large-scale RE deployment and electricity infrastructure does not limit itself to municipal borders. Plans for large-scale wind parks or solar parks therefore requires inter-municipal collaborations and decision making, to ensure that the benefits are equally shared between neighbouring municipalities. (Hoppe & Miedema, 2020)

The focus of this research is on a part of the ongoing energy transition in the Netherlands. In line with the international Paris agreement, the Dutch government presented the national Climate Agreement in 2019, aimed at reducing the Dutch greenhouse gas emissions by 49% in 2030 and by 95% in 2050, compared to 1990 levels (Rijksoverheid, 2019). To increase the share of renewables in the energy system, the national government takes on a regional approach by introducing the Regional Energy Strategy (RES) programme. As part of the RES programme, the government defined 30 energy regions that have to compose their own RE planning strategy on how much, when, and where they want to realise RE projects. In the Climate Agreement the national government states that 50% of the RE on land needs to be locally owned, but that it is up to the energy regions to come up with an own tailored definition on local ownership and how it can be realised. (Rijksoverheid, 2019) In addition there is the new Environmental Act which obliges local authorities to integrate local participation into all projects that have a spatial impact. Local ownership and participation are therefore an integral part of the Dutch energy transition.

Energy cooperatives can provide a solution to the national goals of local ownership and citizen participation. Energy cooperatives form a niche where grassroot innovations are developed that create a societal change on a local level, through the application of innovative technologies (Dóci et al., 2015). They have the potential to influence the energy transition by integrating new, more sustainable, energy practices into the existing energy system and by creating a role for civil society in the transition (Dóci et al., 2015). In addition, the niche has introduced new, innovative, business models and financing schemes in the existing electricity system (Arentsen & Bellekom, 2014). Energy cooperatives consist of a group of citizens, often volunteers, that work together on making the local energy supply of a village or a neighbourhood more sustainable. Creating a more sustainable energy supply can include energy saving practices but also production projects, such as a collective solar rooftop or a locally owned wind turbine. Besides concerning themselves with RE, energy cooperatives have social goals such as supporting the local economy and strengthening the community (HIER Opgewekt & RVO, 2020). In the Netherlands, there is a long history of the cooperative movement and currently there are about 600 local energy initiatives which, for the most part, are organized by energy cooperatives. The Netherlands has experienced a rapid growth in collective solar projects in recent years, which is predicted to keep increasing in the upcoming years (HIER Opgewekt & RVO, 2020). Most cooperatives are focusing on solar energy production. In 2020 there were only 25 wind cooperatives in the Netherlands. This can be because of more social support towards solar energy as an energy source, or because it is more viable for cooperatives to invest in solar projects. Due to the cooperatives' inclination towards solar energy, this research focuses on solar energy.

To develop the energy cooperative niche, niche advocates concern themselves with inward-oriented niche activities that nurture the niche. These activities include facilitating network processes, learning processes and articulating expectations (Smith & Raven, 2012). To promote the cooperative movement to the wider social context, niche advocates need to perform outward-oriented niche advocating to gain social and political support (Smith & Raven, 2012). To gain political support especially, lobbying and forging partnerships with powerful regime actors is necessary (Hargreaves et al., 2013; Smith, 2007). In doing so, the niche is interacting with the energy policy regime. In the Netherlands, umbrella organisations, or, Regional Energy Cooperatives (RECs) are active in energy regions or provinces and function as niche advocates. RECs represent the interests of local cooperatives and work to promote the cooperative movement in the regions or provinces. On a national level, the niche is represented by Energie Samen (ES).



## 1.1. Problem definition

With the introduction of an intermediary governance level, that of the region, the complexity of energy transition governance becomes more pronounced. The three spatial scales of national, regional, and local each have their own energy policy regime. Little is yet known on how the different levels of energy policy regimes influence each other, as MLP does not address the geographical dimensions in a transition. This research aims to shed light on the spatial implications of energy transition governance by analysing the Dutch energy policy regimes on the different spatial scales and how these regimes influence each other.

Moreover, this research aims to contribute to the knowledge on the spatiality of niche-regime interactions by looking at the interactions between the energy cooperative niche and the policy regimes. As mentioned previously, the niche plays an important role in light of the national policy goals of local ownership and citizen participation in the energy transition. Policy support is needed to facilitate the diffusion of niche practices. On a national level several policy instruments are in place that intend to support the niche by giving a financial incentive for realising RE projects (ECoop, 2022; RVO, 2021c, 2021a). Previous research has suggested that these instruments are not always perceived as supportive by the niche (de Boer et al., 2018; Dóci & Gotchev, 2016). However, these studies focused solely on the interactions of the national policy regime with the niche. This research aims to contribute to this existing knowledge by analysing niche-regime interactions on the regional and local scale. This analysis will include how policy regime actors intend to stimulate niche development and diffusion and how niche advocates, united in RECs, are interacting with the policy regime to facilitate the integration of niche practices in the incumbent energy regime.

## 1.2. Research questions

The following question summarises the aim of this research:

“How do regional energy cooperatives interact with the energy policy regimes on the different spatial scales?”

To be able to answer this research question, the following sub questions need to be answered:

1. What energy policy regime is in place on the different spatial scales?
2. How are the different energy policy regimes connected?
3. How do regional energy cooperatives facilitate the regional and local energy transition?

This research is divided into several chapters. First, the scope of the research will be clarified. Second, the research approach will be discussed. Third, the theoretical framework will be introduced. In this research the MLP will be used to frame the energy transition in the Netherlands, with additional conceptualisation that is relevant for this research. Next, the result section will introduce the findings of this research, which includes an extensive analysis of the energy policy regimes on the different spatial scales, based on document analysis. Moreover, information from RECs is presented to provide more insights on niche-regime interactions in different RES regions. Finally, the findings will be discussed and put into the broader context of the main research question. The research will close off with concluding remarks and recommendations for further research will be given.

## 2. SCOPE

The focus of this research will be on the interactions between the energy cooperative niche and the energy policy regime in the Netherlands. First an analysis of the national energy policy regime will be performed, followed by a regional and local analysis of a few selected RES regions and all municipalities present in the RES regions.

This research focuses on a few selected aspects of the policy regime. The analysis of the policy actors limits itself to governmental bodies, energy cooperatives and associated alliances that the cooperatives are possibly involved in. The starting point of policy document analysis is the Climate Agreement and the associated RES programme. This starting point was chosen as the RES programme highlights the presence of sub-national policy regimes. Moreover, the Climate Agreement and the RES programme inherently entails niche-regime interactions because of the associated policy goals of local ownership and participation in RE projects. Aspects from the Environmental Act and the Environmental Vision will be highlighted as well as this represent the regulations with regards to RE projects. As most energy cooperatives focus on solar energy, policy frameworks for solar energy will be taken into consideration as well.

The choice to focus on regional energy cooperatives is based on the fact that these cooperatives are operational on a regional level, while also closely collaborating with local energy cooperatives in the region. Thereby this focus makes it feasible to perform a comparison with regards to niche development between different energy regions. It should be noted that while solar energy has gained substantial popularity in the Netherlands, it is not the most viable option. The Netherlands has only limited hours of sun and it is a small, overpopulated, country, meaning that only limited space is available for large-scale solar parks. In addition, an inefficient ratio of solar and wind energy can lead to grid instability.

As this study focuses on solar energy, the alignment of the energy policy regime with the wind energy cooperatives is not included, as well as those cooperatives concerning themselves with sustainable heating networks. Future research might include these forms of cooperatives as well.

## 3. THEORETICAL FRAMEWORK

### 3.1 The Multi-Level Perspective and the Dutch context

To frame this research, the Multi-Level Perspective (MLP) framework is a useful approach. MLP is a robust, heuristic framework that has proved its usefulness in many empirical studies on sustainable transitions (Ajaz & Bernell, 2021; Bilali, 2019; Geels, 2002; Geels & Schot, 2007; Roberts & Geels, 2019; To et al., 2018). MLP distinguishes three levels within a sociotechnical system; niche innovations, sociotechnical regimes, and a sociotechnical landscape (see figure 1) (Geels, 2002)

During a socio-technical transition, the regime gets destabilised and replaced by a new, more stable, regime (Geels, 2002). Regime change is a function of changing pressures on the regime. An adaptive regime can adequately deal with these pressures. However, in the case of a weaker regime, niches are formed that challenge the regime. (Smith et al., 2005) External pressures originate from the landscape. While normally landscape developments stabilise the incumbent regime, disruptive developments in the landscape pressure the regime and create a “window of opportunity” for niche innovations. When such an opportunity is created, niche innovations can challenge the regime. (Schot & Geels, 2008)

The landscape creates the context in which interactions between the different actors take place (Geels, 2002). Climate change and the associated international climate agreements form exogenous factors from the landscape that destabilise the incumbent energy regime in the Netherlands. A socio-technical regime encompasses all processes connected to stabilising a certain technical development. (Geels, 2002) As part of the socio-technical regime there is the

policy regime that keeps the incumbent technology in place through political support by powerful actors. Governmental actors in the energy policy regime include political authorities on the different spatial levels; national bodies such as the Ministry of Economics and Climate and the Netherlands Enterprise Agency (RVO), regional policymakers consisting of the provincial states and water authorities, and local policymakers of the municipalities (Rijksoverheid, 2019).

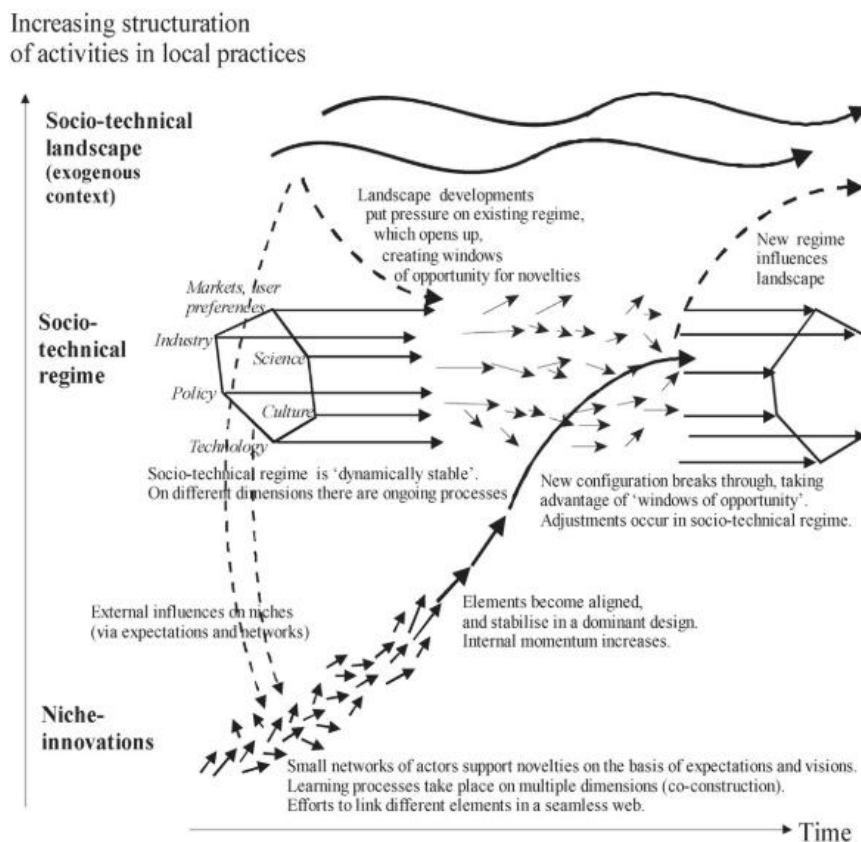


FIGURE 1: VISUAL REPRESENTATION OF THE MLP FRAMEWORK (SCHOT & GEELS 2008)

Niches are protective spaces where radical innovations are developed, nurtured, and protected from regime pressures by a network of change-makers. User practices, regulatory structures and technologies are co-evolving as the niche is developing (F. W. Geels, 2002; F. W. Geels & Schot, 2007; Nill & Kemp, 2009; Schot & Geels, 2008). Niche innovations build up momentum through learning processes, and support from powerful actors (F. W. Geels & Schot, 2007). Originally, the focus was mainly on radical technical innovations (Geels, 2002) however, later research has elaborated on sociotechnical, or, grassroots, innovations in a sustainable transition (Arentsen & Bellekom, 2014; Hossain, 2018; Seyfang & Smith, 2007). The niche of energy cooperatives is important in the Dutch context, because of the national goal to reach 50% local ownership (Rijksoverheid, 2019). Niche advocates are working together in regional- and national organisations (De Participatiecoalitie, n.d.-a; Energie Samen, n.d.-a; HIER Opgewekt, n.d.).

### 3.2 Limitations of MLP

MLP is a suitable framework for analysing long-term sustainable transitions and provides an approach for strategic thinking about transitions. MLP represents an integrative approach on transitions by approaching transitions in a multi-dimensional way. Three levels are conceptualised that include the different actors and processes at the different levels. This allows for an analysis of actor activities and the interactions between these activities that result in a transition. By providing broad outlines, MLP provides a framework that allows for the integration of

theories from other scientific disciplines to further conceptualise more detailed elements. However, this is also where the criticisms towards MLP originate from. It does not adequately conceptualise more detailed processes in a transition (Geels, 2019). In this research MLP will be enriched with the following elements. First, the spatial dimensions of the regime and niche will be explored more. Second, niche-relevant processes like the role of niche advocates and their interactions with regime actors. Finally, the policy regime and the role it plays in niche development.

Including the spatial dimensions in MLP contributes to a better understanding of transition trajectories. It helps to comprehend the spatial implications of energy governance, and allows for an analysis of spatial differentiation of niche-regime interactions and niche development, which influences the transition trajectory. (Raven et al., 2012) Interestingly, in many empirical research the landscape represents supranational developments, a regime is located on the national scale, while the niche seems to operate on the local scale. However, Raven et al. (2012) argue that *“there is no reason to conflate the MLP levels with specific territorial boundaries.”* as MLP does not relate the analytical levels to a specific spatial scale. Indeed, as we will see in this research, the policy regime and the niche are present across multiple spatial scales.

Internal niche dynamics are neglected in the broader context of MLP. Smith et al. (2010) suggest that more light needs to be shed on topics such as common agenda building and how niches can act as political actors. Moreover, the concept of protective spaces and the processes in which niches move beyond the protective spaces need to be explored more (Smith et al., 2010). To gain more insights on niche dynamics, findings from the Strategic Niche Management (SNM) will be discussed. By taking findings from SNM literature, an analysis of activities from both niche- and regime actors and their influence on niche development can be performed.

Finally, MLP lacks policy-relevant dimensions (Weber & Rohracher, 2012). Little is included on the political interactions and policy processes that affect niche development. The different policies and their interactions within the different spatial scales of the regime and the niche are not conceptualised in the MLP framework. Insights from policy theories can enrich the MLP framework in this regard. (Weber & Rohracher, 2012; Smith et al., 2010). Literature on concepts such as the policy mix and governance approaches in sustainable transition will be used to enrich MLP. The influence of the policy mix on niche development and diffusion, and thereby on the overall transition trajectory, will be discussed

### **3.3 Enrichment of MLP**

#### **3.3.1 Niche dynamics**

To enrich the MLP framework with a more in depth understanding of the process of niche development and diffusion, findings from SNM can be used. SNM states that sustainable innovations come about through the construction of protective spaces where experiments take place. Once they are constructed properly, niches can then evoke broader societal change. (Schot & Geels, 2008). SNM distinguishes three processes that stimulate innovative developments; shielding, nurturing and empowerment (Smith & Raven, 2012; Raven et al., 2016).

First, shielding consists of processes that hold back selection pressures from the regime. This can be done in passive protective spaces where selection pressures are less present, or through active shielding. Active shielding can entail policies that can alter technology preferences. (Smith & Raven, 2012) Second, nurturing are the processes that facilitate innovation development. These processes include the articulation of visions and expectations to provide directions to learning processes, the building of social networks to create a network of relevant actors, and facilitating learning processes at different dimensions (Schot & Geels, 2008a). Lastly, empowerment works to make niches more competitive with the dominant regime. There are two types of empowerments; ‘fit-and-conform’ and ‘stretch-and-transform’ (Smith & Raven, 2012). Fit-and-conform processes allow the niche to become competitive with mainstream practices, without altering the selection pressures from the regime. Niches can become competitive without changing the established institutions, infrastructure and networks of the regime.

This can be done by making them more cost-competitive with established technologies. Stretch-and-transform processes empower niches to undermine the current regime and integrate new norms and values. The selection pressures of the regime need to be transformed so that more sustainable alternatives can flourish. This requires changes in the regime, but also societal changes. For this, powerful actors need to be engaged in advocating new configurations. Stretch-and-transform policies include environmental regulations, which drives actors to invest in cleaner niche options. (Smith & Raven, 2012).

In niche development, local and global network of actors can be distinguished. Local networks of niche advocates facilitate inward-oriented activities that aim to develop new socio-technical configurations that can be integrated into incumbent regimes. Global networks of niche advocates are especially important in stretch-and transform-processes. These actors are engaged in outward-oriented activities that promote socio-technical developments to the wider context and hope to gain political and social support this way. (Smith & Raven, 2012) By forging partnerships, lobbying in the wider context, and developing workable solutions that matter in the changing policy environment, these niches can advocate for more policies that further stimulate niche developments (Hargreaves et al., 2013; Smith, 2007). Dóci et al. (2015) found that the support of powerful regime actors is needed to strengthen the position of the niche in the regime.

Networks of niche actors can be active on regional, national or even supranational scales and share knowledge and best practices between these spatial scales (Raven et al., 2012). Fontes et al (2016) found that in the case of wave energy technology, the initial construction of a protected space was constructed through transnational activities of niche actors. They also showed that interactions between different spatial levels take place that can influence the overall niche development. For instance, events on the local level can provide learning opportunities which require a reconfiguration of expectations that are integrated into the higher niche levels. (Fontes et al., 2016) Späth and Rohracher (2012) saw that local vision building and learning processes demonstrate the feasibility and credibility of sustainable alternatives, which can strengthen actor networks and alternative institutions on larger spatial scales. In addition, Dóci et al. (2015) showed that generic rules and practices are formed through local experimentation and are shared among the regional or national networks of niche advocates through intermediary organisations. Generic rules and practices consist of context-independent problem agendas, handbooks, and generic models for, for instance, project development. Geels and Deuten (2006) emphasise the importance of intermediary organisations in knowledge sharing. By providing knowledge platforms, actor networks are created among which expertise and best practices on common problems are shared. Local niche development can thereby be stimulated as the acquired knowledge be applied to solve problems on a local level. Creating generic rules and lessons is important for niche development as it results in stabilised and institutionalised niche practices, creating a type of 'proto-regime' (Dóci et al., 2015)

Späth and Rohracher (2012) found that on a local level a favourable societal context can be created that stimulates niche development. To evoke local change, a heterogeneous actor network should be in place that is able to gather the necessary resources, such as funds, attention, and credibility for a new, sustainable configuration. Dóci et al. (2015) support the notion that for the success of a niche, the heterogeneity of its actor network is vital.

As mentioned previously, support from regime actors is also important for niche development. By gaining the support of local policy makers, niche actors can advocate for the institutionalisation of niche practices in local policy regimes, which can then be adapted in regional- or even national regimes. By adapting new innovative technologies that differ from the incumbent regime, cities or regions can showcase the feasibility of these technologies. For instance, by developing a collectively owned solar park, municipalities can promote the feasibility of collective RE projects to the wider context. Showing the feasibility and desirability of new technolo-

gies on the local scale can provide opportunities for the mobilisation of resources and authorities needed for further institutionalisation in regional- or national policy regimes. (Späth & Rohracher, 2012)

In this research I analyse the niche and niche-regime interactions following findings from SNM. SNM proposes three processes that contribute to niche development and diffusion; shielding, nurturing, and empowering processes. Empowering processes can be either classified as 'fit-and-conform' or 'stretch-and-transform'.

The activities of niche advocates are classified as being either inward-oriented or outward-oriented. Inward-oriented activities are focused on nurturing the niche through learning processes that contribute to new configurations. Outward-oriented activities are aimed at promoting niche practices to the wider context and are focused on creating social and political support, which is especially important in stretch-and-transform processes.

The literature further defines important niche characteristics; stabilised learning processes and generic rules among the local niches, support of powerful regime actors, heterogeneity of the actor network and local practices.

To assess the integration of the energy cooperative niche in the energy regime I will analyse the niche processes as described in SNM and assess the niche characteristics. Niche advocates need to perform inward-oriented, nurturing niche activities to create a robust energy cooperative niche. A robust niche consists of a heterogenic actor network that shares generic rules and learning processes among the different local niches. In addition, niche advocates need to perform outward-oriented niche activities to create political support for energy cooperatives and facilitate diffusion of niche practices in the wider societal context. A higher degree of political support can result in more financial support for the niche.

### 3.3.2 Policy regime

As part of the regime, there is the policy regime. The policy regime plays an important role in a socio-technical transition. Policies can influence niche development and diffusion through shielding, nurturing, and empowering processes (Smith & Raven, 2012).

MLP does not confine a regime to one spatial scale. Actor networks and institutions can span across more than one spatial dimension. It can be said that in an energy transition, a policy regime is present at the national, regional, and local level, as provinces, or regions, and municipalities contribute to national policy goals. These policy regimes show interlinkages as national institutions and policy frameworks influence regional- and local- policy frameworks. Furthermore, the network of policy actors spans across all three levels, as local and regional authorities are represented in national networks. Roesler and Hassler (2019) confirm the notion of separate policy regimes. They found that variations in policies on regional and local scales result in different "*sub-national special regimes*".

The local energy policy regime is nested in the regional regime, which in turn is nested in the national regime. This vertical nesting of regimes can cause misalignments or inconsistencies between regime structures. Misalignments can be problematic as it can lead to missing regional or national policy objectives. At the same time, certain misalignments or inconsistencies between the regimes can provide a space for the development of new practices on local scales that can provide solutions for these inconsistencies. For instance, building the credibility of new practices in a city or region can strengthen actor networks and institutions on the national scale (Späth & Rohracher, 2012). Roesler and Hassler (2019) confirm that local and regional policy makers can create a supportive niche environment by responding to gaps in the national policy regime. In the case of German bio villages, regional and local authorities identified barriers in the national policy regime and created regional supportive frameworks to complement national supportive instruments.

In the context of sustainable transitions, scholars often refer to the adequacy of the 'policy mix' (Rogge & Reichardt, 2016). Policy mixes are needed in the complex configurations of sustain-

able transitions, where a change in many sectors is required. Much research has been performed on the right policy mix for sustainable transitions e.g. (Edmondson et al., 2019; Kivimaa & Kern, 2016; Roberts & Geels, 2019; Rogge & Reichardt, 2016; Tsoutsos & Stamboulis, 2005). In earlier research, the concept of policy mix often referred to the mix of policy instruments. Rogge & Reichardt (2016) instead conceptualise policy mix as a broader and more systemic concept that includes not only policy instruments but also the policy strategy, the policy process, and policy characteristics. A policy strategy consists of the policy objectives and the plans to achieve them. Policy instruments are the tools to achieve the policy objectives. The policy process constitutes the process of policy making and implementation.

For this research it is relevant to look at the policy process and strategy to assess the niche-regime interactions. This includes the participation of cooperatives during the policy process but also the integration of the role of energy cooperatives in the policy strategy that is subsequently formed. Ratinen and Lund (2015) found that niche actors must be included in policy processes to generate a more inclusive policy outcome. Moreover, public inclusion in the policy process and policy outcomes was found to be vital for niche developments and wider socio-technical change. (Ratinen & Lund, 2015)

Geels et al. (2015) discuss three governance approaches that are used in sustainable transitions. First, the market-driven model. Here, the government creates incentives but gives room for autonomous actors to choose freely on how to adapt these incentives. Policy instruments in this approach include financial instruments such as subsidies and taxes. Second, the classic steering model. This approach is more hierarchical, as the government sets goals and directs actors on how to contribute to these goals. Policy instruments include formal rules, laws, and regulations. Finally, the network governance approach. This paradigm entails mutually dependent interactions between the government and actors. Policy instruments of the network governance approach are aimed at facilitating experiments and public debates, network management, and vision building. While the first two policy approaches are more concerned with traditional, 'regulatory' policies, the latter is more concerned with innovative policies that encourage niche development (Geels et al., 2015). Robert and Geels (2019) show that policies from the network governance approach are important in the early stages of a transition. However, once niches are stabilised and the regime is weakened, traditional policy instruments from the market model and classic steering approaches are needed to facilitate niche diffusion and accelerate the transition. (Robert & Geels, 2019)

With regards to financial policy instruments for RE deployment, the current discussion focuses on Feed-In Tariffs (FiTs) and Tradable Green Certificates (TGCs) (see table 1). FiTs are a form of generation-based, price-driven incentive. With FiTs, electricity producers receive a set amount of subsidy for the electricity that they produce. Production tax incentives work similar to FiTs, producers receive a tax exemption for the RE produced. Thus while FiTs provides additional revenue, production tax incentives present negative costs. TGCs are quantity-based, price-driven incentives. Here the government sets targets for RE deployment and obliges energy producers to contribute. Thereafter a market is established and electricity producers can obtain profit from selling their certificates.

FiTs have been used in several European countries as an effective policy instrument for the last decades to promote RE deployment. (Marques & Fuinhas, 2012; Nicolini & Tavoni, 2017; Verbruggen & Lauber, 2012; Zhang et al., 2014) FiTs send clear market signals and offer a safe environment for investors and RE operators. Held et al. (2006) found that FiTs have been more effective than TGCs in promoting specific RE technologies in the short run. In addition, they are easier to implement and have lower administrative costs. However, one drawback of FiTs are that they do not address the high investment costs of RE installations. Investors thus need to have the financial means to cover these high costs before receiving the benefits.

The FiT system should be dynamic with decreasing tariff rates over time, reflecting the learning processes that make RE generation cheaper. This calls for flexibility of the system as a response to changing markets (Davies & Allen, 2014). Zhang et al. (2014) state that FiTs can be

considerably reduced or even completely eliminated in the future, as electricity costs and efficiency of RE will become comparable with current electricity prices. While subsidy policies have proven their success, it should be noted that long-term dependence on direct subsidies might result in a large economic burden (Marques & Fuinhas, 2012).

TABLE 1: OVERVIEW OF MAIN FINANCIAL POLICY SUPPORT INSTRUMENTS (HELD ET AL., 2006)

Policy instrument	Characteristics	Benefits	Drawbacks
<b>FIT</b>	<ul style="list-style-type: none"> <li>• Generation-based, price-driven incentive</li> <li>• Fixed amount of money given for RE production/premium price on top of normal market price</li> </ul>	<ul style="list-style-type: none"> <li>• Stable and secure market</li> <li>• Enhances market access for investors and participants</li> <li>• Allows for technology-specific promotion</li> </ul>	<ul style="list-style-type: none"> <li>• Distorts electricity market prices</li> <li>• Does not address high up-front prices of RE installations</li> </ul>
<b>TGC</b>	<ul style="list-style-type: none"> <li>• Generation-based, quantity-driven incentive</li> <li>• Government sets target, obliges producers to fulfil targets.</li> </ul>	<ul style="list-style-type: none"> <li>• Strong regulation of capacity development</li> <li>• Costs less than FIT</li> </ul>	<ul style="list-style-type: none"> <li>• Does not distinguish between technologies</li> <li>• Less attractive for investors because of market fluctuations</li> </ul>
<b>Production tax incentives</b>	<ul style="list-style-type: none"> <li>• Generation-based price-driven incentive</li> <li>• Payment exemptions from the electricity taxes for all producers</li> </ul>	<ul style="list-style-type: none"> <li>• Works similar to FIT, but presents a negative cost instead of additional revenue</li> </ul>	

An enabling policy regime that stimulates niche development is vital during a transition. The policy mix is an important component of the policy regime. In this research I will focus on the policy strategy and the policy process of the policy mix. Literature shows us that niche actors need to be included in the policy process to generate inclusive policy outcomes and accelerate niche innovations. Inclusive policy outcomes entails a policy strategy that has integrated a role for energy cooperatives and has appropriate policy instruments in place to stimulate their development. Policy instruments can empower the niche through fit-and-conform or stretch-and-transform processes. To facilitate the integration of niche norms and values, policies need to be in place to stretch-and-transform the incumbent energy regime and allow the integration of more sustainable practices. In addition, policy regime actors need to shield the niche from pressures of the incumbent energy regime through supportive policy instruments. Finally, the policy regime can nurture the niche by facilitating learning processes and stimulate the formation of a niche network.

Two types of financial instruments are primarily used; FITs and TGCs. Literature shows that especially FITs are used among many European countries and outperform TGCs with regard to RE deployment. FITs are easier to implement and have lower administrative costs compared to TGCs. Furthermore, FITs allow for technology-specific promotion. FITs therefore seem the most suitable option to stimulate niche developments among energy cooperatives. However, FITs do not account for high up-front prices for RE installations and can distort electricity market prices. This can pose difficulties with regards to project development by the niche.

Three governance approaches for sustainable transitions were discussed. It was seen that the network governance approach is necessary in early transition stages for niche development, and the market-driven, and classic-steering approach are needed in later stages to facilitate niche diffusion. For a successful transition, the policy regime should therefore include elements from all three approaches.



### 3.4 Framework application

For this research MLP was enriched to better comprehend the spatial dynamics, policy dimensions, and niche processes in a transition. With the use of these concepts a theoretical framework is formed to assess the enabling properties of the policy regime in facilitating niche development and diffusion. Furthermore, the internal niche dynamics of the energy cooperative niche will be analysed and its interactions with the energy policy regime, to determine its role in facilitating the energy transition.

#### 3.4.1 Criteria for a successful niche and RECs

One of the sub questions this research aims to answer is “How do regional energy cooperatives facilitate the regional and local energy transition?”

To answer this sub question MLP was enriched with concepts from spatial studies and SNM. Within MLP, RECs can be seen as niche actors that perform niche activities that are can be both inward- or outward-oriented. Important inward-oriented activities nurture the niche and include the formation of a heterogenic actor network. Furthermore, facilitating learning processes and knowledge sharing are important inward-oriented activities that create a set of common rules and practices. Common rules and practices help to stabilise the niche and create internal momentum to challenge the incumbent regime. Outward-oriented activities empower the niche and entail interactions with powerful regime actors to create political support. To ensure niche development and diffusion, both type of activities are equally important.

Niche activities take place across different spatial scales and have the potential to influence overall niche development. For instance, the shaping of general rules and practices takes place between different levels of the niche. For this, intermediary organisations, like RECs need to be in place to facilitate knowledge sharing between the national and local niche levels.

All in all, RECs have the potential to facilitate the regional and local energy transition performing inward-oriented activities that are aimed at the formation of heterogenic niche networks in the regions and facilitating knowledge sharing among this network to create a common agenda of rules and practices. In addition to these inward-oriented activities, RECs can lobby in the local and regional policy regimes to increase the political support for the niche. This contributes to the energy transition as policies can stimulate cooperatives to engage in more RE projects, while contributing to national policy goals of local participation and ownership.

The following criteria are composed to assess the niche and the activities of RECs:

- A heterogenic actor network (Dóci et al., 2015)
- Sharing of general rules and practices among the local niches (Dóci et al., 2015)
- RECs need to facilitate knowledge sharing among the local niches (Geels & Deuten, 2006; Hargreaves et al., 2013)
- RECs need to perform inward-oriented, nurturing niche activities (Schot & Geels, 2008; Smith & Raven, 2012)
- RECs need to perform outward-oriented, empowering niche activities (Hargreaves et al., 2013; Smith, 2007; Smith & Raven, 2012)

In accordance with this, the following sub questions are formed that help to assess how RECs are facilitating the regional and local energy transition:

- How do RECs ensure the formation of a heterogenic network?
- How do RECs facilitate knowledge sharing?
- What inward-oriented activities do RECs perform and how does it stimulate niche development?
- What outward-oriented activities do RECs perform and how does it empower the niche?

### 3.4.2 Criteria for a successful policy regime

The remaining sub questions this research aims to answer are: “What energy policy regime is in place on the different spatial scales?” and “How are the different energy policy regimes connected?”. Following MLP the energy policy regime is situated in the energy regime, which is destabilised by exogenous landscape pressures.

Important elements of the policy regime are the policy mix, the policy network and the governance approach. To assess the policy mix the policy goals, policy instruments, and policy process will be analysed. This will also include an analysis of the policy network, with an emphasis on governmental institutions and niche actors. To accelerate niche development niche advocates need to be included in the policy network and take part in the policy process. Including niche advocates in the policy process will result in more inclusive policy outcomes. I define inclusive policy outcomes as a policy strategy that has integrated a role for energy cooperatives and has stimulative policy instruments in place.

In sustainable transitions, the policy regime can use elements of three governance approaches; network governance, classic-steering, and market-driven. While the network governance approach is important in the early stages of a transition, the market- and classic-steering models are needed in later stages. Putting this in the context of MLP, the network governance approach helps to build up the momentum of niches by facilitating experiments, knowledge transfer, and the formation of actor networks. The classic-steering model opens up the regime by setting national sustainability goals that can be fulfilled by the niche. The market-driven approach facilitates niche diffusion by offering financial instruments that can be used to invest in niche practices. For the correct guidance of the energy transition, elements from all three governance approaches need to be included in the policy regime.

The energy policy regime can stimulate the development of the energy cooperative niche through three processes, derived from SNM. First, the energy policy regime can shield the niche from energy regime pressures through financial support mechanisms, like FITs. Second, the regime can nurture the niche by stimulating the professionalisation of cooperatives and facilitating knowledge sharing. Finally, stretch-and-transform policies can empower the niche and facilitate the integration of sustainable practices in the energy regime.

Because of the polycentric characteristic of energy governance, it can be said that there are distinct policy regimes in place on different spatial scales. On each spatial scale the policy regime has its own policy network, institutions, and regulations. The policy regimes are vertically nested; the national regime influences the regional- and local regimes. Vertical nesting can lead to misalignments or inconsistencies, which can have negative implications. Local and regional policy makers can respond to these inconsistencies and create a supportive environment for the niche. Indeed, literature showed that local and regional deviations in the policy regime influence transition trajectories, as local deviations can stimulate niche development that can strengthen national actor networks and institutions in favour of the niche.

In this research, the interconnectedness of the vertically nested regimes will be assessed by looking at how the higher regime levels influence the regimes at the lower spatial levels. Regional and local deviations from national regulations and normative actor roles will be identified. Furthermore, misalignments between the levels will be highlighted.

Following the literature, criteria for an enabling energy policy regime are set as follows:

- The policy process needs to include niche advocates (Ratinen & Lund, 2015; Rogge & Reichardt, 2016)
- Stretch-and-transform empowering policies need to be in place (Smith & Raven, 2012)
- Nurturing policies need to be in place to stimulate niche professionalisation (Smith & Raven, 2012)
- The policy strategy needs to contain elements from all three governance approaches (F. W. Geels et al., 2015; Roberts & Geels, 2019)

- FITs need to be in place that shield and empower the niche from incumbent energy regime pressures (Held et al., 2006; Smith & Raven, 2012)

The following sub questions are formed to then assess the policy regimes on their enabling quality, how they interact with the niche, and to determine the interconnectedness of the different regimes:

- How are niche advocates included in the policy mix?
- What are the regime's intended interactions with the niche?
- How are the energy policy regimes on the different scales influencing each other?
- What misalignments are there between the different spatial scales?
- What local- and regional deviations from the national policy regime are there and how do they influence niche development

## **4. RESEARCH APPROACH**

Through desk research a thorough analysis of national, regional and local energy policy documents will be performed to identify the energy policy regime on the different spatial levels. Misalignments between the policy regimes and regional- and local policy deviations will be identified. The approach is as follows. First, an analysis of national policy documents will be performed to identify the national energy policy regime. Next, an analysis across the provinces and RES regions will be performed. From this analysis approximately five regions will be chosen for a deeper analysis of the regional and local energy policy regime in those regions. As there are different biophysical and social contexts in the RES regions, the niche-regime interactions might differ per RES region. For that reason the selection of the RES regions will take this into consideration. The energy policy regime analysis will be enriched by using the data gathered from HIER Opgewekt on how energy cooperatives apply the different policy instruments.

To answer the research question on how RECs facilitate the regional and local energy transition information will be gathered on RECs through desk research and semi-structured interviews will be held with representatives from RECs. During these interviews information will be gathered on the organisation of niche advocates in the regions, their network, how niche advocates interact with the policy regime and whether the policy regime is perceived as supportive for niche development.

### **4.1 RES region selection**

As mentioned previously, five RES regions will be selected for the regional and local analysis. To select these regions the following factors will be taken into account; respective solar targets, collective solar capacities and the dispersity of energy cooperatives. Based on these factors five RES regions were chosen for further analysis: Friesland, Groningen, Noord-Holland Zuid, Cleantech and Rivierenland. The reasoning behind this selection will be elaborated on in section 5.1.2.

## 5. RESULTS

### 5.1 ENERGY POLICY REGIMES

In this section I will answer the sub questions: “What are the policy regimes on different spatial scales” and “How do these policy regimes influence each other?”.

I will introduce the energy policy regime in the Netherlands at the different spatial scales by identifying aspects of the policy regime such as the main policy goals, the policy network, the policy frameworks, and the policy instruments that interact with the niche. The intended interactions with the niche will be analysed using concepts from SNM. I will also discuss how the different policy instruments are put to practice by energy cooperatives by providing examples. A summary of the important characteristics of the energy policy regimes is provided in table 3.

#### 5.1.1 National energy policy regime

Global warming and the associated climate change represent exogenous landscape factors that exert pressure on the fossil fuel regime. The destabilisation of the fossil fuel regime has caused a shift in the international energy policy regime, where political support is shifting away from fossil fuels towards RE. International climate agreements were introduced to keep global warming below 1.5 degrees Celsius. Under the international Paris Agreement, each country is expected to outline and communicate their prospective climate actions under what is known as the Nationally Determined Contributions (NDCs). Collectively, the NDCs determine whether or not the long-term goals of the Paris Agreement can be reached (UNFCCC, n.d.)

In the Netherlands, the Climate Agreement was introduced as the national policy framework for climate action. Through the Climate Agreement the Dutch government contributes to the international aspirations. The Climate Agreement encompasses a set of measures to reduce the Dutch greenhouse gas emissions and targets five sectors that need to reduce emissions; electricity, built environment, agriculture, industry and mobility. It thereby connects actors from different domains; the industry, the social-, and the political regime and sets the roles of the different actors in the changed policy environment.

An important policy goal of the Climate Agreement is to increase the RE capacity to 84 TWh in 2030, of which 35 TWh should be on land. To ensure social support for RE on land, 50% should be locally owned. Local ownership is not defined in the Climate Agreement, but it gives incentive for regional and local policy makers to adapt a fitting definition of local ownership in regional and local policy frameworks (Rijksoverheid, 2019).

#### RES programme

To increase RE on land, the Regional Energy Strategy (RES) programme was introduced. As part of this programme, the Netherlands is divided into 30 energy regions that need to form a regional planning strategy for RE on land. This programme introduces a new level of energy governance; the regional energy policy regime. Regional and local authorities (municipalities, water authorities, and provinces) form a regional policy network with actors from different domains including civil society, regional network operators, and businesses. Local energy producing initiatives and owners of RE installations take part in the policy process of the RES as well. (Rijksoverheid, 2019) The RES addresses the sectors built environment and electricity, regions can add policy strategies to address the other three sectors. To allow for improvements in transition strategies and the integration of ongoing sectoral developments, the RES has to be renewed every two years. The regions had to release a concept RES in 2020, and have released RES 1.0. Regions are currently working on the RES 2.0, which is set to be released next year. Before the release of every RES, a draft needs to be agreed upon by the Interprovincial Consultation (IPO), the Union of Water Boards (UvW) and the Association of Dutch Municipalities (VNG). (Rijksoverheid, 2019). To monitor the progress of the RES regions, the government has appointed the Netherlands Environmental Assessment Agency (PBL) (Rijksoverheid, 2019). (PBL, 2021)

To connect the national and regional policy regimes, the National Programme RES (NP RES) was formed. NP RES functions as a national advisory body for the energy regions. It offers a knowledge platform for regional policy actors through which best practices can be shared, and discussions between the different regions are facilitated. Furthermore, it provides guiding principles on local participation and ownership that can be integrated into regional and local policy regimes (Nationaal programma RES, n.d.) Feedback from regional and local policy makers is integrated into guidelines that the NP RES regularly publishes.

The NP RES was constructed and is being conducted by the ministries of Economic Affairs and Climate Policy (EZK) and Interior and Kingdom Relations (BZK), VNG, UvW, and IPO. The NP RES is advised by a programme council, which consists, among others, of governmental representatives across the Netherlands, Dutch network operators, ES, Natuur- en Milieufederaties, PBL and the Participation Coalition (NP RES, 2022; Rijksoverheid, 2019).

The Participation Coalition is a policy alliance between societal actors that advises regions and municipalities on how to engage citizens in the energy transition. The alliance consists of HIER, ES, Natuur- en Milieufederaties, Buurkracht and LSA bewoners (De Participatiecoalitie, n.d.-b). As previously mentioned, ES is the national representative body of energy cooperatives (Energie Samen, n.d.-b). LSA bewoners and Buurkracht form networks of resident initiatives and guides them in their collective actions (Buurkracht, n.d.; LSA, n.d.). HIER helps residents, businesses, and collectives with sustainable energy and CO<sub>2</sub> reduction projects (HIER, n.d.). Lastly, Natuur- en Milieufederaties is represented in all provinces and concerns itself with a liveable and sustainable environment. The organisation lobbies on a national and provincial level, facilitates knowledge sharing, and enhances social support for climate action (Natuur- en Milieufederaties, n.d.).

### **Environmental act**

As a result of exogenous landscape pressures and niche developments, the energy policy regime has integrated new regulations for RE deployment and its environmental impact. In the Netherlands, the Environmental Act forms the basis of environmental law. While the new law is not yet active, it is planned for the end of 2022/the beginning of 2023 (Rijksoverheid, n.d.). The Environmental Act obliges the national government, provinces, and municipalities to form environmental visions. In addition, municipalities have to create an environmental plan that sets the environmental rules on the local scale. As part of the Environmental Act, a National Environmental Vision (NOVI) was presented (MBZK, n.d.-b). In the NOVI a political norm is given for solar panel placement; the Zonneladder, that can be integrated and adapted into regional and local energy policy regimes to fit the biophysical and social context of a place (MBZK, n.d.-a). (see appendix 1 for a visualisation of the Zonneladder)

The new regulations influence the role of local policy regime actors. Under the environmental act, initiative takers of any project with a spatial impact become responsible for local participation. When an environmental permit is requested, the initiative taker needs to show how and when the relevant stakeholders were involved in the process. The role of local authorities thereby changes from initiating projects to facilitating projects. (Rijksoverheid, 2019; Rijnveld & van Schie, 2019). Following the Act, the RES needs to reflect how the various stakeholders were involved in the environmental planning of the regions' municipalities and the results of this participation process. On a local level it gives room to municipalities to form their own rules on process- and financial participation and local ownership. (Rijksoverheid, 2019) The Environmental Act influences niche-regime interactions on the local level. Cooperatives interact with local regime actors by working together on creating local participation. By offering solutions to local regime actors, the niche creates political support in a changing policy regime.

### **Financial policy instruments**

Financial policy instruments have been introduced in the national energy policy regime, as a response to exogenous landscape pressures to reduce CO<sub>2</sub> emissions and thus phase out

fossil fuels. The Regeling Verlaagd Tarief (RVT) was in place until April 1<sup>st</sup> 2021 and exempted participants in RE project from paying electricity taxes on the electricity they produce with their share in the project (ECoop, 2022). However, this regulation has since been replaced by the Subsidieregeling Cooperatieve Energieopwekking (SCE). With the SCE, local energy cooperatives receive a set amount of subsidy per kWh produced each year for a project to make the installation feasible, which is (partly) given to the participants of the project (RVO, 2021c). Additionally there is the Stimulerend Duurzame Energieproductie en Klimaattransitie (SDE++), which is aimed at larger projects and works similarly to the SCE. This subsidy scheme was renewed in 2021 to allow a wider span of carbon mitigating projects (RVO, 2021a). The RVT was a production tax incentive, while the new SCE and SDE++ are a form of a Feed-In Tariff (FIT).

The RVT has been adapted innovatively by the cooperatives. For instance, the 'Op Rozen' concept was developed by a cooperative to make participation more financially accessible, and has been applied by several cooperatives in Twente (Coöperatie Bommelerwaard, n.d.; CORF, n.d.; Hellendoorn op Rozen, n.d.; Hof van Twente op Rozen, n.d.) In this concept majority of the investment costs is obtained through borrowed capital. Part of the electricity bill savings is then used to pay off these loans. The rest of the savings will go the participations or put in a shared fund for other projects. This results in smaller investments needed by the participants.

In addition to the national subsidies, ES has set up a realisation fund for energy cooperatives that have received the SCE or SDE++ subsidy. This fund is financed by Rabobank, Triodosbank and ASN. Energy cooperatives can apply and take on a loan for maximally 75% of their investment costs. The remaining investment costs need to be financed through own capital or obligations. (Energie Samen, n.d.-c)

### **5.1.2 Regional and local energy policy regime**

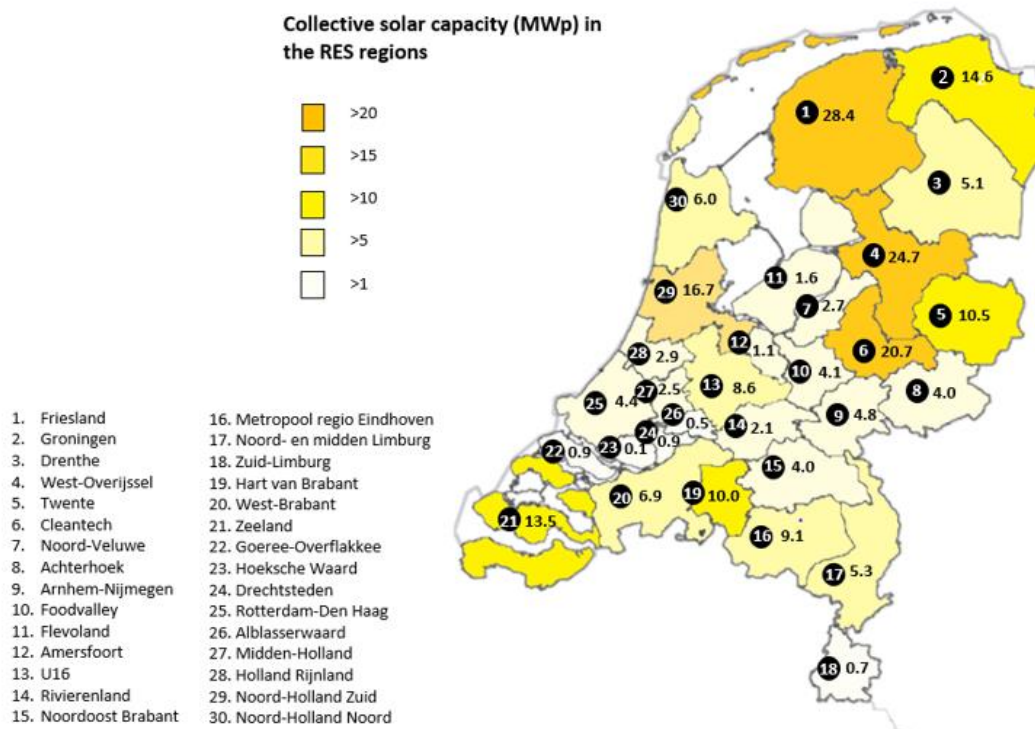
In the previous section the national energy policy regime in the Netherlands was discussed. In the following section the regional and local energy policy regime of selected regions will be analysed. First, a short overview will be given on the status of solar energy in the provinces and the RES regions, as well as the disparity of solar energy cooperatives. Additionally, the available provincial support mechanisms for energy cooperatives will be analysed. Following the region selection as described in 4.1, the regional- and local energy policy regimes of Groningen, Friesland, Noord-Holland Zuid, Rivierenland, and Cleantech will be analysed in more detail.

#### **Solar energy and initiatives in the regions**

As previously mentioned, this research focuses on solar energy, as this is, in general, socially more willingly accepted than wind energy. This is also reflected in the RES bids. In the most recent PBL report an increase in the total bid of the regions was seen in the RES 1.0, compared to the concept RES. This increase is mostly due to more ambitious solar targets in multiple regions. An extra of 3.3 TWh solar energy was added. (PBL, 2021) Taking a look at the solar ambitions of the RES regions it can be seen that Noord-Holland Zuid has the highest solar target (2.3 TWh). Likewise, Groningen and Drenthe have high solar targets of over 2 TWh (PBL, 2021) While Groningen and Drenthe are planning to add a substantial amount of wind energy, Noord-Holland Zuid's primary focus is solar energy. This can be linked to the biophysical conditions of the regions. Noord-Holland Zuid is a highly urbanised region, meaning that little room is available for wind turbines. Groningen and Drenthe on the other hand are rural regions, with more space for wind parks and ground-mounted solar parks.

In total 927 collective solar projects have been realised since 2008 with a collective capacity of 217.2 MWp in 2021 (HIER Opgewekt & RVO, 2022). CBS shows that in 2020, the total solar capacity of the Netherlands was 10.9 MW (CBS, 2020). The capacity of collective solar projects therefore only makes up a small part of the total solar capacity. Indeed, the RVO reported in

2020 that for only a very small portion of the solar energy projects (1.6%) in the Netherlands there was local ownership or other forms of participation (RVO, 2021b).



**FIGURE 2: COLLECTIVE SOLAR CAPACITIES IN THE RES REGIONS (HIER OPGEWEKT & RVO, 2022)**

Looking at the solar projects and the realised capacity within the provinces, Noord-Holland and Gelderland outnumber the other provinces, with the former having 176 projects and the latter 167 (HIER Opgewekt & RVO, 2022). In Gelderland there has been a steep increase in ground-mounted solar parks. As a response to this the province has already contacted the municipalities and urged them to consider the spatial impact of solar parks (PBL, 2021). Interestingly, when considering the RES regions within Gelderland and Noord-Holland, most of the solar capacity has been realised in only one of the RES regions. In Noord-Holland, most of the solar capacity is produced in Noord-Holland Zuid (16.7 MW). In Gelderland the Cleantech region is responsible for Gelderland’s high solar capacity, as it provides a capacity of 20.7 MW. This region has experienced a steep growth with regards to solar capacity, as only a year prior its solar capacity was 5.8 MW. As a RES region, Friesland has the highest collective solar capacity (28.4 MW) (see figure 2). (HIER Opgewekt & RVO, 2022)

A clear preference for solar energy as opposed to wind is seen in most of the RES regions. Compared to the concept RES, 2/3 of the regions have a higher percentage of solar PV in the RES 1.0 (PBL, 2021). Many regions are focusing on solar energy as social support for this energy source is higher than for wind. However, a disconnect between the national and regional policy regime can be seen here. In the Energy Agreement wind targets were set for 2020. The goal was to realise a wind capacity on land of 6,000 MW. This has not been reached yet. In the most recent Monitor Wind on Land of the RVO, it is projected that the 2020 goal will be reached at the end of 2023 (RVO, 2022). This delay is partly caused by the social discussion and lack of support for wind parks. As RES regions can choose how they want to contribute to the national RE on land target, no jurisdiction is in place to enforce RES regions to realise more wind on land. The uneven distribution of wind and solar in many RES regions has not only caused a delay in reaching national goals, it will also pose problems in the future with regards to efficiency and stability of the energy grid.

When looking at the disparity of local energy cooperatives, Friesland and Gelderland have the highest numbers of cooperatives. Taking into account the number of inhabitants in the provinces, Friesland and Groningen have the highest count of energy cooperatives per million inhabitants. In these two provinces there are a lot of village cooperatives, meaning that one energy cooperative is active in one village. In more urbanised regions such as Noord-Holland Zuid, it is more usual that one cooperative is active in one neighbourhood. (HIER Opgewekt & RVO, 2022)

### Provincial financial mechanisms

Financial support mechanisms are in place in all provinces (see table 2).

TABLE 2: PROVINCIAL FINANCIAL POLICY INSTRUMENTS (SEE APPENDIX FOR MORE INFORMATION)

Province	Subsidies	Funds
Drenthe	Subsidierегeling Expeditie Energieneutraal Wonen.	Energiefonds Drenthe
Flevoland	Currently no subsidies are available.	Energie Expertisecentrum Flevoland
Friesland	Voucherregeling Energiecoöperatie Fryslân.	Fûns Skjinne Fryske Enerzjy
Groningen	Startsubsidie Lokale Energie Groningen	Fonds Nieuwe Doen
Gelderland	Subsidie Lokale hernieuwbare energieprojecten	Innovatie- en Energie Fonds Gelderland
Limburg	Currently no subsidies are available.	Limburgs Energie Fonds
Noord-Brabant	Brabant geeft energie.	The Brabantse Ontwikkeling Maatschappij.
Noord-Holland	Duurzaamheidsinitiatieven burgercollectieven subsidie.	Participatiefonds Duurzame Economie Noord-Holland
Overijssel	Opstartsubsidie – LEI voucher	Energiefonds Overijssel
Utrecht	Energietransitie subsidie.	Energiefonds Utrecht.
Zuid-Holland	Subsidie lokale initiatieven energietransitie.	Energiefonds Den Haag
Zeeland	Currently no subsidies are available.	Zeeuws Klimaatfonds.

With the exception of Flevoland, Limburg and Zeeland, all provinces offer a form of subsidy that energy cooperatives can use. Groningen and Overijssel offer subsidies that partly finance the costs associated with establishing an energy cooperative (Provincie Overijssel, n.d.; Startsubsidie lokale energie Groningen, 2022). Other provinces, like Gelderland and Noord-Brabant, offer subsidies that partly cover the investment costs of RE projects (Provincie Gelderland, n.d.; Provincie Noord-Brabant, n.d.). Other provinces provide subsidies for various activities, aimed at professionalisation and other matters, such as participation and regional collaborations.

Funds are available in all provinces that offer different forms of financial support to energy cooperatives, depending on the size of the project. These funds are mostly provincially owned and are non-profit. Many of the funds cover up to 75-80% of the required investment costs for



projects. The remaining investment costs need to be financed by the energy cooperatives and their members. Financing options of the funds vary from loans to guarantees for bank loans and shares/participations in a project. The duration of the loans generally varies from 5 to 15 years. Limburg is the only province that gives out loans for a duration of 20 years (Limburgs Energiefonds, n.d.).

The provincial support mechanisms intend to nurture and empower the niche. Some subsidies create a financial incentive for local communities to start up their own energy cooperative, others intend to professionalise the local cooperatives. Through this nurturing process the niche gets more developed, which makes it more competitive with the incumbent energy regime. The available funds empower the niche and are intended to make it more financially viable for energy cooperatives to engage in new projects by lowering the required capital.

## Region selection

As mentioned in section 4.1, five RES regions are selected for further analysis of their regional and local policy regimes. Based on the findings the following five regions are selected: Groningen, Friesland, Noord-Holland Zuid, Rivierenland, and Cleantech.

Friesland and Groningen were chosen as both provinces have a high density of energy cooperatives (HIER Opgewekt & RVO, 2022). Additionally, Groningen has had a history with natural gas extraction which not only caused large scale housing damage, but also a general distrust towards the government due to lack of help that was given. This may have led to people taking matters into their own hands, forming energy cooperatives to be less dependent on national energy companies. In Friesland the development of the wind park on the IJsselmeer, faced a lot of opposition from both the public and the local authorities (Timár, 2015). The province of Friesland announced in their environmental vision that there will be no more new wind parks in Friesland in the future. Therefore, a stronger focus will be on solar energy in the future (Gedeputeerde Staten Friesland, 2020). Noord-Holland Zuid was chosen because it has the highest solar bid of the RES regions (PBL, 2021). Furthermore, as this region is highly urbanised it will be interesting to see how policy makers plan to reach their ambitious solar bid with little room for ground-mounted solar parks. Cleantech and Rivierenland were chosen as two RES regions in the province of Gelderland. As the province has urged its municipalities to pay attention to the effect of ground-mounted solar projects (*Brief Aan Gemeenten over Zonne-Energie in Gelderland*, 2020), it will be interesting to see how this is translated into local policy change and how this influences the development of collective solar projects. Moreover, while Gelderland has a high collective solar capacity, this is mostly due to the solar capacity of Cleantech, which has increased steeply in the last years. Rivierenland on the other hand, has a relatively low solar capacity (2.1 MWp). (HIER Opgewekt & RVO, 2020, 2022) It will thus be interesting to compare these two regions and identify possible hurdles for the development of collective solar projects in Rivierenland, compared to Cleantech.

## Groningen

### *Regional*

The energy region of Groningen encompasses the whole Groningen province. The governmental actors in the regional policy regime include the provincial states of Groningen, the municipalities, and the regional water authorities Hunze en Aa's and Noorderzijlvest. The regional policy network was extended with stakeholders such as Young RES, societal organisations, entrepreneurs, and Groninger Energiekoepel (GrEK) which represents the interest of local cooperatives. While GrEK is labelled as one of the stakeholders of the RES, its precise role in the regional policy network is not clear. The preparations for the RES 1.0 were done by a stirring group, consisting of chairmen of the provincial states, the municipalities, and the water authorities. (RES Groningen, 2021b)

The regional policy goal is to contribute 5.7 TWh RE capacity to the national goal, which is the highest bid of all RES regions (PBL, 2021). The bid consists of three building blocks. The basis consists of the currently realised RE capacity, and the capacity that will be realised before 2023. The building blocks are concrete projects that have not been realised yet, but will be with a high degree of certainty. The additional municipal ambitions are put forth, but have not been coupled to concrete projects yet. Groningen has a solar capacity of 0.99 TWh in their basis and 0.89 TWh in their building blocks. The remaining municipal ambitions have not been coupled to solar projects yet. The regional regime has adapted the Zonneladder to fit the regional context and plans to focus on realising more solar rooftop PV, as the potential for this in the region is over 1 TWh. At the time of the RES 1.0 there were no concrete national policy guidelines for large-scale rooftop PV that could be integrated into the local regime. The region hopes that this will be offered by the new Environmental Law. (RES Groningen, 2021b) The regional regime provides guiding principles for participation and local ownership that can be adapted by local policy actors. As participation is context-specific, the guide does not present strict guidelines, but presents methods as applied by different municipalities and other collaborations. It is thus left to the local policy makers to make sense of these best practices and adapt it in the local regime. (de Graaff et al., 2021)

### ***Local***

Different local policy goals are set with regards to energy or climate neutrality in the future. Due to the rural character of Groningen many municipalities are open to ground-mounted solar parks. However, the municipalities of Pekela and Stadskanaal have stopped giving out new permits. Pekela has reached its initial goal of 75 ha already and is now investigating whether the higher ambition of 150 ha is desirable with regards to landscape quality (Gemeente Pekela, n.d.). Stadskanaal has been facing capacity problems, which has put a halt on new projects (Gemeente Stadskanaal, n.d.-b) .

The normative roles of local regime actors are similar across the region. Local policy makers take on a facilitating role and direct the initiative taker to compose a participation plan for their project. In this plan the initiative taker needs to present how participation is part of the project process and how local ownership is realised. In addition, the initiative taker needs to follow a participation trajectory with all relevant stakeholders before project development. (e.g. (Gemeente Midden-Groningen, 2019a; Gemeente Pekela, n.d.; Gemeente Veendam, 2022; Gemeente Westerkwartier, n.d.-a) Many municipalities follow the national policy goals and have 50% local ownership as a prerequisite for RE projects. When this is not feasible through financial participation, initiative takers need to invest part of their revenue in a local fund that increases liveability of the community. The municipality of Groningen aims for 50% local ownership for small-scale projects, but for large-scale projects the municipality creates 100% local ownership. The municipality exploits the large-scale projects itself and reinvests the revenue back in the community to accelerate the energy transition. (RES Groningen, 2021a) In Oldambt, new projects need to always be presented to the energy cooperative of the associated village. In this municipality local ownership entails ownership by the local cooperative. (Gemeente Oldambt, 2021)

### ***Intended interactions with the niche***

On a regional level, niche advocates are included in the policy process of the RES, albeit the role of GrEK is not entirely clear. As previously mentioned, provincial support mechanisms are in place in Groningen. The subsidies and fund have empowering and nurturing elements for the niche. Fonds Nieuwe Doen offers financing for smaller and larger projects and thereby plays into the Only in a few local regimes financial policy instruments are in place. Westerkwartier has a subsidy available that cooperatives can use to cover start-up costs and costs associated with feasibility studies (Gemeente Westerkwartier, n.d.-b). In Stadskanaal a local fund is in place to support projects by sustainable initiatives (Gemeente Stadskanaal, n.d.-a).

By stimulating the start up of new cooperatives Westerkwartier intend to nurture the local niche. Stadskanaal intends to empower the niche by financially supporting new project. In Oldambt, niche advocates are part of the local policy network, as all plans for new RE projects need to be presented to a local cooperative and the local cooperative needs to be involved in all projects. In other local regimes, local cooperates are seen as an important stakeholder for the development of RE projects and the acceleration of municipal plans.

## **Friesland**

### ***Regional***

The RES region Friesland encompasses the province of Friesland. The key policy actors in the regional policy regime consist of the following governmental actors: the provincial states of Friesland, the municipalities and the water authority Friesland. In addition, actors from the societal domain; the Friese Energie Alliantie (FEA) and the industrial domain; the regional network operator Liander are included in the policy process of the RES. The FEA represents all societal organisations that are involved in the RES process and currently consists of 11 organisations, including Ús Köoperaasje which represents the interest of local energy cooperatives. (RES Fryslân, n.d.).

While the ambitions of the municipalities and the FEA both result in a higher bid than was set in the RES 1.0, a lower bid was purposely chosen to remain realistic and create trust. (RES Fryslân, 2021b) The policy goal is to contribute at least 3 TWh RE capacity to the national goal, of which 80% has already been realised or permitted. The remaining 20% will mostly consist of solar energy, both on rooftops and ground-mounted. In the provincial environmental vision the provincial states communicate that they do not want more large wind turbines in the Frisian landscape. The national Zonneladder is adopted in the regional policy regime. The Fryske energie waaier provides policy norms for the realisation of RE projects in the different landscapes of Friesland that can be adapted in local policy regimes. (RES Fryslân, 2021b)

Involving citizens in the energy transition is the responsibility of local authorities, but the regional regime does provide communication tools to them to engage the local community. Moreover, RES Fryslan sent out a questionnaire to citizens in the region on how they want to be involved in the energy transition. This information is used by the local authorities and adapted in municipal frameworks. The Sinnetafel method is presented in the regional regime as a guiding principle that can be integrated in the local policy regime to ensure support for solar projects. It prescribes how local policy actors can involve the community in solar projects. All local stakeholders will take part in a discussion to voice their interests in the project, whereafter their interests are taken into account while designing the project. (Gedeputeerde Staten Friesland, 2020; RES Fryslân, 2021a)

### ***Local***

Energy neutrality in 2050 is integrated in many of the local policy regimes in Friesland (see appendix 3). In some cases more ambitious goals are set than in the national regime: energy neutrality as a goal for 2030 or 2040. Municipalities focus mostly on solar rooftops and ground-mounted solar in, or in the vicinity of, the built environment. For instance, Heerenveen wants to protect nature areas around the small villages in the municipality, but does allow solar parks in the vicinity of the city limits (Gemeente Heerenveen, 2019). Smallerlingland is also more hesitant with solar parks in rural areas. For this reason they have not appointed search areas. (Gemeente Smallerlingland, n.d.-a) Ooststellingswerf has stopped the development of new solar parks until their RE policies are more developed and are, for now, focusing solely on solar rooftops and floating solar (Gemeente Ooststellingwerf & BùgelHajema, 2021). Harlingen encourages the development of new solar projects, but makes no exemptions for solar placement in previously excluded areas (Gemeente Harlingen, 2021). Leeuwarden has adjusted its regulation with regards to solar projects; no environmental permits are needed for the develop-

ment of projects under certain circumstances. The municipality has provided a guide for initiative takers on where to place new projects and what the regulations are in these areas (Gemeente Leeuwarden, n.d.-c).

The dispersity of the small villages within a municipality can be seen in the local policies. Opsterland gives the responsibility to the villages to appoint their own search areas, as they have a better knowledge of the local area. Westwellingwerf encourages the villages to create their own environmental visions.

The roles of the policy actors are diverse in Friesland. In Waadhoeke policy makers judge new proposals for solar projects based on a score form (Gemeente Waadhoeke, 2020). Local policy makers in Westwellingwerf are ready to take on an executive role by developing RE projects if there are not enough initiatives in the next five years to meet the municipal goals. Súdwest-Fryslân has an energy coordinator that stimulates new cooperatives and collaborations between initiative takers. The municipality sets up workshops to help energy cooperatives with their projects. (Gemeente Súdwest-Fryslân, n.d.-a, n.d.-b)

The Sinnetafel method is adapted in some local regimes. For instance, in Smallerland and Opsterland the municipality is actively involved in project meetings (Gemeente Opsterland, 2020; Gemeente Smallerland, n.d.-a). The national local ownership goal is adapted in all local regimes. In Duntamadiel, initiative takers need to invest in a local fund if local ownership cannot be realised. In Smallerland the municipality and initiative taker can discuss other ways in which the project can have a positive contribution to the local community if local ownership cannot be met (Gemeente Smallerland, n.d.-a).

### *Intended interactions with the niche*

Support mechanisms are in place to stimulate the start up of new cooperatives or stimulate already existing cooperatives to engage in more projects. Achtkarspelen has a local fund in place that was established in collaboration with Energie Coöperatie Buitenpost (Gemeente Achtkarspelen, 2021a). Policy makers in Terschelling and Vlieland have collaborated on a climate fund to stimulate sustainable initiatives on the islands (Klimaatfonds Terschelling Vlieland, n.d.). Other municipalities like De Fryske Marren, Leeuwarden, and Súdwest-Fryslân have subsidies available for new or already existing energy cooperatives (Gemeente de Fryske Marren, n.d.-b; Gemeente Leeuwarden, n.d.-b; Gemeente Súdwest-Fryslân, n.d.-c).

By stimulating the start up of new cooperatives the local policy regime intends to nurture the niche. For instance, in Sud-West Fryslân an energy coordinator is in place that helps local cooperatives with their professionalisation and stimulates collaborations with initiative takers (Gemeente Súdwest-Fryslân, n.d.-a). In Waadhoeke, a knowledge platform was created for information sharing between cooperatives (Gemeente Waadhoeke, 2020). In addition, by stimulating more projects the regimes intend to empower the niche.

Niche advocates are part of the local policy networks. In de Fryske Marren cooperative representatives were involved in the policy process for solar parks (Gemeente de Fryske Marren, n.d.-a). In Schiermonnikoog, the local cooperative was involved in the policy process of the sustainability vision (Gemeente Schiermonnikoog et al., 2021) and on Terschelling, the municipality works closely with the energy cooperative on the sustainability execution agenda (Gemeente Terschelling, 2018)

## **Noord-Holland Zuid**

### *Regional*

The province of Noord-Holland was divided into two energy regions; Noord-Holland Noord and Noord-Holland Zuid. In Noord-Holland Zuid the key governmental actors are the provincial states of Noord-Holland, the municipalities and the water authorities Amstel, Gooi, Vecht, van Rijnland and Hollands Noorderkwartier. The municipalities are united in six different subregions: Amsterdam, Amstelland, Gooi en Vechtstreek, Haarlemmermeer, IJmond en Zuid-Kennemerland and Zaanstreek/Waterland. The RES is formed by a stirring group, which aids the

local policy makers in the RES process and ensures that all relevant stakeholders are involved. The Participation Coalition Noord-Holland (PC-NH) is an important actor in the regional policy network. The coalition has developed guiding principles on local ownership and how it can be incorporated into the local policy regime. The coalition is a collaboration between the Vereniging van Energie Coöperaties en Initiatieven Noord-Holland (VEINH), de Natuur en Milieufederatie Noord-Holland and Energie Samen Noord-Holland (ESNH). (RES Noord-Holland Zuid, 2021)

The regional policy goal is to contribute 2.7 TWh to the national RE goals. In the region little space is available for wind turbines due to its urban characteristics. This is reflected in its bid; more than half of the aspired capacity will be realised by solar energy. While there is no explicit mention of a Zonneladder in the RES, the region does propose an order preference for solar placement. The region wants to focus on solar rooftops and they urge the national government to provide more stimulating policies and financial incentives. In addition, the potential of solar energy above parking lots is explored, as this is a good way to create multi-functional areas and has sufficient social support. However, difficulties such as costs and grid connection need to be solved first. (RES Noord-Holland Zuid, 2021)

### *Local*

Many municipalities have the ambition to become independent from fossil fuels by 2040. Among the local regimes there is a strong focus on rooftops and multi-functional areas like parking spaces and along infrastructure. In Beemster no permit is needed for solar rooftop under certain conditions (RES Noord-Holland Zuid, n.d.). Some municipalities, like Aalsmeer and Amstelveen, exclude solar fields as primary functions of an area. Others, like Ouder-Amstel and Bloemendaal even exclude ground-mounted solar parks altogether (Gemeente Ouder-Amstel, n.d.; RES Noord-Holland Zuid, n.d.). Amsterdam has the ambition of having solar panels on all suitable rooftops by 2050 (Gemeente Amsterdam, n.d.-a). Like in Gooise Meren and Zaanstad, Amsterdam has not appointed areas for solar development outside the city limits (RES Noord-Holland Zuid, n.d.).

Local participation policies were not found for every municipality. Haarlemmermeer and Amsterdam have finalised their participation policies and both oblige initiative takers to collaborate with local energy cooperatives for new projects (Gemeente Amsterdam, n.d.-a; Gemeente Haarlemmermeer, 2021). Heemstede seems to take responsibility for participation itself (Gemeente Heemstede, 2019). The municipality decides which stakeholders need to be involved and how much they need to be involved. The communication strategy of new projects will be based on this.

### *Intended interactions with the niche*

Niche support instruments are present in the local policy regimes. For instance, Aalsmeer and Amstelveen both have a service hub that provides free advice for initiatives that want to realise RE projects (Gemeente Aalsmeer, n.d.; Gemeente Amstelveen, n.d.). The municipalities intend to nurture the local niche by contributing knowledge and expertise. Zaanstad offers a sustainability loan and Diemen provides micro subsidy to cooperatives (Gemeente Diemen, 2020; Gemeente Zaanstad, n.d.). Amsterdam by far has the most instruments available. The municipality offers multiple subsidies for sustainable initiatives, both for project preparations and the actual implementation phase. Additionally, it has a fund in place for sustainable initiatives. (Gemeente Amsterdam, n.d.-e, n.d.-b, n.d.-d, n.d.-c) These subsidies intend to stimulate project development, which empowers the niche.

Niche advocates take part in policy process in different municipalities. In Blaricum, the municipality included the input of energy cooperatives in their policies on large-scale RE projects (Gemeente Blaricum, 2022b). In Hilversum and Laren cooperatives collaborate with municipalities on identifying search areas for new projects (Gemeente Hilversum, 2021; Gemeente Laren, 2022). Moreover, the cooperatives contribute to discussions on RE production in the

local regimes and work together with different municipalities on creating a regional project approach (RES Noord-Holland Zuid, n.d.).

## **Gelderland**

The province of Gelderland has created the Gelderse Energy Agreement (GEA). (Gelders Energieakkoord, n.d.-a). The GEA forms a policy network of over 220 partners, including energy cooperatives, industrial partners, regional and local authorities, and many more (Gelders Energieakkoord, n.d.-b). The GEA facilitates the RES programme in the six energy regions by strengthening regional policy networks. The GEA aims to increase cooperative professionalisation. In addition, it wants to ensure better collaboration between energy cooperatives and project developers. The GEA wants to aid local policy makers with their participation policies, as this is not as well developed in every municipality. (Gelders Energieakkoord, n.d.-c)

The GEA has adapted the national political norms for solar placement in a Zonnewijzer, which serves as a guide for the design of solar fields in different areas in Gelderland. It provides insights on how solar energy can fit into different landscape types, while creating a benefit for the local environment and keeping in mind ecological features of the area. To ensure that all large-scale RE projects are locally owned, the GEA, together with Energie Samen Gelderland (ESG) and Klimaatverbond Nederland, has developed a new method: social tendering. This sets normative roles for the local policy actors. Using social tendering, municipalities allocate areas for the development of projects and invite suitable initiative takers to propose a project plan. Another option is that the municipality itself develops the project and is responsible for local ownership.

Gelderland has taken the national Climate agreement and has adapted it to form its own provincial climate agreement. By establishing this provincial agreement the province facilitates a provincial energy policy regime that includes actors from many different sectors, has clear policy goals, and provides a policy framework for regional and local policy makers.

## **Rivierenland**

### ***Regional***

The governmental actors in the regional policy regime in Rivierenland are the provincial states of Gelderland, the municipalities, and the water board Rivierenland. The stirring group of the RES consists of actors from many different sectors. In addition to governmental representatives, the Gebiedscoöperatie Rivierenland, which represents different civil organisations, Liander, VNO NCW Rivierenland, Samenwerkende Woningcorporaties and Greenport Gelderland, which represents the horticulture sector, are part of the stirring group. (RES Rivierenland, 2021) During the policy process of the RES 1.0, all relevant stakeholders were invited to join ateliers to provide their insights. This was first set up as a regional session, which gave the foundation for local ateliers. Later, regional and municipal questionnaires were sent out to gather information on the public opinion towards the RES plans. (RES Rivierenland, 2021)

The policy goal of Rivierenland is to contribute 1.2 TWh RE to the national goals. The region has doubled its bid compared to its concept RES. Of this 1.2 TWh, 0.584 TWh will be provided by solar energy, divided in solar rooftop (0.301 TWh) and solar fields (0.283 TWh). For realising solar projects, the region uses a Zonneladder, which roughly follows the national norms as presented in the NOVI. (RES Rivierenland, 2021)

On the way to the RES 2.0, Rivierenland is working on its Collaboration Agenda, to ensure better communication, knowledge sharing, and tuning of activities between the regional and local regime actors. Rivierenland wants to develop regional policy frameworks on local ownership and participation. Additionally, a regional stimulating programme for rooftop PV development is to be implemented. The region is planning to create a CommunityHub, an online platform on which citizens and local energy cooperatives can find and share information on their projects. This way the region hopes that new collaborations can be initiated. It is the responsibility of the local policy makers and Energie Samen Rivierenland (ESR) to provide the data for

this. In the RES, the importance of having energy cooperatives in all municipalities is emphasised, to make sure that in each municipalities citizens can be actively involved in RE projects. (RES Rivierenland, 2021)

### *Local*

There seems to be less possibilities for the development of large-scale ground-mounted solar parks in this region. The municipality of Zaltbommel excludes agricultural lands and meadows as potential search areas (Gemeente Zaltbommel, 2021). As a second preference, many municipalities want to develop energy landscapes along infrastructure and create multi-functional spaces. The municipalities of Neder-Betuwe and Maasdriel both propose that solar parks should be developed close to wind turbines (Gemeente Maasdriel, 2021). During a stakeholder meeting by the municipality of West Maas en Waal local entrepreneurs voiced that they hope that in the future there will be more possibilities for realising ground-mounted solar projects (Gemeente West Maas en Waal, n.d.). Buren is ambitious in its rooftop solar plan, as it plans to fill 80% of the rooftops with solar panels (Gemeente Buren, 2020).

Not all of the municipalities have finalised their participation policies yet. From the ones that have, the normative roles as described in the Environmental Act are followed. Most of the municipalities oblige initiative takers to have a participation plan and follow the national goals of 50% local ownership. Zaltbommel even states that initiative takers need to strive for 100% local ownership (Gemeente Zaltbommel, 2021). Furthermore, West Maas en Waal and Zaltbommel oblige initiative takers to invest part of the project's revenue in local funds (Gemeente West Maas en Waal, 2021; Gemeente Zaltbommel, 2021).

### *Intended interactions with the niche*

No local support mechanisms were found. On a regional scale, ESR is part of the regional policy network by collaborating with the municipalities to create a regional knowledge platform.

## **Cleantech**

### *Regional*

The key governmental actors in the regional policy network in Cleantech are the provincial states of Gelderland, the municipalities, the water authorities Vallei en Veluwe and Rijn en IJssel. The local energy cooperatives in Cleantech have united and are also closely working together with the RES organisation. During the making of the RES 1.0 regional RES-ateliers were organised to facilitate discussions between local policy makers. Additionally, discussions between other stakeholders, like societal organisations, were organised to discuss the results of the RES-ateliers. For the participation of regional stakeholders the regional RES actors are responsible. Local policy makers are responsible for organising participation of local stakeholders. (RES Cleantech, 2021)

The policy goal is to contribute 1.07 TWh RE capacity to the national goal. The bid consists largely of solar rooftops (0.51 TWh) and ground-mounted solar parks (0.45 TWh, amounting to 600 ha). Only 0.11 TWh will be realised through wind energy. Of this bid, 0.05 TWh solar rooftops and 250 ha of solar parks have been realised (1-1-2020). (RES Cleantech, 2021) The policy goal was lowered compared to the concept RES after spatial considerations. The region wants to focus on solar rooftops and asks the national government to introduce more stimulating elements to speed up solar rooftop implementation. The region is working a regional policy framework for ground-mounted solar parks that needs to be integrated into local policy regimes. Cleantech has adapted the national Zonneladder in their RES. (RES Cleantech, 2021)

### *Local*

Within the region there is variety with regards to municipal ambitions. Apeldoorn and Voorst both have ambitious goals for solar parks (Gemeente Apeldoorn, 2020; Gemeente Voorst,

2019). Apeldoorn wants to realise 250 ha of solar parks and Voorst wants to realise 190 ha. Together these municipalities are thus responsible for half of the Cleantech ground-mounted solar park goal. To reach their ambition, the municipality of Apeldoorn has established a special taskforce for solar energy. Voorst has created its own Voorster Energy Strategy (VES). Other municipalities have a stronger focus on large-scale solar rooftops, like Epe and Heerde (Gemeente Epe, n.d.; Gemeente Heerde, 2021). Epe will focus on solar rooftops until 2030 and will later start to include ground-mounted solar parks in their policy plan. Heerde and Brummen have set a maximum area of solar parks to 15 ha because of the landscape characteristics of the region (Gemeente Brummen, 2021; Gemeente Heerde, 2021). While Lochem has not released their policies on RE deployment, citizens have a strong preference for rooftop PV and urge the municipality to not do more than is strictly necessary in the energy transition (Gemeente Lochem, n.d.).

In the municipalities of Heerde, Brummen and Lochem a council of local citizens and experts is established to ensure local ownership and participation are part of new projects. The council works as both an advisory body and an examining body. In Voorst, the initiative taker needs to create a participation plan together with citizens (Gemeente Voorst, 2019). If citizens do not want to contribute to a participation plan, it is left to the initiative taker to develop one. The national goal of 50% local ownership is integrated into all local policy regimes. Local ownership can take on financial participation or other forms. Brummen states that it is open to discuss other options than 50% local ownership.

#### *Intended interactions with the niche*

Financial support mechanisms for the niche are only available in Apeldoorn. The subsidy scheme supports citizens and social organisations that want to contribute to the energy transition. This policy instrument intends to empower the niche by stimulating new project development. Other distinct interactions with the niche are seen in Epe, where the local energy cooperative was involved in the policy process of the municipality's environmental vision.



**TABLE 3: CHARACTERISTICS OF THE POLICY REGIMES ON THE THREE SPATIAL SCALES**

<b>Spatial level</b>	<b>Policy network</b>	<b>Policy goals</b>	<b>Policy instruments</b>	<b>Niche interactions</b>
<b>National</b>	Ministries of EZK, RVO and BZK	49% CO <sub>2</sub> reduction in 2030.	Climate agreement NP RES	Shielding and empowering
	IPO, VNG, UvW NP RES	35 TWh RE on land	Environmental Act and NOVI	Regulations set role for local cooperatives
		50% local ownership and local participation	RVT, SCE and SDE	Niche advocates take part in policy process
<b>Regional</b>	Provincial States, water authorities, municipalities	Compose regional RE planning strategy. contributing to national goals	RES	Nurturing and empowering
	Social organisations		Provincial subsidies and funds	Niche advocates take part in policy process
	Regional energy cooperatives			
<b>Local</b>	Municipality	Appoint search areas to contribute to RES.	Environmental vision	Nurturing and empowering
	Initiative takers	Contribute to local participation and ownership goals	Policy frameworks for solar placement	Niche advocates take part in policy process
	Local energy cooperatives		Local (financial) support mechanisms	

## 5.2 REGIONAL ENERGY COOPERATIVES

In the previous section the energy policy regimes and their intended interactions with the niche were analysed. Furthermore, the influence of the national policy regime on the regional- and local regimes was discussed and regional- or local deviations from nationally set policy goals, regulations, and normative roles were highlighted.

In this section I aim to answer the research question: “How do regional energy cooperatives facilitate the regional and local energy transition?”

To answer the research question, interviews were performed with representatives from Energie Samen Gelderland (ESG), Energie Samen Rivierenland (ESR) and Energie Samen Noord-Holland (ESNH). Available information on Groninger energiekepel (Grek) and Ús Kööper-aasje (ÚK) will be used to cover a wider span of RECs. The chapter is structured in the following five sectors. First, their inward-oriented activities will be discussed; elaborating on how they contribute to network formation and how they ensure a robust network. Second, their outward-oriented activities will be discussed; their main partners and their role in policy regimes will be highlighted. Lastly, the niche support of the energy policy regime as perceived by the RECs will be discussed.

### 5.2.7 Inward-oriented activities

In this section the inward-oriented, nurturing niche activities of RECs will be discussed. Common inward-oriented activities are; establishing a regional niche network, and professionalising this network by facilitating knowledge sharing processes.

#### Niche network

A common inward-oriented activity of RECs is the formation of regional, heterogenous niche networks. ESR indicated that their first concern was to strengthen the cooperative structure in Rivierenland. They helped set up local cooperatives in every municipality in Rivierenland. ESR is still closely affiliated with the local cooperatives. However, ESR notes that the cooperatives are in different phases with regards to their development and professionalisation, which poses hurdles for collaborations.

ESNH also focuses on creating a strong niche network in Noord-Holland. 'That is actually the primary function of an umbrella organisation. People do not have the time to develop a whole network. We develop the network and open it up to people.' ESNH strives to have active cooperatives in the entire province that address all aspects of the energy transition; 'In some places you will see that in the same geographical area one cooperative focuses on solar energy, another one on wind energy, and a third one focuses on energy coaches. Or you see areas where one cooperative does everything. Supporting this process and developing these structures is an important facet.' Due to the size of Noord-Holland, multiple collaboration clusters of local cooperatives were formed. These clusters have network meetings on a provincial level. The clusters work together to create viable business cases as projects are starting to become more large-scale. Moreover, the local cooperatives help each other with matters like subsidy applications. ENSH notes that in some places it is more difficult to set up this collaboration. 'A lot of cooperatives focus on themselves and want to be independent. They don't see the use of collaborations with the cooperative in neighbouring villages.' ESNH also urges energy cooperatives to collaborate with other organisations that work on topics such as circularity and biodiversity, to create a wider network of organisations that work on the transition.

#### Niche professionalisation

All RECs perform activities that aim to increase the professionalisation of the niche network. ESNH shares knowledge mainly on the organisation development and professionalisation with local cooperatives and helps in *'taking away the insecurities'* with regard to larger-scale projects. While in Noord-Holland there is no need for knowledge on projects, this need still exists in Rivierenland. Indeed, ESR provides experienced project managers to the local cooperatives. *'We have a lot of experience and expertise. Then it's of course very efficient to detach a project manager who has already realised a solar rooftop eight times before.'* In Gelderland, ESG helps the local cooperatives with organisational development as well. ESG developed an acceleration plan to support the energy cooperatives with making a *'multi-year implementation plan'* in which the cooperatives present their plans for the coming years. In addition ESG set up Community of Practices (CoP), where everyone is welcome to share knowledge and practical experience on different subjects. Existing CoPs include subjects such as; collaborations with municipalities, heat transition, and storage. ESG is also willing to start up new CoPs if the need arises among the network. (Energie Samen Gelderland, n.d.) In Groningen, Grek has set up a programme to professionalise and strengthen the local energy sector; the Programme Energy Participation (PEP). Through this programme they want to create a strong position for energy cooperatives in the energy sector of Groningen. As part of this programme they want to strengthen the collaborations between local cooperatives and municipalities, help the cooperatives with their professionalisation, and build knowledge and share this knowledge among the network. Grek has set up CoPs similar to ESG, where they bring together cooperatives with experts and knowledge platforms. (GREK, n.d.) ÚK also aims to strengthen the cooperative network in Friesland by guiding local communities in setting up

energy cooperatives. They facilitate knowledge sharing among the cooperatives in Friesland on financing and participation matters. (Ús Koöperaasje, n.d.) In addition, ÚK has set up LEI-Fryslan, through which local cooperatives can receive financing for the risk-bearing phase of their projects. This financing can be used to hire experts of all kind of fields, ranging from project development, technical research, and the financial aspects of the project. (Ús Koöperaasje, n.d.)

### 5.2.8 Outward-oriented niche activities

The cooperatives perform outward-oriented activities as well that aim to empower the niche. In order to do so, partnerships and collaborations with powerful regime actors is needed. In this section, the network of the RECs will be presented. This includes partnerships and collaborations with actors from different domains, including energy regime actors. Furthermore, their role in the energy policy regimes will be discussed.

#### Partners

All RECs collaborate with their provincial Natuur & Milieufederaties. In Noord-Holland, ESNH collaborates with Natuur & Milieufederatie Noord-Holland, with whom they have founded a similar collaboration to the Participation Coalition: the Participation Coalition Noord-Holland (PC-NH). (Participatiecoalitie Noord-Holland, n.d.) PC-NH helps to professionalise and scale-up the cooperative movement. As part of the PC-NH ESNH also facilitates participation trajectories for municipalities in appointed search areas.

In Gelderland, ESG and Natuur- & Milieufederatie Gelderland (NMG) have formed a similar collaboration to the Participation Coalition as well. ESG notes that the participation coalition is currently not very active due to *'a lack of capacity'* and that they *'are not really developing'* due to this. ESG and NMG also work together on a CoP with the focus on a nature-inclusive energy transition. Grek also collaborates with Natuur & Milieufederatie Groningen on the PEP. The local energy cooperative Grunneger Power is also part of this collaboration. (GREK, n.d.) Finally, ÚK collaborates with the Friese Milieufederatie as they are both part of the FEA. The FEA consists of different societal organisation, including the association of building cooperatives and Youth panel Friesland. (RES Fryslân, 2021b).

ESG and ESR are part of the GEA, which offers a wide network of over 200 actors from different domains. Within the GEA, working groups are active that focus on certain themes. ESR and ESG are affiliated to the programme of sustainable energy production. ESR says *'On the provincial level you have working groups and programmes from the GEA, in which we are also very active and often take the lead.'* ESG notes that they do not decide what is put into the programme, but *'It shows that they [GEA partners] realise that the programme determines what energy cooperatives can do.'* ESG has also worked together with the GEA and Klimaatverbond Nederland to create the social tender method for participation.

Some of the RECs are also collaborating with different financial partners. For instance, ESNH collaborates with the Rabobank but emphasises that *'This collaboration is open for more parties.'* They work together with Rabobank and Alliander to accelerate the sustainable heating transition. This collaboration provides ESNH with access to the network of Rabobank as well as knowledge and expertise. Furthermore, as mentioned previously, ÚK set up LEI-Fryslan to offer financial support for local cooperatives. This financing option has been set up together with the regional fund; Fûns Skjinne Fryske Enerzjy (FSFE) (Ús Koöperaasje, n.d.).

Other collaborations include industrial and business partners. ESNH works together with Liander on the matters of energy security and net congestion. ESR works together with different branch organisations of entrepreneurs in Rivierenland, based on what projects they are working on.

Finally, the RECs are all united in the national body ES. ESR says it is active in various working groups in ES *'It makes it easier for us to have connections with different ministries.'* ESG says it regular meetings with ES on the development of the energy cooperative sector in Gelderland. Furthermore, they are in regular contact with a central solar project developer of ES, as ES also has a knowledge platform specifically on solar project development.

### Role in policy regimes

In the previous chapter, the role of ES in the national energy policy regime was briefly discussed. ES is involved in the national policy process of the NP RES. ES ensures that the interests of the energy cooperatives are integrated into the national policy regime, which in turn influences the role regional and local cooperatives can play in the policy regime. ESNH provided an interesting insight on the role of ES in the policy process of the Climate Agreement. The notion of 50% local ownership was integrated into the Climate Agreement and all its accompanying policy pieces, because of the lobbying of ES.

In this section, a more in depth overview will be given on how RECs are interacting with the regional and local energy policy regime.

ESNH and ESG are both strongly active on the provincial level. ESNH lobbies for more structural financial support for the cooperatives in Noord-Holland. While there are financing options available, this is often not for the initial, risk-bearing phase of a project. The cooperatives do also not always meet the conditions to receive the provincial funding. ESNH is therefore urging the province to join the national ES fund. *'We have convinced the officials I think. But now we have to convince the politicians.'* ESNH further interacts with provincial policy makers as they receive requests to delegate representatives to provincial meetings *'To help inform councilmen, members from the Provincial States, and officials, to share knowledge, organise courses, or write papers that can be shared.'*

ESG says it is starting to learn more about provincial lobbying and how it could contribute to their work. An example of their lobbying activities is the *'new story of the energy cooperatives'* that ESG is formulating. This is a shared lobbying story towards the province to inform them on the diversity of the energy cooperatives in Gelderland. In a more informal matter, ESG has had conversations with the province about joining the national ES fund. Moreover, ESG has been working on a provincial implementation plan for energy cooperatives, which was commissioned by the provincial states of Gelderland. They are working out a provincial procedure for the collaboration between municipalities and local cooperatives. With regards to direct involvement in provincial policy processes ESG adds *'it's not like we have contributed to, or voted on the participation regulations of the province. That is just being developed and we are very happy with that.'* While there is no direct involvement with the policy process on a provincial level, there seems to be a good collaboration between ESG and the province. This shows that ESG has gained sufficient political support of the province and that their role in the energy transition in Gelderland is acknowledged.

RECs are involved in the regional policy regime through the RES. The stirring group of RES Noord-Holland Zuid has collaborated with important stakeholders from the beginning, including ESNH. ESNH is allowed to be at every meeting, they receive all important policy pieces, and all their contributions are taken into considerations. *'We are really being treated as if we are an alderman from a municipality.'* ESNH adds that this open collaboration has *'helped a lot with trust'* towards the regional policy makers. On the regional level, ESNH also helps regional water authorities to improve their collaboration with local cooperatives. ESR is part of the RES stirring group in Rivierenland. *'We have shown we can handle big projects and have built trust towards the board of the RES that we are an important stakeholder.'* In addition, the RES board has asked ESR to monitor the energy production projects. ESR has set this up for Rivierenland and was approached by the RVO to see if it is possible to extend this monitoring approach to more regions. In Cleantech there was initially no appointed role for the energy cooperatives in the RES process. However, the cooperatives have lobbied to change this

*'There was reason to object to that together.'* The cooperatives have appointed a representative that will be included in the advisory board for the RES. ÚK is also part of the RES policy process as it is part of the FEA, which is one of the partners of the RES stirring group (RES Fryslân, n.d.). Grek is also participating in the RES Groningen (RES Groningen, n.d.)

Not all RECs are involved in policy processes on the local level. ESG says it is not involved in local policy processes. They focus on the needs of the cooperatives instead *'if the need arises among the cooperatives, we want to share something on the collaborations with municipalities.'* They have set up a CoP on this subject. ESG adds that the provincial lobbying story can be applied by local cooperatives to lobby towards the municipality. In Cleantech it can be seen that the role of cooperatives in the local policy regime differs per municipality. *'It can interfere with your other interests, if you are busy with the development of a project.'*

ESR does play a role in the local energy policy regime. ESR contributes in the policy process by providing their vision on municipal policies, which gets adapted into the eventual policy framework. For instance, they were involved in the policy process of the local Zonneladders. ESR also tries to put issues on local policy agendas *'you could say it is a sort of lobby. But in a sense it is also a collaboration.'* ESR notes that because of the smaller size of the municipalities, there is often a lack of capacity and therefore a lack of expertise on sustainability issues among municipal officials. Local policy makers therefore come to ESR for advice on these matters. While they do accept help, some of the municipalities are more hesitant. ESR sees that municipalities are still finding their role in the energy transition and are afraid of losing control of the local energy transition to ESR. To help the municipalities with navigating the changing policy environment ESR strives to set up a regional policy organisation for the energy transition.

ESNH and ESR both facilitate participation for municipalities. In addition, municipalities ask ESNH to help them bring together social organisations and create a local cluster that works on the energy transition. ESNH does not play a direct role in local policy processes, however by facilitating participation it helps local policy makers to contribute to the national policy goals.

### 5.2.3 Perceived energy policy regimes

In the previous chapter, the political support mechanisms on the different spatial scales of the energy policy regime were analysed and its intended interactions with the niche. In this section, the perspective of the RECs on the niche support by the policy regimes is presented.

The SCE and SDE++ subsidies are financial policy instruments of the national policy regime. In addition, ES has set up a national fund together with multiple banks however, this fund is not available for the risk-bearing initial phase, while that is where most cooperatives struggle with. It became clear there are different views on the national policy instruments. ESNH mentioned that there is insecurity with regards to the SCE, causing some local cooperatives to quit their project plans. The subsidy took a very long time to be implemented. ESNH notes that there seems to be a *'slowness and lack of urgency'* at the government. In addition, the energy market is a contributing factor to the problems of the subsidies. For instance, the drop in energy taxes has influenced the business cases of projects with an RVT subsidy, suddenly the business cases are not viable anymore.

ESR mentioned that the speed with which the environmental permits are given by the municipalities poses a barrier to receive national subsidy, as it often exceeds the timespan of subsidy applications. In Rivierenland, many projects are currently using the SDE++ subsidy. The project is then mostly financed through obligations, a form of local crowdfunding. ESR does not experience a

ESG says that if cooperatives know how to go about the subsidy application process, it is doable for solar projects, but that it is hard to build on them, as the government is prone to change the subsidies.

On a provincial level, funds are available to energy cooperatives but as ESNH points out *'every province goes about a different way with financing'*. An obstacle is that not all cooperatives can

follow the prerequisites to get financing from these funds in Noord-Holland. In addition, the financing is in many cases focused on projects, but cannot be used to develop the cooperative. ESNH adds that *'The Province says: you can get 10,000 euros for this project, but you can't use that to pay the people that have helped to set up the organisation.'*

As mentioned previously, Gelderland has its own realisation fund. The province has decided to not join the national ES fund as *'they thought the conditions are better'*. One important condition to obtain financing through the fund in Gelderland is that you need to at least have 50 participations. The province will then finance half of the project. (Energiefonds Gelderland, n.d.) ESG adds *'if you know how to use that, and have the SDE subsidy in place, you don't have that many problems with the financing of your projects.'* However, for large-scale sustainable heating projects financing becomes more difficult.

In the local policy regimes, there are often no financial support mechanisms in place. ESNH states that many governments are afraid that if they finance local energy cooperatives, this will be seen as a form of governmental support of organisations, *'then commercial clubs will say: if you finance them, we also want financing.'* Many municipalities therefore refrain from offering structural support mechanisms. In Hilversum the municipality does support the organisations, however many municipalities simply refuse to do so. An interesting case is seen in the municipality of West-Betuwe, where a sustainability fund was established. This fund is financed through the profits generated by the wind park. While the sustainability fund is connected to West-Betuwe, and should be used to increase liveability of that municipality, they do share knowledge and expertise with neighbouring municipalities.

One other fundamental aspect on political support was mentioned by ESNH, which is the stance of the governments towards the cooperatives. The government is eager to enable public-private collaborations, but once the cooperative is registered as legal entity, the government treats it as a business venture. Being a legal entity comes with difficulties for the cooperatives, as they cannot comply with the legal requests laid upon them. ESNH adds *'As a beginning energy initiative you can't apply [for a public tender], because you don't meet the conditions of the application.'* Moreover, *'the government treats you as a business venture, even when you are just a citizen initiative.'* In Rivierenland, ESR faces similar problems, as municipalities see them as a market party and are therefore hesitant to receive their support.

The national goals of local ownership and participation are integrated into the regional and local energy policy regime. ESNH says that they have pushed policy makers to clearly define local ownership in their policies. ESNH adds that *'Some municipalities have done so, others haven't. This means that it (local ownership) will look very different in the implementation phase.'* ESR confirms that the implementation of local ownership is different per municipality. The definition of local ownership is being figured out collectively, but *'slowly the original purpose becomes clear'*. ESG adds that *'everyone is asking, 50% is that feasible, don't we want 100%? Is it an obligation?'* ESG notes that it is good to have the national goal as a *'external, neutral source'* to integrate into local policies, and that *'the translation from national to local (policies) is actually very simple'*. ESG adds that *'eventually the percentage is a result from the negotiation between a cooperative and a commercial developer. It's just nice if it works out.'* While policies are in place to ensure participation in the entire process of new projects, this is not always followed in practice. ESR says that local ownership is often realised after initiative takers have received an environmental permit. ESNH and ESR note that the community needs to be involved from the beginning of a project, and even before that. The community should not only have the option to financially participate when the project is finished. ESR adds to that *'Then you will also make a lot more effort in creating social support.'* Even before developing a project, social cohesion needs to be stimulated. ESNH says *'Actually participation starts ten years prior'* this way the local community will welcome RE projects more readily and will be more open to ownership of that project.

## 6. DISCUSSION

This thesis aimed to contribute to the understanding of the spatial implications of energy governance and niche development by focusing on Dutch energy governance and the role of RECs in the energy transition. Enriching MLP with concepts on spatiality, policy, and niche processes enabled an analysis of the energy policy regimes and niche-regime interactions. In this section I will discuss the findings and integrate them into the theoretical framework I have composed. I will assess the energy policy regimes on their enabling properties for niche development and discuss to what extent RECs contribute to the regional and local energy transition. Emphasis is put on the spatial variation of these two aspects.

In terms of MLP we have seen that as the energy regime is pressured by exogenous landscape factors, so is the energy policy regime. The policy regime has integrated policy frameworks to govern the energy transition, containing policy instruments that stimulate RE deployment and innovative niche developments of energy cooperatives. The energy cooperative movement can be considered as a niche that is integrating more sustainable energy practices in the incumbent energy regime. Within the niche, RECs function as intermediary niche advocates that perform both inward-oriented and outward-oriented niche activities. They help to build up internal momentum by creating a set of common rules and agendas, ensuring a heterogenic network, and lobbying mostly in the regional policy regime to create political support for the niche.

### 6.1 Policy regime analysis

According to the literature, in a sustainable transition the policy regime needs to contain elements from all three governance approaches as described by Geels et al (2015). Elements from all three governance approaches were recognised in the policy regimes in the Netherlands. First, the national financial policy instruments are market-driven instruments that give an incentive to invest in RE projects, but leave it up to actors to adapt these financial incentives. In addition, the Environmental law takes on a classic-steering approach as it sets regulations with regards to local participation that regional- and local policy actors need to adhere to.

The Climate Agreement and the associated RES programme contains elements from both the classic-steering model and the network governance approach. The government has set the national goal of 35 TWh RE capacity and regulations with regards to local participation, which directs how regional and local authorities need to contribute to these goals. At the same time, the RES programme contains elements of the network governance approach as it forges collaborations between policy makers and other actors through the interactive RES programme. This programme facilitates network- and vision building within the regions and allows for feedback to the national policy makers on what the regions need in order to successfully reach the national goals. Subsequently, the regional regime takes on a network governance approach as the RES programme is the main policy framework in the regional regime. In addition, the provincial financial instruments are market-driven elements. Local regimes seem to take on a network governance approach as well as municipalities often work together with local organisations to compose their environmental vision. Local financial instruments are market-driven tools that can be adapted by local cooperatives or other sustainable investors. Furthermore, the local regime adapts the classic-steering approach by the national regime by setting regulations for RE projects that initiative takers need to adhere to.

To evoke wider societal change and stimulate niche developments, niche advocates need to be included in the policy process (Ratinen & Lund, 2015; Rogge & Reichardt, 2016). It was seen that niche advocates are part of the policy process on the national and regional scale. On the national scale ES is part of the programme council of NP RES. Findings suggest that the inclusion of ES in the national policy process has influenced niche development by giving an incentive for the inclusion of niche advocates in regional- and local policy processes. Indeed, the policy strategy of many regional- and local regimes entails close collaborations with

energy cooperatives. On a regional scale RECs take part in the RES process. On a local scale the role of niche advocates in the policy regime varies. While in some municipalities, niche actors take part in policy processes, this is not the case everywhere. Niche actors were most prominently part of local policy processes in Noord-Holland Zuid. In Friesland many municipalities also included niche advocates in their policy processes. In Rivierenland and Cleantech the role of niche advocates in local policy processes was less visible.

Regime variations were seen when looking at policy inclusiveness (see table 4). Niche advocates are involved in the RES process in different ways. While it was seen that in Noord-Holland Zuid and Rivierenland niche advocates were closely involved in the RES process, one of the interviewees indicated that this is not the case in all energy regions. In Cleantech there was no predetermined role for the energy cooperatives in the RES process at first, the cooperatives had to lobby to get a regional representative in the RES group. Policy inclusiveness has been suggested to speed up niche development (Ratinen & Lund, 2015). Noord-Holland Zuid has an inclusive RES process and is a RES region with one of the most local cooperatives, which could indicate a well-developed niche. However, the high number of cooperatives can also be due to the urban characteristics of the region. Many of the cooperatives in Noord-Holland Zuid are active in neighbourhoods, while in Rivierenland the cooperatives are active in one entire village or municipality. The number of cooperatives is therefore not a strong measure for regional niche development. Neither is, for instance, the realised collective solar capacity that reflects the number and size of projects conducted by energy cooperatives. When looking at realised cooperative solar capacity, it can be seen that Noord-Holland Zuid and Cleantech both have a high collective capacity even though the RES process in Cleantech was less inclusive at the start than in Noord-Holland Zuid. On a local scale, variations in policy inclusiveness were also observed. ESR noted that they closely collaborate with local policy makers in the policy process. In other cases the role of cooperatives in local policy processes was less clear. However, this was solely based on policy document analyses. Empirical research can provide a clearer image on this. Nevertheless, findings suggest that there is local spatial variety with regards to policy inclusiveness.

While policy inclusiveness was touched upon, and it was seen that inclusiveness on a national level has helped overall niche development, the influence of inclusiveness on niche development on regional and local scales remains unclear. While the RES process in Cleantech was at first less inclusive, this has not led to a less-developed regional niche; the cooperatives in Cleantech have a high amount of members and are working on large-scale projects. To understand whether and how regional and local policy inclusion has sped up niche developments of energy cooperatives, further research can perform a more in-depth case study comparison with a RES region where niche advocates are not included in the policy process.

Following findings from the literature, both nurturing and stretch-and-transform empowering policies need to be in place to stimulate niche development and diffusion. FITs were found to be the most suitable financial policy instrument to nurture and empower the niche. (Held et al., 2006; Smith & Raven, 2012) Supportive policy instruments are in place on all spatial scales, while more prominently on the national and provincial scale. On a national scale the SCE and SDE++ are a form of FIT that intend to shield and empower the niche. First, they shield the niche from incumbent regime pressures by creating an investment interest towards cooperative RE projects. Furthermore, they are a sign of stretch-and-transform empowerment. The subsidies stimulate cooperatives to engage in more RE projects and thereby stimulate the transformation of the incumbent energy regime as niche practices and values are integrated. However, earlier research suggested that national subsidies only partly empower the niche. De Boer et al. (2018) found that the old PCR scheme did not significantly increase the number of local energy initiatives. It did induce local innovation which was widely shared among the niche. The innovations stimulated a learning process for local policy makers that work together with the initiatives. Moreover, local practices influenced national policy making as the old PCR subsidy was adapted after feedback from local cooperatives (de Boer et al., 2018).

On the regional scale funds are present in every province and subsidies in most provinces. These funds and subsidies both nurture and empower the niche. Nurturing occurs by offering



financing for the professionalisation of local cooperatives, while empowering occurs by subsidising a part of the investment costs of cooperative projects. Likewise, on a local scale empowering subsidies are in place to partly cover investment costs. In addition, free expertise advice and other subsidies for the professionalisation of local cooperatives is offered in some municipalities. Spatial variation in niche support was seen in regional and local regimes. While empowering elements were present in all provinces, only a few provinces had nurturing elements in place. Moreover, the conditions to obtain financing differ per province with regards to loan duration and required own capital. On a local scale, municipal support mechanisms were mostly present in Friesland and Noord-Holland, while in Cleantech and Rivierenland there was very little local niche support. Only few municipalities had nurturing policy instruments in place. Different conditions for niche development therefore exist between municipalities and regions (Roesler & Hassler, 2019). One of the interviewees indicated that the inconsistency in niche support poses difficulties for niche development, as local policy makers make inconsistent decisions when it comes to subsidies and the role of local cooperatives. More consistency of niche support is thus needed to ensure a more uniform development.

### 6.1.1 Vertical nesting

Raven et al. (2012) suggested that vertically nested regimes influence each other. This was confirmed here as well. It was seen that national regulations and frameworks shape the roles of regional and local regime actors. For instance, the RES programme gave an incentive for the formation of (new) regional policy networks that can include niche advocates. In addition, the RES needs to reflect how citizen participation was part of the policy process. On a local scale initiative takers have become responsible for local participation, while the role of municipalities has changed to facilitating. The regulations also set a role for energy cooperatives in local regimes as they can provide solutions for adhering to the national regulations.

The national policy goal of 50% local ownership is overall adapted in local regimes. Some deviations can be seen as some municipalities set it as a strict goal, while others use it as a guiding principle. In some cases 50% local ownership is specifically defined as being owned by the local energy cooperative. By adapting this notion these local regimes show political support for the niche and empower it by creating a predetermined role of niche advocates in the policy regime. Municipalities differently adapt the national regulations for local participation. Overall a participation plan needs to be in place that reflects how participation was part of the project. In some municipalities in Cleantech a project council consisting of experts and citizens is set up that ensures participation is integrated in the project. In Friesland the province has developed a framework for participation in solar projects that is adapted by some municipalities. Deviations in the normative roles can be seen in the local regimes. While in most cases the municipality takes on a facilitating role, in some municipalities policy makers take on an executive role. For instance, in Groningen the municipality exploits large-scale RE projects to ensure local ownership. In Westwellingwerf and Heemstede the municipality is also ready to take on an executive role in realising RE projects.

The national regime further influences regional- and local regimes by setting national policy norms for solar placement that are adapted in regional- and local policy frameworks. These norms are adapted in all regional and local regimes, tailored to the biophysical context of the region or locality. For instance, in Noord-Holland Zuid a strong emphasis is on solar PV above parking lots, which can be explained by its urban characteristics. In Gelderland there are a lot of preserved nature areas, which is reflected in their Zonnewijzer.

Vertical nesting of regimes can cause misalignments or inconsistencies (Raven et al., 2012). Multiple misalignments were encountered during this research. The national government has set policy objectives for wind energy capacity in the Energy Agreement, however these have not been met as the RES framework lacks specific wind or solar targets. Another misalignment was pointed out by ESR where the speed at which environmental permits are handed out by municipalities often exceeds the allowed timespan set for the SDE++ subsidy. Finally, local ownership is not clearly defined in the Climate Agreement and is therefore not binding which

has resulted in inconsistent implementations. Each municipality thus sets its own conditions, ranging from complete juridical ownership to only financial participation. The role of local cooperatives in project development thereby varies per municipality. More consistent implementation of national goals can ensure more uniformity in niche-regime interactions and allow for a smoother energy transition.

**TABLE 4: SIMILARITIES AND DIFFERENCES BETWEEN REGIONAL- AND LOCAL POLICY REGIMES**

	<b>Similarities</b>	<b>Differences</b>
<b>Policy network</b>	<p>Energy cooperatives take part in the policy process in all energy regions.</p> <p>All regions have included societal actors in the RES network</p>	<p>The role of cooperatives in local policy regimes differs per municipality</p> <p>Collaborations between RES partners differs per region</p> <p>Deviations in normative roles in local regimes.</p>
<b>Policy goals</b>	<p>All regions and municipalities adapt the national local ownership goals</p>	<p>Contribution to national RE capacity differs per energy region</p> <p>Variety in regional and municipal solar ambitions.</p>
<b>Policy instruments</b>	<p>National political norms for solar placement is adapted in all regions</p> <p>Provincial funds are available in all energy regions.</p>	<p>Conditions for provincial financing differ</p> <p>Not all provinces have subsidies in place</p> <p>Different local policy frameworks for participation and local ownership</p>
<b>Niche support</b>	<p>The provincial funds intend to empower the niche</p>	<p>Nurturing subsidies are only present in a few provinces</p> <p>Municipal financial support differs per local regime.</p>

## 6.2 Niche analysis

It was seen that all RECs perform inward- as well as outward-oriented activities. Both are equally important to facilitate the energy transition. Inward-oriented activities are important for creating a robust niche, where a common agenda is established and a heterogenous network is in place. Outward-oriented activities are then needed to promote the niche to the wider context and generate both societal and political support for the niche. By showcasing the relevance of the niche in the energy transition RECs can advocate for more supportive policies in regional- and local regimes. Similarities and differences with regards to the activities of RECs are summarised in table 5.

Inward-oriented niche activities of the RECs include the formation of a heterogenous niche network in the respective regions. Spatial variation was seen between regional niche networks. For instance, in Noord-Holland setting up a niche network was quite a challenge due to the size of the province. Multiple collaborating clusters within the province were formed. By ensuring that these clusters consist of cooperatives that cover each aspect of the energy transition,

ESNH ensures a heterogeneous network. In Rivierenland, ESR set up a regional niche network by establishing local cooperatives in all municipalities.

Another common inward-oriented activity is the facilitation of knowledge transfer. By sharing knowledge and expertise of the global niche level, RECs function as intermediary organisations and ensure the formation of common rules and practices. These findings are in line with a study performed by Geels and Deuten (2006) that emphasises the role of this kind of intermediary organisations for niche development. Spatial variation was seen in the type of knowledge that was shared. In Noord-Holland local cooperatives are especially in need for knowledge on organisational development. In Rivierenland cooperatives still have a need for expertise on project development as well. This can be explained by the relative young niche network in Rivierenland, meaning that the local cooperatives have less experience and knowledge available.

Outward-oriented activities include the formation of partnerships with powerful regime actors. Societal and political support on a regional and local level can influence the transition trajectory as it can lead to the institutionalisation of niche practices on higher spatial scales and strengthen the global networks in favour of the niche (Späth & Rohracher, 2012)

RECS are engaged in partnerships with regime actors from different domains; societal organisations, industrial actors, and financial actors. For instance, some RECs collaborate with financial actors; ESNH collaborates with Rabobank and ÚK collaborates with the provincial fund of Friesland. The other RECs did not seem to collaborate with actors from the financial domain, but did show some collaborations with other partners such as grid operators, business sector, and other kinds of alliances with societal partners.

All RECs are performing empowering activities that contribute to increase the political support of the niche. ESNH and ESG interact with provincial policy makers. All of the RECs are part of the regional policy process of the RES, thereby becoming part of the regional energy policy regime. This shows that all RECs have generated significant support from regime actors. Interestingly, during the interviews it became clear the inclusion of RECs in the RES process is not the case in all regions. However, this was not found in any of the energy regions analysed during this research. On a local level, only ESR seemed to have a direct role in municipal policy processes. AS ESR said, due to the smaller size of the municipalities, they often lack the knowledge on sustainability issues. They thus require the expertise of ESR on this. In Noord-Holland this might not be the case as the municipalities are more urbanised and thus often larger. However, ESNH does help municipalities with participation trajectories and setting up local energy movements, which also contributes to the political support of the niche as ESNH offers solutions to local policy makers in the changing policy environment.

Several hurdles for niche development were discussed with the interviewees. Inconsistent niche support and difficulties with obtaining financial support were mentioned. During the interviews it again became clear that every province and municipality takes on a different approach when it comes to niche support and adaptation of national goals. This is in line with the policy regime analysis. As ESNH states, some municipalities refrain from offering structural, nurturing, support to the local niche, which has implications for its development. Furthermore, as not every municipality has a strong definition of 50% local ownership, this affects the role of local cooperatives in the policy regimes. While in some municipalities cooperatives are closely involved in participation processes, in others it is not the case.

Furthermore, the attitude of the government towards energy cooperatives was mentioned by one interviewee to be problematic. Cooperatives are labelled as legal entities and often approached as business ventures, which poses difficulties for cooperatives as they cannot adhere to the requirements laid upon them. Other hurdles include time, money, and the fact that local cooperatives primarily focus on improving their local environment. These hurdles are among common problem faced by grassroot innovations (Seyfang & Smith, 2007). The capacity of the initial individuals that establish a cooperative was mentioned as an important factor for the development of a cooperative. This touches upon the findings from Middlemis and Parish (2010), who found that personal capacities present within a community affect its potential to be environmentally active. The same could therefore be suggested on the importance of

personal capacities present in energy cooperatives and the cooperatives potential to contribute to the energy transition. Seyfang and Smith (2007) also found that that key individuals with a particular combination of skills are required for the development of grassroots innovation, and its lack thereof poses challenges.

TABLE 5: SIMILARITIES AND DIFFERENCES BETWEEN RECS

	Similarities	Differences
<b>Inward-oriented activities</b>	<p>Setting up regional niche networks</p> <p>Knowledge sharing among the regional network</p>	<p>In Noord-Holland the niche network consists of multiple clusters</p> <p>Niche networks have needs for different types of knowledge</p>
<b>Outward-oriented activities</b>	<p>Partners with other energy- or nature related organisations (e.g. Natuur en Milieufederaties)</p> <p>Participation coalition present in Noord-Holland and Gelderland</p> <p>All are involved in the RES policy process</p>	<p>ESNH and ÚK collaborate with financial partners</p> <p>ESR and ESG take part in the GEA which offers them a very wide network</p> <p>Not all are involved in local policy processes</p>

**6.3 Framework**

When looking at the composed framework, MLP served as a strong basis to frame the interactions between governmental actors and energy cooperatives in the Dutch energy transition. By integrating concepts of policy, niche processes and spatiality into MLP, the used framework allowed for the assessment of the energy policy regime and the energy cooperative niche. In addition, it allowed for the assessment of spatial variation between policy regimes and niche-regime interactions, which helps us to better understand the complexity of energy governance. However, as Van Dam and Van Der Windt (2022) rightfully point out, with a rising number of empirical studies, there is a need for a standardised framework to address the spatiality of the energy transition.

Some important aspects were neglected in the current research and its framework. For instance, it neglected the policy mix characteristics, which encompasses concepts such as the comprehensiveness, coherence and credibility of the policy mix. Including these concepts would have allowed for an even more in depth policy regime analysis. Moreover, while the concepts of local and regional regime deviations were touched upon, the methods of this research did not include a deeper analysis on how policy makers shape local and regional context in favour of niche development.

**6.4 Suggestions for further research**

I would like to propose suggestions for future research that can enrich this current research. First, the focus on this research was on the enabling properties of the energy policy regime with regards to niche support. Kivimaa & Kern (2016) found that in a sustainable transition, the policy mix should contain both niche support and regime destructive policies, which was supported by To et al. (2018). This research did not look at the destructive policies towards the

fossil fuel regime. Future research might therefore focus on the regime destructive policies in the Netherlands to provide a more complete overview on the role of the energy policy regime in the energy transition.

Second, the focal point of the policy regime analysis were aspects of the Climate Agreement and the RES programme as well as the Environmental Act. This was chosen as these policy frameworks showed direct interactions with the energy cooperative niche. The policy network analysis included governmental bodies and niche advocates and their associated alliances. The author recognises that these actors make up only part of the policy network. Future analyses can address the niche-regime interactions more broadly by including, for instance, Distribution System Operators, environmental NGOs, and actors from the industrial and business domains.

Third, as mentioned previously, regional and local regime deviations were found. Späth and Rohracher (2012) suggested that these deviations can influence long-term transition processes. This research did not conduct interview with policy makers to provide more detailed information on how they shape the local context in favour of niche development. This may be a focal point for further research.

## 7. CONCLUSION

This thesis aimed to answer the research question “How do regional energy cooperatives interact with the energy policy regimes on the different spatial scales?” A literature study was performed to enrich the MLP framework with necessary concepts. Through an analysis of policy documents the energy policy on the national, regional, and local scales were defined. Information on the RECs was gathered through desk research and by performing semi-structured interviews with representatives of three RECs. The interactions between the RECs and the energy policy regimes were analysed by assessing how the policy regime intends to stimulate niche development, and by outlining the outward-oriented activities of the RECs.

Findings show that RECs interact with the energy policy regime mainly on the regional level. RECs do not directly interact with the national policy regime. In the regional policy regime RECs are involved in the policy process of the RES by being part of the RES stirring group. By taking part in this regional policy process, RECs ensure a role for themselves in the policy strategy. For instance, in Rivierenland ESR is responsible for creating a regional knowledge platform as part of the RES programme. In Noord-Holland Zuid, ESNH helps policy makers with realising local participation and ownership. ESNH and ESG are both active on the provincial policy level as well. Both of them perform projects commissioned by the provincial states, and both lobby to gain political support for the niche. Not all RECs interact with the local policy regime. For instance, ESG was not involved with local policy makers. On the other hand, ESR was part of the local policy processes and performs projects for municipalities. ESNH facilitates local ownership for municipalities. These findings do suggest that RECs are also involved in the local energy transition, however it is unclear to what extent they do so.

Further conclusions can be drawn on the spatial implications of energy governance. First, the national energy policy regime influences the regional- and local regimes and thereby also niche-regime interactions on the lower spatial scales. National policy frameworks, including political norms and regulations influence the policy process and role of policy actors on the lower scales. This finding emphasises the complexity of energy governance. In addition, it confirms that local and regional energy transitions are influenced by external regime conditions (Van Dam & Van Der Windt, 2022). Governance on the three different levels should be aligned to facilitate a smooth energy transition as misalignments and inconsistencies between the policy regimes can occur that hamper the transition process. Second, financial policy instruments that interact with the niche are in place on each spatial scale, albeit more prominently on the

national and regional levels. Spatial differentiation was seen in their intended interaction with the niche. While empowering instruments were in place in all provinces, nurturing instruments were only in place in selected provinces. On a local level this same spatial differentiation was seen. While in general there was little local support, some municipalities empowered the niche while others nurtured the niche as well. The energy cooperative niche would benefit from more uniformity in financial support, as both nurturing and empowering policy instruments are needed to stimulate niche development and diffusion.

Finally, RECs are niche advocates that play a crucial role in creating a robust niche. By creating regional, heterogeneous niche networks, and serving as intermediaries in this network, RECs are facilitating the regional energy transition. Creating robust regional niche networks not only strengthens the position of the niche on a regional level, but also strengthens the niche network on the national level. (Späth & Rohracher, 2012)

All in all, RECs are important facilitators of the energy transition. They interact with the policy regime by influencing the policy process especially on the regional scale and advocate for a strong position for energy cooperatives. Moreover, by strengthening regional networks, RECs influence overall niche development and can thereby also be considered important actors in the national energy transition in the Netherlands.

## 8. REFERENCES

- arentsen, m., & bellekom, s. (2014). *power to the people: local energy initiatives as seedbeds of innovation?* <https://doi.org/10.1186/2192-0567-4-2>
- bulkeley, h. (2005). reconfiguring environmental governance: towards a politics of scales and networks. *political geography*, 24(8), 875–902. <https://doi.org/10.1016/j.polgeo.2005.07.002>
- buurkracht. (n.d.). *over - buurkracht*. retrieved may 30, 2022, from <https://www.buurkracht.nl/over/>
- cbs. (2020). *statline - hernieuwbare energie; zonnestroom, windenergie, res-regio*. <https://opendata.cbs.nl/statline/#/cbs/nl/dataset/85004ned/table?dl=55e8d>
- coöperatie bommelerwaar. (n.d.). *vragen & antwoord - bommelerwaar*. retrieved may 20, 2022, from <https://www.bommelerwaar.nl/faq-ervaringen/>
- corf. (n.d.). *over op rozen | corf - coöperatie op rozen facilitair*. retrieved may 19, 2022, from <https://www.oprozenfacilitair.nl/over-op-rozen>
- coutard, o., & rutherford, j. (2010). energy transition and city–region planning: understanding the spatial politics of systemic change. <https://doi.org/10.1080/09537325.2010.496284>, 22(6), 711–727. <https://doi.org/10.1080/09537325.2010.496284>
- daaromduurzaamdiemen. (n.d.). *microsubsidie aanvragen - platform daaromduurzaamdiemen*. retrieved may 21, 2022, from <https://daaromduurzaamdiemen.nl/initiatieven/2174774.aspx>
- davies, i. l., & allen, k. (2014). feed-in tariffs in turmoil. *west virginia law review*, 116(3), 938–1005.
- de boer, j., zuidema, c., van hoorn, a., & de roo, g. (2018). the adaptation of dutch energy policy to emerging area-based energy practices. *energy policy*, 117, 142–150. <https://doi.org/10.1016/j.enpol.2018.02.008>
- de bom. (n.d.). *investeren in duurzame elektriciteit | bom investeren | de brabantse ontwikkelings maatschappij*. retrieved may 10, 2022, from <https://www.bom.nl/investeren/product/investeren-in-duurzame-elektriciteit>
- de graaff, s. a., pek, a. l., hofstra, h., mulder, m., tijdens, m., & harsveld, b. (2021). *lokaal eigendom en participatie res groningen*. <https://resgroningen.nl/over+de+res/achtergrondinformatie/default.aspx#folder=1990174>
- de participatiecoalitie. (n.d.-a). *home - de participatiecoalitie betreft bewoners bij de energietransitie*. retrieved march 17, 2022, from <https://departicipatiecoalitie.nl/>
- de participatiecoalitie. (n.d.-b). *over ons - de participatiecoalitie*. retrieved may 19, 2022, from <https://departicipatiecoalitie.nl/wat-is-de-pc/>
- dóci, g., & gotchev, b. (2016). when energy policy meets community: rethinking risk perceptions of renewable energy in germany and the netherlands. *energy research & social science*, 22, 26–35. <https://doi.org/10.1016/j.erss.2016.08.019>
- dóci, g., vaseiliadou, e., & petersen, a. c. (2015). exploring the transition potential of renewable energy communities. *futures*, 66, 85–95. <https://doi.org/10.1016/j.futures.2015.01.002>
- ecoop. (2022). *wat houdt de pcr-regeling precies in? - postcoderoosregeling / regeling verlaagd tarief*. <https://www.postcoderoosregeling.nl/wat-houdt-de-pcr-regeling-precies-in/>
- eef flevoland. (n.d.). *financieringsmogelijkheden voor uw duurzame energieproject | eef flevoland*. retrieved april 15, 2022, from <https://www.eef-flevoland.nl/financiering/>
- energie samen. (n.d.-a). *energie samen*. retrieved march 17, 2022, from <https://energiesamen.nu/>
- energie samen. (n.d.-b). *jouw belangenvereniging - energie samen*. retrieved may 9, 2022, from <https://energiesamen.nu/pagina/1/over-energie-samen>
- energie samen. (n.d.-c). *ontwikkelfonds voor energiecoöperaties - energie samen*. retrieved may 10, 2022, from <https://energiesamen.nu/pagina/77/ontwikkelfonds-voor-energiecooperaties>
- energie samen gelderland. (n.d.). *werkplaatsen/cop's - energie samen gelderland*. retrieved

june 9, 2022, from <https://energiesamengelderland.nl/kennis/werkplaatsen-cops/energiefonds-den-haag>. (n.d.). *over het fonds | energiefonds den haag - ed*. retrieved april 18, 2022, from <https://www.eddenhaag.eu/over-het-fonds/over-het-fonds/energiefonds-drenthe>. (n.d.). *energiefonds drenthe - energiefonds drenthe*. retrieved may 10, 2022, from <https://www.drentseenergieorganisatie.nl/energiefonds-drenthe> energiefonds gelderland. (n.d.). *innovatie- en energiefonds gelderland | oost nl*. retrieved april 15, 2022, from <https://oostnl.nl/nl/innovatie-en-energiefonds-gelderland> energiefonds overijssel. (n.d.). *financieringsvormen - energiefonds overijssel*. retrieved may 10, 2022, from <https://www.energiefondsoverijssel.nl/financieringsvormen/> energiefonds utrecht. (n.d.). *duurzaamheidslening voor bedrijven en instellingen | energiefonds utrecht*. retrieved may 10, 2022, from <https://www.energiefondsutrecht.nl/?msclkid=941c6fa3d04811ec89bd5f83493a1fd3> fonds nieuwe doen. (n.d.). *lening aanvragen? - fonds nieuwe doen groningen*. retrieved february 9, 2022, from <https://www.fondsnieuwedoet.nl/lening-aanvragen/> fontes, m., sousa, c., & ferreira, j. (2016). the spatial dynamics of niche trajectory: the case of wave energy. *environmental innovation and societal transitions*, 19, 66–84. <https://doi.org/10.1016/j.eist.2015.09.003> fsfe. (n.d.). *energiecoöperatie lening - fsfe*. retrieved april 15, 2022, from [https://www.fsfe.fr/energiecooperatie\\_lening/](https://www.fsfe.fr/energiecooperatie_lening/) gailing, l., & röhring, a. (2016). is it all about collaborative governance? alternative ways of understanding the success of energy regions. *utilities policy*, 41, 237–245. <https://doi.org/10.1016/j.jup.2016.02.009> gedeputeerde staten friesland. (2020). *de romte diele omgevingsvisie provincie fryslân*. geels, f., & deuten, j. j. (2006). *local and global dynamics in technological development: a socio-cognitive perspective on knowledge flows and lessons from reinforced concrete*. 33(4), 265–275. geels, f. w. (2002). technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *research policy*, 31, 1257–1274. geels, f. w., mcmeekin, a., mylan, j., & southerton, d. (2015). a critical appraisal of sustainable consumption and production research: the reformist, revolutionary and reconfiguration positions. *global environmental change*, 34, 1–12. <https://doi.org/10.1016/j.gloenvcha.2015.04.013> geels, f. w., & schot, j. (2007). typology of sociotechnical transition pathways. *research policy*, 36(3), 399–417. <https://doi.org/10.1016/j.respol.2007.01.003> geels, f. w., sovacool, b. k., schwanen, t., & sorrell, s. (2017). *the socio-technical dynamics of low-carbon transitions*. <https://doi.org/10.1016/j.joule.2017.09.018> gelders energieakkoord. (n.d.-a). *de verbinding met de regio's - duurzame opwekking - gelders energieakkoord*. retrieved may 5, 2022, from <https://www.geldersenergieakkoord.nl/duurzame-opwekking/de-verbinding-met-de-regio> gelders energieakkoord. (n.d.-b). *het netwerk - gelders energieakkoord*. retrieved may 16, 2022, from <https://www.geldersenergieakkoord.nl/netwerk> gelders energieakkoord. (n.d.-c). *het plan - duurzame opwekking - gelders energieakkoord*. retrieved may 16, 2022, from <https://www.geldersenergieakkoord.nl/duurzame-opwekking/het-plan> gemeente aalsmeer. (n.d.). *servicepunt energieadvies voor collectieven en organisaties*. retrieved may 21, 2022, from [https://www.aalsmeer.nl/wonen-leven/product/duurzaamheid\\_servicepunt-energieadvies-voor-collectieven-en-organisaties](https://www.aalsmeer.nl/wonen-leven/product/duurzaamheid_servicepunt-energieadvies-voor-collectieven-en-organisaties) gemeente achtkarspelen. (2021a). *gebiedsfonds sinnegreide voor duurzame initiatieven in achtkarspelen | gemeente achtkarspelen*. <https://www.achtkarspelen.nl/gebiedsfonds-sinnegreide-voor-duurzame-initiatieven-in-achtkarspelen/> gemeente achtkarspelen. (2021b). *ontwerp omgevingsvisie achtkarspelen 2021-2040*. gemeente amstelveen. (n.d.). *servicepunt energieadvies voor collectieven en organisaties*. retrieved may 21, 2022, from [https://www.amstelveen.nl/duurzaamheid/product/duurzaam-wonen\\_advies-duurzaam-](https://www.amstelveen.nl/duurzaamheid/product/duurzaam-wonen_advies-duurzaam-)



wonen\_servicepunt-energieadvies-voor-collectieven-en-organisaties  
gemeente amsterdam. (n.d.-a). *concept res amsterdam*.

gemeente amsterdam. (n.d.-b). *lening duurzaamheidsfonds - gemeente amsterdam*.  
retrieved may 21, 2022, from <https://www.amsterdam.nl/wonen-leefomgeving/duurzaam-amsterdam/duurzaamheidsfonds/#h31dc6919-7f91-4677-8255-5420aa5ecb35>

gemeente amsterdam. (n.d.-c). *subsidie integraal maatschappelijk initiatief - gemeente amsterdam*. retrieved may 21, 2022, from  
<https://www.amsterdam.nl/veelgevraagd/?productid=%7be07f7072-cef2-47d6-99a3-d75d291d70e2%7d>

gemeente amsterdam. (n.d.-d). *subsidie ruimte voor duurzaam initiatief - duurzame projecten en programma's - gemeente amsterdam*. retrieved may 21, 2022, from  
<https://www.amsterdam.nl/veelgevraagd/?productid=%7b1d452e36-8f3e-46f4-9854-bf98ff0c5aaa%7d>

gemeente amsterdam. (n.d.-e). *subsidie ruimte voor duurzaam initiatief - op weg naar klimaatneutrale buurten amsterdam - gemeente amsterdam*. retrieved may 21, 2022, from  
<https://www.amsterdam.nl/veelgevraagd/?productid=%7b8b2e56d9-1222-499b-be8e-9228d2afb710%7d>

gemeente amsterdam, liander, & tennet. (2022). *ruimtelijk kader voor de uitbreiding van de hoofd-elektriciteitsinfrastructuur*.

gemeente apeldoorn. (n.d.). *subsidierегeling energieke activiteiten - gemeente apeldoorn*.  
retrieved april 26, 2022, from <https://www.apeldoorn.nl/subsidierегeling-energieke-activiteiten?highlight=energie%2c%20subsidie>

gemeente apeldoorn. (2020). *afwegingskader voor apeldoornse zonneparken*.

gemeente apeldoorn. (2022). *omgevingsvisie apeldoorn*.

gemeente blaricum. (2022a). *programma duurzaam blaricum inhoud*.

gemeente blaricum. (2022b). *uitvoeringsplan energietransitie blaricum. november 2019*.

gemeente brummen. (2021). *uitnodigingskader windmolens en zonnevelden*.

gemeente buren. (2020). *beleidsplan zon en wind*. <https://pdc.buren.nl/wp-content/uploads/2020/10/begrippenlijst-duurzaamheid.pdf>

gemeente culemborg. (n.d.). *lokaal energieneutraal | gemeente culemborg*. retrieved april 25, 2022, from <https://www.culemborg.nl/lokaal-energieneutraal>

gemeente dantumadiel. (2022). *omgevingsvisie dantumadiel*.

gemeente de fryske marren. (n.d.-a). *duurzaamheidsprogramma*.

gemeente de fryske marren. (n.d.-b). *subsidierегeling duurzaamheid de fryske marren | gemeente de fryske marren*. retrieved may 21, 2022, from  
<https://www.defryskemarren.nl/subsidierегeling-duurzaamheid-de-fryske-marren>

gemeente diemen. (2020). *duurzaam diemen*.

gemeente diemen. (2021). *ontwerp- omgevingsvisie diemen 2040 (issue september)*.

gemeente epe. (n.d.). *transitievисie energie en warmte*.

gemeente groningen. (n.d.). *subsidies en leningen voor verduurzaming en energiebesparing | gemeente groningen*. retrieved may 21, 2022, from  
<https://gemeente.groningen.nl/subsidies-en-leningen-voor-verduurzaming-en-energiebesparing>

gemeente haarlem. (n.d.). *subsidie collectieve zonnestroom*. retrieved may 21, 2022, from  
<https://www.haarlem.nl/subsidie-collectieve-zonnestroom/>

gemeente haarlemmermeer. (2021). *beleidskader lokaal eigenaarschap in zon-en windprojecten*.

gemeente harlingen. (n.d.). *programma duurzaam harlingen*.

gemeente harlingen. (2021). *zonnepanelen in harlingen*.

gemeente heemskerk. (n.d.). *milieubeleidsplan gemeente heemskerk 2020-2023*.

gemeente heemstede. (2019). *beleidsanalyse omgevingsvisie fase 1 de gemeente heemstede van a tot z*.

gemeente heerde. (n.d.). *contourennota uitvoering lokaal klimaatbeleid 2017-2021*.

gemeente heerde. (2021). *uitnodigingskader zonnevelden en windmolens in de gemeente*

*heerde.*  
 gemeente heerenveen. (n.d.). *leef: lokaal energie experimenten fonds.*  
 gemeente heerenveen. (2019). *samen duurzaam in heerenveen. duurzaamheidsprogramma 2019-2022.*  
 gemeente heerenveen. (2021). *omgevingsvisie heerenveen 1.0.*  
 gemeente het hogeland. (2019). *beleid kleinschalige duurzame energie opwekking het hogeland.*  
 gemeente hilversum. (2021). *omgevingsvisie hilversum geactualiseerde samenvatting omgevingsfoto hilversum.*  
 gemeente laren. (2022). *contourendocument omgevingsvisie.*  
 gemeente leeuwarden. (n.d.-a). *omgevingsplan | omgevingswet leeuwarden.* retrieved may 2, 2022, from <https://omgevingswet.leeuwarden.nl/nl/omgevingsplan>  
 gemeente leeuwarden. (n.d.-b). *subsidieregeling duurzame dorpen en wijken – 2022 | gemeente leeuwarden.* retrieved may 2, 2022, from <https://www.leeuwarden.nl/nl/subsidies/subsidieregeling-duurzame-dorpen-en-wijken-2022>  
 gemeente leeuwarden. (n.d.-c). *toets - plan voor de zon.* retrieved may 9, 2022, from <https://www.planvoordezon.nl/toets>  
 gemeente lochem. (n.d.). *op weg naar beleid grootschalig energie opwekken met wind en zon - gemeente lochem.* retrieved april 26, 2022, from <https://www.lochem.nl/afval-energie-natuur-en-milieu/energie/windenergie>  
 gemeente maasdriel. (2021). *visie zon en wind maasdriel.*  
 gemeente midden-groningen. (2019a). *beleid zonneparken in midden-groningen.*  
 gemeente midden-groningen. (2019b). *duurzaamheidsvisie midden-groningen.*  
 gemeente noardeast-fryslân. (2021a). *beleidskader zonne-energie.*  
 gemeente noardeast-fryslân. (2021b). *uitgangspuntennotitie omgevingsvisie.*  
 gemeente oldambt. (2021). *programma zon en wind.*  
 gemeente ooststellingwerf, & bûgelhajema. (2021). *omgevingsvisie ooststellingwerf.*  
 gemeente opsterland. (n.d.). *omgevingsvisie | gemeente opsterland.* retrieved may 2, 2022, from <https://www.opsterland.nl/omgevingsvisie>  
 gemeente opsterland. (2020). *zonneplan opsterland.*  
 gemeente ouder-amstel. (n.d.). *aanpak duurzaam ouder-amstel - gemeente ouder-amstel.* retrieved may 4, 2022, from [https://www.ouder-amstel.nl/home/duurzaamheid/aanpak\\_duurzaam\\_ouder\\_amstel](https://www.ouder-amstel.nl/home/duurzaamheid/aanpak_duurzaam_ouder_amstel)  
 gemeente pekela. (n.d.). *visie op zonneparken in pekela - gemeente pekela.* retrieved april 22, 2022, from [https://www.pekela.nl/onderwerpen/bouwen\\_en\\_omgeving/duurzaamheid/visie\\_op\\_zon\\_neparken\\_in\\_pekela](https://www.pekela.nl/onderwerpen/bouwen_en_omgeving/duurzaamheid/visie_op_zon_neparken_in_pekela)  
 gemeente schiermonnikoog, royal haskoningdhv, groningen, h., & entrance. (2021). *naar een dursum eilaun schiermonnikoog.*  
 gemeente smallingerland. (n.d.-a). *besluit van de gemeenteraad van de gemeente smallingerland houdende regels omtrent het beleid verder met zonne-energie in smallingerland.* retrieved may 9, 2022, from <https://lokaleregelgeving.overheid.nl/cvdr643023/1?msclkid=24529849cf7e11ec96c69dc8e91adb61>  
 gemeente smallingerland. (n.d.-b). *omgevingsvisie smallingerland.*  
 gemeente stadskanaal. (n.d.-a). *gemeente stadskanaal: gebiedsfonds.* retrieved may 8, 2022, from <https://stadskanaal.nl/werktduurzaam/stadskanaal-op-zon>  
 gemeente stadskanaal. (n.d.-b). *gemeente stadskanaal: visie op zonne-energie.* retrieved april 22, 2022, from <https://stadskanaal.nl/opzon>  
 gemeente súdwest-fryslân. (n.d.-a). *klimaatagenda think global, act local.*  
 gemeente súdwest-fryslân. (n.d.-b). *schone energie - samen súdwest-fryslân.* retrieved april 27, 2022, from <https://samensudwestfryslan.nl/omgevingsvisie/themas/duurzaamenergieneutraalenklimaatadaptief/schoneenergie/default.aspx>

gemeente súdwest-fryslân. (n.d.-c). *subsidiereregelingen 2022 gemeente súdwest-fryslân*. retrieved april 27, 2022, from <https://lokaleregelgeving.overheid.nl/cvdr663389/1>

gemeente terschelling. (2018). *uitvoeringsprogramma terschelling duurzaam 2018-2022*.

gemeente tiel. (n.d.). *omgevingsvisie | gemeente tiel*. retrieved april 25, 2022, from <https://www.tiel.nl/omgevingsvisie>

gemeente tytsjerksteradiel. (2021). *duorsum tegearre dwaan. duurzaamheidsagenda tytsjerksteradiel*.

gemeente uithoorn. (n.d.). *op weg naar de omgevingsvisie uithoorn 2040*.

gemeente veendam. (2022). *visie zonne-energie veendam*.

gemeente vlieland. (n.d.). *visie & ambitie - duurzaam vlieland -*. retrieved april 27, 2022, from [https://www.vlieland.nl/duurzaamheid/visie-ambitie\\_45645/](https://www.vlieland.nl/duurzaamheid/visie-ambitie_45645/)

gemeente vlieland. (2021). *omgevingsvisie vlieland: langzaam meebewegen*.

gemeente voorst. (2019). *beleidsuitgangspunten zonnevelden 2.0 gemeente voorst*.

gemeente waadhoeke. (2020). *duurzamer worden door het “oars” te doen. duurzaamheidsagenda waadhoeke*.

gemeente west-betuwe. (n.d.). *krachten bundelen participatiebeleid*.

gemeente west-betuwe. (2040). *west betuwe ontwerp omgevingsvisie*.

gemeente west maas en waal. (n.d.). *koersnotitie duurzaamheid en energiebeleid*.

gemeente west maas en waal. (2021). *selectieleidraad zonne-energie*.

gemeente westerkwartier. (n.d.-a). *duurzaamheidsbeleid 2020-2025*.

gemeente westerkwartier. (n.d.-b). *subsidiereregeling energiecollectieven | gemeente westerkwartier*. retrieved may 21, 2022, from <https://www.westerkwartier.nl/subsidiereregeling-energiecollectieven>

gemeente westerkwartier. (2020). *visie hernieuwbare elektriciteit gemeente westerkwartier*.

gemeente westerwolde. (n.d.). *beleidsnotitie zonneparken en kleine windmolens gemeente westerwolde*. retrieved april 25, 2022, from <https://lokaleregelgeving.overheid.nl/cvdr623627/1>

gemeente westerwolde. (2018). *westerwolde samen verduurzamen*.

gemeente weststellingwerf. (2019). *omgevingsvisie weststellingwerf*.

gemeente zaanstad. (n.d.). *wat houdt de verordening stimuleringslening duurzaamheid zaanstad in?* retrieved may 21, 2022, from <https://www.zaanstad.nl/mozard/!suite86.scherm0325?mpag=366&mvrg=10311>

gemeente zaltbommel. (2021). *zon- en windbeleid*.

gemeente zaltbommel, & gemeente maasdriel. (2021). *ontwerp omgevingsvisie bommelerwaard*.

gemeente zutphen. (n.d.-a). *afwegingskader zonne-energie | gemeente zutphen*. retrieved april 26, 2022, from <https://zutphen.nl/energie/zonne-energie/afwegingskader-zonne-energie>

gemeente zutphen. (n.d.-b). *het omgevingsplan landelijk gebied | gemeente zutphen*. retrieved april 26, 2022, from <https://zutphen.nl/omgevingswet/omgevingsplan-landelijk-gebied/het-omgevingsplan-landelijk-gebied>

grek. (n.d.). *programma energieparticipatie | grek*. retrieved may 16, 2022, from <https://greksite.wixsite.com/grek/programma-energie-participatie>

hargreaves, t., hielscher, s., seyfang, g., & smith, a. (2013). grassroots innovations in community energy: the role of intermediaries in niche development. *global environmental change*, 23(5), 868–880. <https://doi.org/10.1016/j.gloenvcha.2013.02.008>

held, a., ragwitz, m., & haas, r. (2006). *on the success of policy strategies for the promotion of electricity from renewable energy sources in the eu*.

hellendoorn op rozen. (n.d.). *home | hellendoorn op rozen*. retrieved may 19, 2022, from <http://www.hellendoornoprozen.nl/>

het parool. (2014). *friesland: geen windmolens in ijsselmeer | het parool*. <https://www.parool.nl/nieuws/friesland-geen-windmolens-in-ijsselmeer~bc746a62/>

hier. (n.d.). *over klimaatstichting hier | hier*. retrieved may 30, 2022, from <https://www.hier.nu/over-klimaatstichting-hier>

hier opgewekt. (n.d.). *financiële ondersteuning voor energiecoöperaties - per provincie | hier*

- opgewekt. retrieved april 11, 2022, from <https://www.hieropgewekt.nl/kennisdossiers/financiele-ondersteuning-voor-energiecooperaties-per-provincie>
- hier opgewekt. (n.d.). *over ons | hier opgewekt*. retrieved march 17, 2022, from <https://www.hieropgewekt.nl/over-ons>
- hier opgewekt & rvo. (2020). *lokale energie monitor 2020 | hier opgewekt*. <https://www.hieropgewekt.nl/lokale-energie-monitor>
- hier opgewekt & rvo. (2022). *lokale energie monitor 2021*.
- hof van twente op rozen. (n.d.). *veelgestelde vragen | hof van twente op rozen*. retrieved may 19, 2022, from <https://www.hofvantwenteoprozen.nl/veelgestelde-vragen>
- hoppe, t., & miedema, m. (2020). a governance approach to regional energy transition: meaning, conceptualization and practice. *sustainability*, 12(3), 915. <https://doi.org/10.3390/su12030915>
- ipcc. (2021). summary for policymakers. in *climate change 2021: the physical science basis. contribution of working group i to the sixth assessment report of the intergovernmental panel on climate change*.
- jordan, a. j., huitema, d., hildén, m., van asselt, h., rayner, t. j., schoenefeld, j. j., tosun, j., forster, j., & boasson, e. l. (2015). emergence of polycentric climate governance and its future prospects. *nature climate change*, 5(11), 977–982. <https://doi.org/10.1038/nclimate2725>
- kivimaa, p., & kern, f. (2016). creative destruction or mere niche support? innovation policy mixes for sustainability transitions. *research policy*, 45(1), 205–217. <https://doi.org/10.1016/j.respol.2015.09.008>
- klimaatfonds terschelling vlieland. (n.d.). *klimaatfonds terschelling en vlieland – het klimaatcompenseren door duurzame projecten te ondersteunen op terschelling en vlieland*. retrieved may 21, 2022, from <https://klimaatfondsterschellingvlieland.nl/>
- limburgs energiefonds. (n.d.). *financiering - limburgs energiefonds*. retrieved april 15, 2022, from <https://www.limburgsenergiefonds.nl/financiering/>
- lsa. (n.d.). *lsa voor bewonersinitiatief - lsa*. retrieved may 30, 2022, from <https://www.lsabewoners.nl/>
- marques, a. c., & fuinhas, j. a. (2012). are public policies towards renewables successful? evidence from european countries. *renewable energy*, 44, 109–118. <https://doi.org/10.1016/j.renene.2012.01.007>
- mattes, j., huber, a., & koehrsen, j. (2015). energy transitions in small-scale regions – what we can learn from a regional innovation systems perspective. *energy policy*, 78, 255–264. <https://doi.org/10.1016/j.enpol.2014.12.011>
- mbzk. (n.d.-a). *ruimte voor klimaatadaptie en energietransitie - ontwerp novi*. retrieved april 20, 2022, from <https://www.novistukken.nl/richting+geven+op+prioriteiten/ruimte+voor+klimaatadaptie+energietransitie/default.aspx>
- mbzk. (n.d.-b). *samenvatting - ontwerp novi*. retrieved april 20, 2022, from <https://www.novistukken.nl/samenvatting/default.aspx>
- nationaal programma res. (n.d.). *werkwijze - regionale energiestrategie*. retrieved february 9, 2022, from <https://regionale-energiestrategie.nl/werkwijze/default.aspx>
- natuur- en milieufederaties. (n.d.). *over ons - natuur en milieufederaties*. retrieved may 30, 2022, from <https://www.natuurenmilieufederaties.nl/over-ons/>
- nicolini, m., & tavoni, m. (2017). are renewable energy subsidies effective? evidence from europe. *renewable and sustainable energy reviews*, 74, 412–423. <https://doi.org/10.1016/j.rser.2016.12.032>
- nill, j., & kemp, r. (2009). evolutionary approaches for sustainable innovation policies: from niche to paradigm? *research policy*, 38(4), 668–680. <https://doi.org/10.1016/j.respol.2009.01.011>
- np res. (2022). *samenstelling programmaraad np res (maart 2022)*.
- participatiecoalitie noord-holland. (n.d.). *participatiecoalitie noord-holland – de energietransitie voor en door de inwoners!* retrieved june 6, 2022, from

<https://participatiecoalitie-nh.nl/>

pbl. (2021). *monitor res 1.0*.

pdenh. (n.d.). *home - pdenh*. retrieved march 17, 2022, from <https://www.pdenh.nl/>

pollitt, m. g. (2012). the role of policy in energy transitions: lessons from the energy liberalisation era. *energy policy*, 50, 128–137.  
<https://doi.org/10.1016/j.enpol.2012.03.004>

provincie drenthe. (n.d.). *subsidie expeditieregeling - provincie drenthe*. retrieved april 15, 2022, from <https://www.provincie.drenthe.nl/@125114/subsidie-0/>

provincie friesland. (n.d.). *voucherregeling energiecoöperatie fryslân 2021 | fryslan*. retrieved april 15, 2022, from <https://www.fryslan.frl/voucherregeling-energiecooperatie-fryslan-2021>

provincie gelderland. (n.d.). *lokale hernieuwbare energieprojecten*. retrieved april 15, 2022, from <https://www.gelderland.nl/subsidies/lokale-hernieuwbare-energieprojecten>

provincie limburg. (n.d.). *subsidie coöperatieve energieprojecten (nadere subsidieregels coöperatieve energieprojecten 2018-2019) (vervallen) - provincie limburg*. retrieved april 15, 2022, from <https://www.limburg.nl/loket/subsidies/actuele-subsidies/subsidieregelingen-2/@2192/subsidie/>

provincie noord-brabant. (n.d.). *energie - brabant geeft energie, subsidie - provincie noord-brabant*. retrieved april 15, 2022, from [https://www.brabant.nl/applicaties/producten/energie\\_\\_brabant\\_geeft\\_energie\\_subsidie\\_18888](https://www.brabant.nl/applicaties/producten/energie__brabant_geeft_energie_subsidie_18888)

provincie noord-holland. (n.d.). *duurzaamheidsinitiatieven burgercollectieven noord-holland 2021, subsidie - provincie noord-holland*. retrieved march 17, 2022, from [https://www.noord-holland.nl/loket/producten\\_en\\_diensten/producten\\_op\\_alfabet/d/duurzaamheidsinitiatieven\\_burgercollectieven\\_noord\\_holland\\_subsidie](https://www.noord-holland.nl/loket/producten_en_diensten/producten_op_alfabet/d/duurzaamheidsinitiatieven_burgercollectieven_noord_holland_subsidie)

provincie overijssel. (n.d.). *opstartsubsidies - lokale energie overijssel*. retrieved may 10, 2022, from <https://www.lokaleenergieoverijssel.nl/financiering/opstartsubsidies/>

provincie utrecht. (n.d.). *energietransitie | provincie utrecht*. retrieved april 18, 2022, from <https://www.provincie-utrecht.nl/loket/subsidies/energietransitie#hoogte>

provincie zuid-holland. (n.d.). *lokale initiatieven energietransitie, subsidie - provincie zuid-holland*. retrieved april 18, 2022, from <https://www.zuid-holland.nl/online-regelen/subsidies/subsidies/lokale-initiatieven/>

ratinen, m., & lund, p. (2015). policy inclusiveness and niche development: examples from wind energy and photovoltaics in denmark, germany, finland, and spain. *energy research & social science*, 6, 136–145. <https://doi.org/10.1016/j.erss.2015.02.004>

raven, r., schot, j., & berkhout, f. (2012). space and scale in socio-technical transitions. *environmental innovation and societal transitions*, 4, 63–78.  
<https://doi.org/10.1016/j.eist.2012.08.001>

res cleantech. (2021). *res 1.0*.

res fryslân. (n.d.). *res fryslân | friese energie alliantie*. retrieved may 16, 2022, from <https://www.resfryslan.frl/nieuws/friese-energie-alliantie/>

res fryslân. (2021a). *ambitiedocument friese overheden*.

res fryslân. (2021b). *regionale energie strategie fryslân*.

res groningen. (2021a). *achtergrond document elektriciteit*. 1–47.

res groningen. (2021b). *res 1.0 groningen*. 1–26.

res noord-holland zuid. (n.d.). *rollen, beleidskaders en instrumenten overheden noord-holland zuid*.

res noord-holland zuid. (2021). *res noord-holland zuid. september*.

res rivierenland. (2021). *res rivierenland*.

rijksoverheid. (n.d.). *omgevingswet | rijksoverheid.nl*. retrieved february 9, 2022, from <https://www.rijksoverheid.nl/onderwerpen/omgevingswet>

rijksoverheid. (2019). *klimaatakkoord | publicatie | klimaatakkoord*.  
<https://www.klimaatakkoord.nl/documenten/publicaties/2019/06/28/klimaatakkoord>

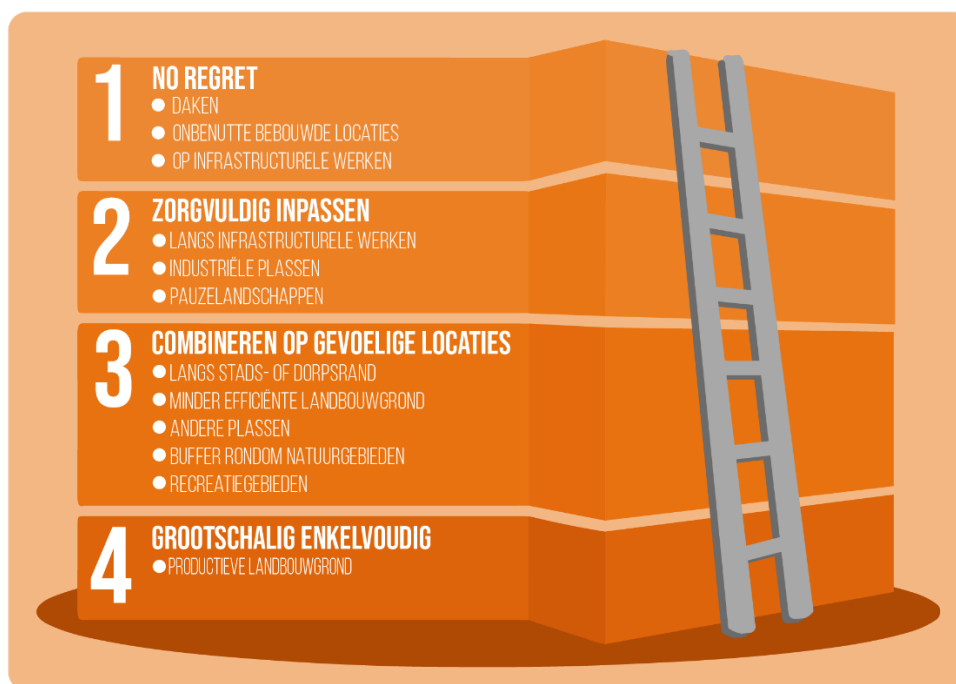
rijnveld, m., & van schie, n. (2019). *kader voor het vormgeven van participatie bij duurzame*

- energieprojecten. november*, 1–36. <https://www.greendeals.nl/green-deals/participatie-van-de-omgeving-bij-duurzame-energieprojecten>
- roberts, c., & geels, f. w. (2019). conditions and intervention strategies for the deliberate acceleration of socio-technical transitions: lessons from a comparative multi-level analysis of two historical case studies in dutch and danish heating. *technology analysis and strategic management*, 31(9), 1081–1103. <https://doi.org/10.1080/09537325.2019.1584286>
- roesler, t., & hassler, m. (2019). *creating niches-the role of policy for the implementation of bioenergy village cooperatives in germany*. <https://doi.org/10.1016/j.enpol.2018.07.012>
- rogge, k. s., & reichardt, k. (2016). policy mixes for sustainability transitions: an extended concept and framework for analysis. *research policy*, 45(8), 1620–1635. <https://doi.org/10.1016/j.respol.2016.04.004>
- rvo. (2021a). *kenmerken sde++ | rvo.nl | rijksdienst*. <https://www.rvo.nl/subsidie-en-financieringswijzer/sde/aanvragen/kenmerken>
- rvo. (2021b). *monitor zon-pv 2021 in nederland*. <https://www.rijksoverheid.nl/documenten/rapporten/2021/09/23/monitor-zon-pv-in-nederland>
- rvo. (2021c). *subsidieregeling coöperatieve energieopwekking (sce) aanvragen | rvo.nl | rijksdienst*. <https://www.rvo.nl/subsidie-en-financieringswijzer/sce>
- rvo. (2022). *monitor wind op land over 2021*.
- schot, j., & geels, f. w. (2008). strategic niche management and sustainable innovation journeys: theory, findings, research agenda, and policy. *technology analysis and strategic management*, 20(5), 537–554. <https://doi.org/10.1080/09537320802292651>
- seyfang, g., & smith, a. (2007). *grassroots innovations for sustainable development: towards a new research and policy agenda*. <https://doi.org/10.1080/09644010701419121>
- smith, a. (2007). translating sustainabilities between green niches and socio-technical regimes. *technology analysis & strategic management*, 19(4), 427–450. <https://doi.org/10.1080/09537320701403334>
- smith, a., & raven, r. (2012). what is protective space? reconsidering niches in transitions to sustainability. *research policy*, 41, 1025–1036. <https://doi.org/10.1016/j.respol.2011.12.012>
- smith, a., stirling, a., & berkhou, f. (2005). the governance of sustainable socio-technical transitions. *research policy*, 34(10), 1491–1510. <https://doi.org/10.1016/j.respol.2005.07.005>
- späth, p., & rohracher, h. (2012). local demonstrations for global transitions-dynamics across governance levels fostering socio-technical regime change towards sustainability. *europaan planning studies*. <https://doi.org/10.1080/09654313.2012.651800>
- startsubsidie lokale energie groningen. (2022). *startsubsidie lokale energie groningen*. <http://startsubsidielokaleenergie.nl/>
- to, l. s., seebaluck, v., & leach, m. (2018). future energy transitions for bagasse cogeneration: lessons from multi-level and policy innovations in mauritius. *energy research & social science*, 35, 68–77. <https://doi.org/10.1016/j.erss.2017.10.051>
- unfccc. (n.d.). *the paris agreement | unfccc*. retrieved march 25, 2022, from <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>
- ús koöperaasje. (n.d.). *lei-fryslân*. retrieved june 9, 2022, from <https://uskooperaasje.frl/lei-fryslan/>
- van dam, k. i. m., & van der windt, h. j. (2022). *islands as playing and breeding grounds for incumbents, entrepreneurial technologists, policymakers, and engaged citizens: the case of energy transition on ameland*. <https://doi.org/10.3390/su14137839>
- verbruggen, a., & lauber, v. (2012). assessing the performance of renewable electricity support instruments. *energy policy*, 45, 635–644. <https://doi.org/10.1016/j.enpol.2012.03.014>
- zeeuws klimaatfonds. (n.d.). *co2 compensatie — zeeuws klimaatfonds*. retrieved april 18, 2022, from <https://www.zeeuwsklimaatfonds.nl/co2-compensatie-2>
- zhang, h. l., van gerven, t., baeyens, j., & degreè, j. (2014). *photovoltaics: reviewing the*

*European feed-in-tariffs and changing PV efficiencies and costs.*  
<https://doi.org/10.1155/2014/404913>

## 9. APPENDICES

### 9.1 Appendix 1: visual depiction of solar placement norms



### 9.2 Appendix 2: overview of provincial financial instruments

Province	Subsidies	Funds
Drenthe	The province offers a subsidy of a maximum of 10 000 euros, which is available for an initiative that concerns itself with RE projects. (Provincie Drenthe, n.d.)	Energiefonds Drenthe is a provincial fund that offers loans to organisations that are investing in RE, energy savings, or a circular economy. Funding can cover up to 75% of total investment costs. The timespan of the loan can either be 5 or 10 years. (Energiefonds Drenthe, n.d.)
Flevoland	A subsidy for energy initiatives was available from 2019 until the end of 2020. Currently no subsidies for energy initiatives are available. (HIER opgewekt, n.d.)	Energie Expertisecentrum Flevoland offers financing for RE projects, which can cover up to 75%-80% of the project costs. The timespan of the loan differs from 5 or 10 years. (EEF Flevoland, n.d.)
Friesland	Energy cooperatives can use a voucher of 5000 euros to hire experts on juridical, fiscal, financial and organisational matters. (Provincie Friesland, n.d.)	Fûns Skjinne Fryske Enerzjy is a provincial fund that offers multiple financing options (loans, guarantee for bank loans and participations in projects). Energy cooperatives can take up a loan for 15 years, which can cover 2/3 of the investments. (FSFE, n.d.) Preconditions: <ul style="list-style-type: none"> <li>• The cooperative invests at least 37 500 in solar panels</li> </ul>



		<ul style="list-style-type: none"> <li>The cooperative is responsible for 1/3 of investment costs</li> </ul>
Groningen	<p>The province offers a starting subsidy that citizens can use to start up a local energy initiative. The subsidy can also be used to start up their first project. 40% of the project costs need to be co-financed (Startsubsidie lokale energie Groningen, 2022)</p> <p>A subsidy is available for roof owners that want to replace old, asbestos rooftops with a new one, and place solar panels on it. This is done in collaboration with a local energy cooperative. (Gemeente Groningen, n.d.)</p>	Fonds Nieuwe Doen is a provincial fund that offers loans in different sectors. For the energy sector they offer loans for local energy cooperatives, that can cover up to 75% of total investment costs. (Fonds Nieuwe Doen, n.d.)
Gelderland	<p>The province offers subsidies for local RE projects that cover up to 20% of investment costs. (Provincie Gelderland, n.d.)</p> <p>Preconditions:</p> <ul style="list-style-type: none"> <li>The project should have at 50 participants</li> <li>The participants finance 25% of the project</li> <li>Participations start at 50 euros</li> <li>The return time of the project should be at least 5 years</li> </ul>	Innovatie- en Energie Fonds Gelderland is a provincial fund that offers financing to small- and middle sized companies, that aim to contribute to the energy transition of Gelderland. (Energiefonds Gelderland, n.d.)
Limburg	A subsidy for energy cooperatives was available from 2018 to 2019. Currently no subsidies are available. (Provincie Limburg, n.d.)	Limburgs Energie Fonds is a provincial fund that offers financing for projects that realise CO <sub>2</sub> reduction in Limburg. This includes solar and wind projects. The loan starts at 100 000 euros and can cover up to 80% of the total investment costs. The timespan of the loan is 20 years. (Limburgs Energiefonds, n.d.)
Noord-Brabant	The province offers a subsidy for projects that accelerate the energy transition in Brabant. The subsidy covers up to 50% of the investment costs, with a maximum of 24 999 euros (Provincie Noord-Brabant, n.d.)	The Brabantse Ontwikkeling Maatschappij takes part in solar- and wind parks as a co-investor. This way they lower down risks for all parties that are involved. If the park is functioning well for 4 years they quit as co-investors. (De BOM, n.d.)
Noord-Holland	The province offers subsidy for various activities of local energy initiatives. The subsidy is aimed at the general professionalisation of a cooperative. Subsidies can cover up to 100% of these activities, with a maximum of 10 000 euros.(Provincie Noord-Holland, n.d.)	Participatiefonds Duurzame Economie Noord-Holland (PDENH) offers financing options (loans and shares) to businesses and organisations that contribute to the sustainability goals of the province. They offer capital from 500 000 euros to 7 million euros. Under certain circumstances they also offer capital starting at 250 000 euros. The fund covers up to 50% of the financial needs of the project. (PDENH, n.d.)
Overijssel	The province offers subsidy for the starting up of an energy initiative as well as activities in the planning phase for energy saving projects and energy production projects. The coverage of costs depend on the activity that is being subsidised. A maximum of 10 000 euros is available when it concerns large-	<p>Energiefonds Overijssel offers different financing options for energy initiatives (loans, guarantees for bank loans and participations in projects).(Energiefonds Overijssel, n.d.)</p> <ul style="list-style-type: none"> <li>Loans starting at 1 million euros</li> </ul>

	scale projects and 5000 euros for small-scale projects. (Provincie Overijssel, n.d.)	<ul style="list-style-type: none"> <li>• Guarantees for bank loans starting at 1 million euros, covering up to 80% of the loan</li> <li>• Participation agreement in a project</li> </ul>
Utrecht	The province offers subsidy for various activities of energy cooperatives such as professionalisation, regional collaboration, participation trajectories, and for the different stages of realising RE projects. They also offer subsidy for municipalities for realising participation. The amount of subsidy that is available differs per activity. (Provincie Utrecht, n.d.)	Energiefonds Utrecht offers loans for organisations concerned with RE projects that result in CO <sub>2</sub> reduction. Loans are available that can cover up to 75% of the total investment costs, with a time span of 10 years. For larger projects, guarantees and participations are also available. (Energiefonds Utrecht, n.d.) <ul style="list-style-type: none"> <li>• Loans from 5 000 up to 50 000 euros</li> <li>• Loans starting at 50 000 euros</li> </ul>
Zuid-Holland	The province offered subsidy to local energy initiatives for the costs of project development. The subsidy covers up to 50% of the total project costs and per project a maximum of 75 000 euros is possible. (Provincie Zuid-Holland, n.d.) Currently no subsidy is available anymore, as it has all been used.	Energiefonds Den Haag is a fund for RE projects in Den Haag and the whole of Zuid-Holland and offers financing in the form of loans. (Energiefonds Den Haag, n.d.)
Zeeland	The province does not have subsidies specifically for energy cooperatives. (HIER opgewekt, n.d.)	Zeeuws Klimaatfonds is a provincial fund, established following the stakeholder model (different sectors of society are represented in the fund). Parties can compensate their CO <sub>2</sub> emissions by gifting money to the fund. This money is then used to invest in CO <sub>2</sub> compensating projects. The money that is gifted depends on the amount of CO <sub>2</sub> that is compensated. (Zeeuws Klimaatfonds, n.d.)

### 9.3 Appendix 3: overview local policy regimes Groningen

Municipality	Energy vision	Participation policies	Financial instruments
Eemsdelta	Not available	Not available	No subsidies available
Groningen	The municipality wants to be CO <sub>2</sub> neutral by 2035. They use the zonneladder in their policy; 50% of bedrijven rooftops and 37.5% of other rooftops should be filled with solar PV, with a combined capacity of 310 MWp. The remaining 500 MWp will be realised on land. They see energy cooperatives as an important stakeholder to accelerate solar on rooftops.	A participation plan needs to be in place. For all small-scale projects 50% local ownership. Large solar parks have 100% social ownership. The municipality exploits these parks, and calls it social ownership. It reinvests the revenue into accelerating the energy transition. All citizens can profit from projects this way.	No subsidies available
Het Hogeland	The municipality aims for 50% RE by 2050, adding 18 TJ of RE per year. The preference is solar on rooftops. They plan to place solar PV on 15% of the rooftops. After that, 15-20 ha of solar parks is needed for their	A participation plan needs to be in place. Projects are 50% local ownership. Additionally, 50% of the revenue needs to be put into a local fund. Preferably initiatives need to be local or started by an energy	No subsidies available

	ambitions. The municipality says to be working together with energy cooperatives to realise RE projects. (Gemeente Het Hogeland, 2019; RES Groningen, 2021a)	cooperative. (Gemeente Het Hogeland, 2019)	
Midden-Groningen	The municipality aims for 25% RE by 2030 and a 55% CO2 reduction. To realise this, 1900 ha of solar is needed. For 2025 the ambition is to realise 600 ha of solar and evaluate by that time. The municipality want to support plans by local energy cooperatives. (Gemeente Midden-Groningen, 2019b; RES Groningen, 2021a)	A participation plan needs to be in place. All solar parks require 50% local ownership, which is defined as co-investing. When this is not possible, other arrangements can be made e.g. putting more revenue in a local fund or social/work participation. (Gemeente Midden-Groningen, 2019a)	No subsidies available
Oldambt	The municipality wants to realise 100 ha of solar parks by 2030. They use a zonneladder for this, and there is a preference for projects by local cooperatives opposed to other project developers. (Gemeente Oldambt, 2021)	A participation plan needs to be in place. 50% local ownership is a prerequisite for all initiatives, which means it is 50% owned by the local energy cooperative. If this cannot be achieved, a local fund needs to be established instead. The project plan is presented to the community, including the energy cooperative of the village. (Gemeente Oldambt, 2021)	No subsidies available
Pekela	In 2019 a vision for solar parks was released. They use the Zonneladder to prioritise areas for solar deployment. In their vision a total area of 75 ha was assigned, which has been reached already. No new projects are being realised while they evaluate if the ambition of 150 ha is desirable. (Gemeente Pekela, n.d.)	A participation plan needs to be in place. The goal of 50% local ownership of solar park is an ambition but not a prerequisite. Other forms of participation are also an option. Revenues need to be put in a local fund. (Gemeente Pekela, n.d.)	No subsidies available
Stadskanaal	The municipality wants to be energy neutral by 2050. For this they want a solar capacity of 600 MW. With their plans they contribute 0.43 TWh to RES Groningen. Because of capacity problems, no new projects can currently be realised. (Gemeente Stadskanaal, n.d.-b; RES Groningen, 2021a)(Gemeente Stadskanaal, n.d.-b)	An agreement between initiative taker, the municipality and local community needs to be made before a project. Revenues can be put into a local fund, this is not a prerequisite.	They have a local fund to increase liveability in the vicinity of solar parks, but also to support sustainable initiatives. (Gemeente Stadskanaal, n.d.-a)
Veendam	The municipality has a Zonnievisie for the realisation of solar energy in the municipality. They follow a zonneladder for this; first	The initiative taker needs to have a participation plan to show how citizens are in-	No subsidies available

	rooftops, then industrial areas and lastly spaces that will not be used for agriculture in the future. (Gemeente Veendam, 2022)	involved, and go through a process with different stakeholders to come to an agreement. (Gemeente Veendam, 2022)	
Westerwolde	The municipality wants to become energy neutral by 2035. Even though their preference is for solar rooftops, ground mounted solar and wind turbines are needed to achieve their ambitions. Initiative takers need to have a design plan, discussing the size, location and design of the solar park. The municipality is stimulating the start up of energy cooperatives. (Gemeente Westerwolde, 2018)	The initiative taker follows a trajectory with the local community, municipality and network operator before starting a project. Solar parks need to be 50% locally owned. If this is not achieved, a share of the revenue needs to be put in a local fund. (Gemeente Westerwolde, n.d.)	No subsidies available
Westerkwartier	The municipality wants to have a RE capacity of 0.35 TWh in 2030. 118 GWh is realised through solar rooftops, their second preference is small wind turbines. Their ambition for solar parks is between 63.5-135 ha. Large-scale initiatives are not supported by the municipality, except for a few locations. The municipality works together with farmers and local cooperatives for RE projects. (Gemeente Westerkwartier, 2020)	A participation plan needs to be in place. A share of the revenue needs to be put into a local fund. Financial participation is an important aspect of the participation plan. (Gemeente Westerkwartier, n.d.-a)	There are subsidies available that finance the start up costs of an energy cooperative, with a maximum of 5000 euros. (Gemeente Westerkwartier, n.d.-b)  In principle the municipality will not finance RE projects, but with an exception they can stand guarantee for loans taken on by energy cooperatives.

#### 9.4 Appendix 4: overview local policy regimes Friesland

Municipality	Energy vision	Participation	Financial instruments
Achtkarspelen	The municipality wants to be energy neutral in the future. There is a municipal zonneladder through which optimal locations for solar panels are determined. (Gemeente Achtkarspelen, 2021b)	No participation policies found.	They have established a local fund, Sinnegreide. Around 7500 euros is annually available for sustainable initiatives. This was done in collaboration with EC Buitenpost. (Gemeente Achtkarspelen, 2021a)
Ameland	By 2035, the municipality wants to have a CO <sub>2</sub> reduction of 95%, compared to 1990. Could not find their environmental vision. (RES Fryslân, 2021a)	I could not find policies yet	No subsidies available

Dantumadiel	They have a conceptual environmental vision. The municipality wants to have 70% RE by 2030 (0.019 TWh). Of the total energy mix, 30% will be solar. This requires 103 TJ (42 ha extra) in 2025 and 188 TJ (77 ha extra) in 2050. For this they want to focus on rooftops first. Ground-mounted solar is needed, but this will not be realised on agricultural or nature grounds. (Gemeente Dantumadiel, 2022)	For process participation they apply the Sinnetafel method, where all stakeholders join the discussion on the initiative. A participation plan needs to be in place, which is approved by the municipality. 50% local ownership is a must. When this is not reached, the initiative taker needs to put money in a local fund, depending on the size of the project. (Gemeente Dantumadiel, 2022)	No subsidies available
De Fryske Marren	By 2030 they want to have a CO <sub>2</sub> reduction of 49% compared to 1990 levels and have RE production of 50%. Their contribution to the RES: 0.084 TWh. Focus is solar on rooftop, otherwise multi-functional spaces or less important agricultural grounds. The municipality wants to play a stimulating and facilitating role towards energy cooperatives. Representatives of the cooperatives have played a role in the policy making of the solar policy. (Gemeente de Fryske Marren, n.d.-a)	There should be participation with every initiative. No specific policies found.	Subsidies are available for organisations that contribute to the sustainability agenda. Co-financing with own capital is a prerequisite to receive subsidy (Gemeente de Fryske Marren, n.d.-b)
Harlingen	By 2030 the municipality wants to have 88% RE production. Contribution to the RES 0.010 TWh. They work with the zonneladder to realise large-scale solar. For new projects there should be more solar where it is possible, but that excluded areas should stay excluded. For the projects in the RES, there is enough net capacity. For other additional projects there is no net capacity left. (Gemeente Harlingen, n.d., 2021)	No participation policies found.	No subsidies available
Heerenveen	The municipality follows the climate agreement; 49% CO <sub>2</sub> reduction. They want to realise 40% local RE production by 2030. Total RE production 0.160 TWh. Their policy on solar parks is from 2016, but follows the same rules as the zonneladder. Around the city of Heerenveen solar parks are possible, but around the vicinity of the smaller villages it needs to be taken more in consideration due to nature areas. (Gemeente Heerenveen, 2019, 2021)	No participation policies found.	The Lokaal Energie Experimenten Fonds is a municipal fund to stimulate local initiatives. Five initiatives can each get up to 100 000 euros (Gemeente Heerenveen, n.d.)
Leeuwarden	The municipality wants to have 100% RE production by 2050. By 2030 85%	The municipality is still working on a final environmental plan, in which they will present a guide to	Subsidy is available for local sustainable initia-

	RE production in the built environment. Their contribution to the RES is 0.260 TWh. The municipality has a guide to help initiative takers with finding the right location for solar projects. The emphasis is on projects in the built environment. Depending on the exact location of ground-mounted PV installations, different prerequisites exist. The municipality has an adjusted regulation which makes realising solar projects without a permit possible. (Gemeente Leeuwarden, n.d.-a, n.d.-c)	help initiative takers with realising participation. This will be finished later on in 2022.	tives. Amount of subsidy depends on the activity of the initiative (max. 7500 euros) (Gemeente Leeuwarden, n.d.-b)
Noardeast-Fryslan	By 2030 the municipality wants to have 70% of their energy from RE, which amounts to 510 TJ. Of this 443 TJ will be large-scale. Their contribution to the RES will be: 0.046 TWh. Solar should make up 30% of the total energy mix, for which 165 ha is needed in 2050. They use the zoneladder and additionally they made a Visionmap to show where solar energy is most desirable. (Gemeente Noardeast-Fryslan, 2021b)	They use the Sinnetafel method for process participation. Agreements between the initiative taker and the community are presented to the municipality. The initiative taker is free to design the participation process as they want, but local organisations like an energy cooperative need to be included. 50% local ownership is desired, if this cannot be reached then the initiative taker needs to invest in a local fund, depending on how much ownership has been reached. (Gemeente Noardeast-Fryslan, 2021a)	No subsidies available
Ooststellingswerf	The municipality wants to be CO <sub>2</sub> and energy neutral by 2030. Contribution to RES of 0.042 TWh. They are busy with developing a municipal programme for RE, so for now they have stopped the development of large-scale solar projects until this is finished. For now they focus on rooftop PV and floating solar. (Gemeente Ooststellingwerf & BûgelHajema, 2021)	No participation policies found for RE projects.	They have no subsidies, but here is a regulation to specifically stimulate Postcoderoos
Opsterland	The municipality wants to be energy neutral by 2035. Contribution to the RES will be 0.018 TWh. The municipality is now busy with developing a new environmental vision, which will be finished later on in 2022. They have policies for solar fields, in addition to provincial policies, the responsibility for search areas is put on the villages as they have better knowledge of the local landscape. In a coalition agreement (2018-2022), the municipality aimed to have 100	A participation plan needs to be in place before the project starts. Additionally, the municipality is involved in meetings with the citizens and later on a participation report will be written by the initiative taker. For all initiatives there is at least 50% local ownership and a local fund is in place as well. The local energy cooperative will decide, together with two other organisations, what the	No subsidies available

	MWh by 2022. The municipality wants to stimulate energy cooperatives, by offering financial support in the start-up phase and by sharing knowledge.(Gemeente Opsterland, n.d.)	fund will be used for. (Gemeente Opsterland, 2020)	
Schiermonnikoog	The municipality wants to be self-sufficient and energy neutral by 2025. The municipality wants to realise 55% CO <sub>2</sub> reduction by 2030, following the national goals. They follow the zonneladder, but do not have specific plans for solar energy yet. During the making of the sustainability vision, the energy cooperative of the island has played a big role. (Gemeente Schiermonnikoog et al., 2021)	No participation policies found for RE projects.	No subsidies available
Smallingerland	Before 2030, the municipality wants 50% of their energy from RE. Contribution to the RES: 0.071 TWh. The municipality sees possibilities for solar energy, especially ground-mounted in the built environment, but is hesitant with solar parks in rural areas; they will also not appoint search areas either. The municipality stimulates energy cooperatives by offering them knowledge, and when needed with money. (Gemeente Smallingerland, n.d.-b)	The initiative taker needs to organise meetings with citizens, which the municipality will attend as well. From these meetings a participation report needs to be made. Financial participation needs to be offered, if this is not possible the initiative taker and municipality can decide other ways in which the project can have a positive contribution to the community. (Gemeente Smallingerland, n.d.-a)	No subsidies available
Sudwest Fryslân	The municipality wants to be energy- and CO <sub>2</sub> neutral by 2050. Following the zonneladder, the potential of solar on rooftops is 0.323 TWh. The municipality will not collaborate any more for projects on solar panels and wind turbines on the Ijsselmeer. (Gemeente Súdwest-Fryslân, n.d.-a, n.d.-b)	The notions of local ownership and financial participation as described in the Climate Agreement are followed. 50% local ownership is needed for all projects. There is an energy coordinator, whose aim is to increase the number of cooperatives and stimulate collaborations. Workshops are planned to help cooperatives with setting up projects.	Energy cooperatives can get 2000 euros yearly for their activities. If not established, they can get a subsidy for that as well (2600 euros). (Gemeente Súdwest-Fryslân, n.d.-c)
Terschelling	The municipality is currently working on the environmental vision. They want to reduce CO <sub>2</sub> by 47% in 2023, for which they also want to look at new solar parks. The municipality works together with the local energy cooperative to execute the sustainability programme. As the energy cooperative is the only one on the island, they will play a big role in RE supply of the island (Gemeente Terschelling, 2018).	No participation policies found for RE projects..	Terschelling established a local fund together with Vlieland to finance local sustainable initiatives. This has been realised together with the local cooperatives of the islands. (Klimaatfonds Terschelling Vlieland, n.d.)

Tytsjerksteradiel	The municipality wants to be energy neutral by 2040. Their contribution to the RES is 0.051 TWh. The focus is on increasing rooftop solar pv, by 2040 they want to have realised the full potential of this, and by 2030 40% of the potential will be realised. The eventual energy mix will be 50/50 solar and wind. Multiple energy cooperatives are active in the municipality, and thus play a big role in the local energy transition. The municipality wants to give out certain areas for project development specifically by these cooperatives.(Gemeente Tytsjerksteradiel, 2021)	They aim for 50% ownership of solar projects. If this is not possible then money should be invested in a local fund. They use the Sinnetafel method to increase participation. During the Sinnetafel conversations, energy cooperatives will be involved as well.(Gemeente Tytsjerksteradiel, 2021)	No subsidies available
Vlieland	The island would like to become self-sufficient in their energy supply. For this their preferred option is one big project instead of several small ones. In their environmental vision they discuss the possibility of wind turbines. The municipality says in their sustainability agenda that it will contribute financially to the solar park that will be developed, together with the local energy cooperative. (Gemeente Vlieland, n.d., 2021)	No participation policies found for RE projects.	A local fund was established together with Terschelling to finance local sustainable initiatives (Klimaatfonds Terschelling Vlieland, n.d.).
Waadhoeke	Energy neutral by 2040. No quantified ambitions. For the realisation of large-scale solar they have a score form based on local ownership, vicinity to power station, sun combined with wind and clustering of solar parks. An information platform is developed, which entrepreneurs and energy cooperatives can use to share information. (Gemeente Waadhoeke, 2020)	50% local ownership of solar is a must, initiatives can score higher if they have at least 60% locally ownership. (Gemeente Waadhoeke, 2020)	No subsidies available
Weststellingwerf	Energy neutral in 2050, for this they need to have an RE production of 1.350 TJ. By 2030, 70% RE production. Contribution to the RES: 0.061 TWh. If there are not initiatives in the next five years, the municipality will take over and start with RE development themselves. They encourage local environmental visions in the villages, to develop RE projects. Additionally, the municipality wants to stimulate the start up of an energy cooperative in the municipality. (Gemeente Weststellingwerf, 2019)	No specific policies on participation it seems, but it is emphasised that in the local visions all stakeholders need to be involved, and that projects need to have a positive contribution to the local community and environment.	No subsidies available



### 9.5 Appendix 5: overview local policy regimes Noord-Holland Zuid

Municipality	Energy vision	Participation	Financial Instruments
Aalsmeer	The municipality wants to be independent from fossil fuels by 2040. They use the zonneladder; the preference is rooftop PV and multi-functional usage. Solar fields as primary function are thus excluded. (RES Noord-Holland Zuid, n.d.)	A participation plan and a financial plan should be in place. It should be known how the local community will financially and socially profit from the project.	A service hub provides free advice for initiatives that want to realise large-scale rooftop PV. (Gemeente Aalsmeer, n.d.)
Amstelveen	The municipality wants to be independent from fossil fuels by 2040. They use the zonneladder; the preference is rooftop PV and multi-functional usage. Solar fields as primary function are thus excluded. (RES Noord-Holland Zuid, n.d.)	A participation plan and a financial plan should be in place. It should be known how the local community will financially and socially profit from the project.	Free advice is provided for initiatives that want to realise RE projects (Gemeente Amstelveen, n.d.).
Diemen	The municipality wants to be independent from fossil fuels by 2040 and realise 90% CO <sub>2</sub> reduction by 2050. They use the zonneladder and thus focus on rooftop solar PV and other unused areas, such as next to infrastructure. They have appointed multiple search areas. (Gemeente Diemen, 2020, 2021)	In the environmental vision there are no clear guidelines on participation in RE projects. I could also not find other policy documents on this.	Microsubsidy is available for sustainable initiatives. Each initiative can receive 750 euros annually. (DaaromDuurzaamDiemen, n.d.)
Ouder-Amstel	The municipality wants to realise a CO <sub>2</sub> reduction of 50% by 2030 and be energy-neutral by 2050. They only want solar energy on rooftops and sound barriers. Ground-mounted installations are excluded. Only if the predetermined potential cannot be reached, other search areas become possible. (Gemeente Ouder-Amstel, n.d.)	The goal is to realise 50% local ownership of large-scale RE projects. No policy documents were found that provide guidelines for realising local ownership. The municipality however is working together with local energy cooperatives to look at wind turbine placements.	No subsidies available.
Uithoorn	The municipality wants to be independent from fossil fuels by 2040. Due to spatial constraints, the municipality will need more than local and regional RE. Their focus is on rooftop PV. They are currently looking for other search areas on land, which will be finalised in the RES 2.0. (Gemeente Uithoorn, n.d.)	The municipality stimulates sustainable initiatives. They have not finalised policies on how to realise participation in RE projects yet.	No subsidies available.
Amsterdam	The municipality wants to contribute 0.7 TWh to the RES. In 2030 they want 400 MW solar energy on rooftops and multi-use areas within the city. By	Participation policies are more elaborate for wind energy projects than solar projects. For solar parks a prerequisite is	Multiple subsidies are available for initiatives concerned with sustainability. These subsidies can

	2050, all suitable rooftops have solar panels on them. The municipality has no goal for solar on land outside of the city limits. Areas for solar parks thus include parking lots and industrial areas. (Gemeente Amsterdam, n.d.-a; Gemeente Amsterdam et al., 2022)	that citizens can participate and that there is collaboration with the community and an energy cooperative. A goal is to reach 50% local ownership for all RE projects. (Gemeente Amsterdam, n.d.-a)	be used for project preparations or to finance the implementation phase. (Gemeente Amsterdam, n.d.-e, n.d.-d, n.d.-c)  A sustainability fund is available for initiatives that concern themselves with sustainable projects. The time-span of the loan is 20 years and at least 33% of the investment costs need to be provided through own capital. (Gemeente Amsterdam, n.d.-b)
Blaricum	The municipality wants to be energy-neutral before 2050. They do not have a completed environmental vision yet and their sustainability programme is only for the period 2018-2022. They have used the input of energy cooperatives and other stakeholders to get insights on large-scale RE production. (Gemeente Blaricum, 2022b, 2022a)	No participation policies found for RE projects.	No subsidies available.
Gooise Meren	Energy-neutrality by 2050. Solar parks are preferably on rooftops or other multi-functional areas. In the rural areas no solar parks are possible. Roofs from the municipal buildings are made available to a local energy cooperative. (RES Noord-Holland Zuid, n.d.)	Initiative takers need to take care of participation themselves and have to go through an open and just process with all relevant stakeholders when developing a RE project.	No subsidies available.
Hilversum	The municipality wants to be independent from natural gas by 2040 and CO <sub>2</sub> -neutral by 2050. By 2030 the municipality wants to have solar panels on all large suitable roofs. Currently the municipality is working on a pilot project of placing solar panels on parking lots and they aim to put solar panels on sound barriers. Energy cooperatives were included in exploring search areas. (Gemeente Hilversum, 2021)	No participation policies found for RE projects.	In the RES document it is mentioned that subsidies are provided for the energy cooperatives Hilver-Zon and Hilversumse Energie Transitie to perform feasibility studies, but this was not found on the municipal website. (RES Noord-Holland Zuid, n.d.)
Huizen	The municipality wants to be climate neutral and independent from natural gas by 2050. Due to spatial restrictions, the possibilities for RE production is limited. Large-scale rooftop	No participation policies found for RE projects.	No subsidies available

	PV and parking lots are possible options. Together with other regional municipalities and energy cooperatives, a project approach is being developed for solar on rooftops, energy cooperatives are involved here. (RES Noord-Holland Zuid, n.d.)		
Laren	The municipality wants to be energy neutral around 2040. They want to focus on solar energy, but do not see this within the city itself. Instead the focus will be on solar near infrastructure, large rooftops and parking lots. Energy cooperatives were involved in exploring search areas.(Gemeente Laren, 2022)	The municipality is still working on their participation policies.	No subsidies available
Weesp	They want to become climate neutral, but have not set a specific year for that. The municipality does not want any wind turbines. They want to focus on rooftop solar PV on corporate buildings. Other options include next to infrastructure and on parking lots. (RES Noord-Holland Zuid, n.d.)w	The municipality is still working on their environmental vision. No policy documents on participation available yet	No subsidies available
Wijdmeren	The municipality wants to be climate-neutral by 2050. The municipality wanted to focus more on wind energy, but due to the nature areas and the cultural-historic context this is not possible. There are options for rooftop solar PV and solar on parking lots. (RES Noord-Holland Zuid, n.d.)	The municipality is still working on their environmental vision. No policy documents on participation available yet.	No subsidies available
Haarlemmermeer	The municipality wants to contribute 0.7 TWh to the RES by 2030. Solar panels need to be placed on rooftops, only on land if it is necessary, they follow the zonneladder for this. Other options include on parking lots, along infrastructure and unused areas that will be built on in the future. Solar parks should be clustered together. (RES Noord-Holland Zuid, n.d.)	The initiative taker is responsible for participation, the plans need to be put into a participation plan. The project needs to be developed in collaboration by local initiatives or entirely by a local initiative. The goal is to create 50% local ownership, which can entail collective benefits (local fund) or an individual benefit (receiving electricity). All agreements need to be put in a local agreement.(Gemeente Haarlemmermeer, 2021)	No subsidies available.
Beverwijk	Due to the urban character of the municipality, wind turbines and large-scale solar parks are a challenge. However,	No participation policies found for RE projects.	No subsidies available

	there are options for rooftop PV and PV on parking lots (RES Noord-Holland Zuid, n.d.).		
Bloemendaal	They follow the goals of the national agreement and don't go beyond that. There is no space in the municipality for large-scale RE production due to nature areas. There are options for rooftop PV and placing solar PV on parking lots. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	No subsidies available for RE projects.
Haarlem	The municipality wants to be independent from fossil fuels by 2040 and aspires to generate most of its electricity local and renewable by 2030. They are exploring the options for solar energy on parking lots and water. Additionally, they are exploring if it is possible to have solar energy in protected urban areas. Energy cooperatives were involved in thinking sessions to reach the municipal goals.(RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	A subsidy is available for collective solar projects. The subsidy is aimed at financing the start-up costs of a project. The maximum amount of subsidy per project is 2500 euros. (Gemeente Haarlem, n.d.)
Heemskerk	The municipality is still exploring the potential of solar energy on rooftops and on parking lots. (Gemeente Heemskerk, n.d.)	The municipality is open to help with establishing an energy cooperative that can facilitate projects and this way create local ownership. no specific policies found on participation in RE projects	No subsidies available
Heemstede	The municipal organisation wants to be climate neutral by 2030. The municipality focuses on large-scale rooftop PV and PV on parking lots. (RES Noord-Holland Zuid, n.d.)	It seems that the municipality takes on the role of arranging participation in RE projects themselves. It decides which stakeholders to communicate with and when. (Gemeente Heemstede, 2019)	No subsidies available
Velsen	The municipality wants to realise solar on rooftops, on parking lots and along infrastructure. Additionally they see options for combining wind and solar energy. Energy cooperatives were involved in a feedback session on the spatial design of RE projects. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	No subsidies available for RE projects.
Zandvoort	The municipality wants to be energy-neutral by 2050. Primary focus for solar	No participation policies found for RE projects.	No subsidies available

	is rooftop PV and multi-functional usage of solar parks on parking lots. (RES Noord-Holland Zuid, n.d.)		
Beemster	The municipality follows the goals of the climate agreement. No permit is needed to place solar panels on rooftops, under certain preconditions. They plan to stimulate solar panels on agricultural roofs, but are facing capacity problems. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	No subsidies available
Edam-Volendam	The municipality consists largely of agricultural and nature areas. Realising solar parks on agricultural, nature areas and future industrial grounds is excluded. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	No subsidies available
Purmerend	There is little room for large-scale solar parks and wind turbines due to the urban character of the municipality. The focus will thus mostly be on solar rooftops. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	No subsidies available
Oostzaan	The municipality aspires energy neutrality of the municipal organisation by 2040. They support the regional notion of putting solar panels on all roofs. For this project, collaborations with local initiatives will be sought out. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	No subsidies available
Wormerland	The municipal organisation will be energy neutral by 2030. They support the regional notion of putting solar on all rooftops and above parking lots. They will work together with energy cooperatives and other partners to realise this. Wind turbines are not supported in the municipality. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	No subsidies available
Landsmeer	They are supporting the regional notion of putting solar panels on all roofs. They do not want any wind turbines in their municipality or in the direct vicinity. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	No subsidies available
Waterland	Following the climate agreement: energy neutrality by 2050. The municipality especially promotes solar initiatives but is also open for wind initiatives. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	No subsidies available

Zaanstad	Energy neutrality between 2030-2040. They want to have solar on all rooftops and above large parking lots. Additionally solar and wind parks along the Noordzeekanaal. Due to the protected nature area around the city, no RE production is possible there. (RES Noord-Holland Zuid, n.d.)	No participation policies found for RE projects.	A loan is available for sustainable projects that create a CO <sub>2</sub> reduction. This loan ranges from 10 000 euros to 200 000 euros. (Gemeente Zaanstad, n.d.)
----------	---	--	--

### 9.6 Appendix 6: overview local policy regimes Rivierenland

Municipality	Energy vision	Participation	Financial instruments
Buren	The municipality will contribute 0.218 TWh to the RES. Additionally, their ambition is to reduce CO <sub>2</sub> by 55% by 2030. They eventually want 80% of the roofs to be filled with solar. They are now mostly focusing on the first two steps of the zonneladder. The initiative taker needs to have a plan on the design and what will happen to the area after the solar park. (Gemeente Buren, 2020)	A participation plan needs to be in place. All projects need to have 50% local interest. This can be in the form of local ownership, local funds, and compensations.	No subsidies available
Culemborg	The municipality will contribute 0.097 TWh to the RES. They want to become energy neutral by 2040. The steps are as follows; by 2023 there should be 16% more RE and by 2026 25% more RE. There is no document on the solar vision of the municipality. (Gemeente Culemborg, n.d.)	No participation policies found for RE projects.	No subsidies available.
Maasdriel	Maasdriel will contribute 0.126 TWh to the RES. Maasdriel has worked together with Zaltbommel to create an environmental vision for the region “Bommelerwaard”. They want to put solar PV on all suitable rooftops. For ground-mounted solar they want to combine it with wind energy wherever possible. Because of the characteristics of the local landscape, some areas are better suited for wind/solar than others. This is visualised in a map. (Gemeente Maasdriel, 2021; Gemeente Zaltbommel & Gemeente Maasdriel, 2021)	For large-scale solar projects, the initiative taker needs to have a participation plan in place and show how they will realise at least 50% cooperative ownership.	No subsidies available
Neder-Betuwe	The municipality will contribute 0.234 TWh to the RES. By 2025 the municipality wants 40% RE and by 2030 55%. They only want ground-mounted solar parks in the vicinity of existing or planned wind parks. Additionally, the space at which solar parks are placed should be multifunctional. They initially proposed	A participation plan needs to be in place, in which the process participation is discussed. The municipality aims that projects have 50% local ownership by citizens or local businesses.	No subsidies available.

	that 20 ha can be used for solar, however they extended this.		
Tiel	The municipality will contribute 0.090 TWh to the RES. They have not released the full version of their environmental vision. This will be released this year. Thus, no policy on sustainable energy is available yet. (Gemeente Tiel, n.d.)	No participation policies found for RE projects.	No subsidies available
West-Betuwe	The municipality will contribute 0.349 TWh to the RES. This will be combined with a 55% CO <sub>2</sub> reduction as discussed in het GEA They want to realise 90 ha of solar parks, for which they will follow the zonneladder, and plan to cluster energy projects on non-agricultural lands outside of the built environment. (Gemeente West-Betuwe, 2040)	The initiative taker needs to inform the municipality about how participation will be realised in the project. (Gemeente West-Betuwe, n.d.)	No subsidies available.
West Maal en Waal	The municipality will contribute 0.049 TWh to the RES. Of this 0.018 TWh will be solar on rooftops and 0.030 TWh solar parks. This will require a total of 20 ha of solar energy. They follow the GEA and aspire a 55% CO <sub>2</sub> reduction in 2030. For the development of large-scale solar parks they have a selection procedure based on; construction plan, spatial incorporation, process participation, and financial participation. (Gemeente West Maas en Waal, n.d.)	The initiative taker needs to show how the solar parks will be at least 50% locally owned. Additionally, they need to show how much they will contribute to the local fund. They also need to show how citizens were involved in the whole process. They mention that collaboration with the local energy cooperative is a good way to let people financially participate. (Gemeente West Maas en Waal, 2021)	No subsidies available
Zaltbommel	Zaltbommel will contribute 0.145 TWh to the RES. They follow the ambitions of the Gelders Energieakkoord. Ground-mounted solar parks will not be put on agricultural lands or meadows and should be integrated well with the local environment. The land should be multi-purpose.(Gemeente Zaltbommel, 2021)	The initiative taker is responsible for at least 50% local ownership, but should strive for 100% local ownership. A minimal contribution of 0.50 euros/ MWh should be given to the local fund.	No subsidies available

### 9.7 Appendix 7: overview local policy regimes Cleantech

Municipality	Energy vision	Participation	Financial instruments
Apeldoorn	The municipality wants to be energy neutral before 2050, and has a goal of reaching 39% energy neutrality in 2030. For this it aims to have 250 ha of solar parks by 2030, for which three clustered areas were appointed, where space should be multi-purpose. The municipality has released a	Initiatives from citizens themselves had a preference. The initiative taker needs to have a participation report in place that shows how participation was present in the process. There should be at least 50% financial local	They have a subsidy for citizens and social organisations that plan to contribute to the energy transition. The maximum share is 50% of the total investment

	guide for the development of solar parks in the coming years. Additionally a special taskforce for solar energy was established in the municipality. (Gemeente Apeldoorn, 2020, 2022)	participation in projects. The municipality proposes a local energy cooperative as a form of ownership	costs, with a maximum amount of 2500 euros. (Gemeente Apeldoorn, n.d.)
Brummen	They want to be self-sufficient in their energy supply in the future. By 2030 they want to produce 320 TJ with RE, which makes up 20% of their electricity usage without industry. Besides solar on rooftops, they want to realise 100 ha of solar parks. One solar park can only be up to 15 ha, because of the landscape characteristics. (Gemeente Brummen, 2021)	New initiatives work together with a council, which consists of experts and local citizens. The council has an examining role but also gives advice to the initiative. Together with local citizens it is decided how revenues will stay in the local community. The municipality is open for other options than just 50% local ownership. The municipality sees energy cooperatives as a good option for letting all citizens have a say in projects. (Gemeente Brummen, 2021)	No subsidies available
Epe	Next to the environmental vision, they have their own transition vision. The municipality aims to be CO <sub>2</sub> neutral by 2050. Until 2030 they want to focus on large-scale solar rooftops. Later in the transition they include solar parks as well. The local energy cooperative is part of the project group that were responsible for the municipality's energy vision. (Gemeente Epe, n.d.)	They aim for 50% local ownership of RE projects. The municipality offers support for participation trajectories of solar parks. (Gemeente Epe, n.d.)	No subsidies available
Heerde	Annual growth of rooftop PV of 35% until 2035. They use the Zonneladder of the RES for solar implementation. Solar parks can have a maximum of 15 ha, but this also depends on the local landscape characteristics. (Gemeente Heerde, n.d.)	They strive for at least 50% local ownership for all projects. For each project a local council is involved, consisting of experts and citizens. This council guides and advises the process. At the end a report should be handed in on how communication and participation was part of the project process. (Gemeente Heerde, 2021)	No subsidies available
Lochem	They are still working on their policy for large-scale RE deployment and their environmental vision. They will contribute 0.12 TWh solar, which equals to 100 ha. After discussion with the citizens multiple aspects were found important: focusing on rooftop PV; not doing more than is necessary; establishing a citizens council to help in the transition. Energy cooperatives are a stakeholder for increasing solar on rooftops. With regards to large-scale projects; only one wind project or one to two solar parks. (Gemeente Lochem, n.d.)	The municipality is still working on a policy for this.	No subsidies available
Voorst	They have created their own Voorster Energie Strategie (VES). Currently they have renewed it to VES 2.0. The municipality	Together with citizens, a dialog and participation plan is created	No subsidies available



	wants to become energy neutral by 2030. In total 255 ha of solar energy is needed for this, of which 65 ha on rooftops and 190 ha on land. They use the zonneladder to appoint areas for solar(Gemeente Voorst, 2019)	before starting the project, so citizens can decide for themselves how and when they want to be involved. If citizens do not want to help with this plan, the initiative taker will do it themselves.	
Zutphen	The municipality aims to be energy neutral by 2030. However, they do not have clear policies on large-scale solar deployment yet. This will be released this summer. They are still working on their environmental plan, which will also be released this summer. (Gemeente Zutphen, n.d.-b, n.d.-a)	There are no policies on participation yet.	No subsidies available

Research report of Jasmijn Brouwer

Report: EES-2022-577

Supervised by:

Dr. A. (Aamina) Teladia, Integrated Research on Energy, Environment and Society (IREES)

Dr. E.C. (Esther) van der Waal, IREES

Dr. H.J. (Henny) van der Windt, IREES

University of Groningen

Energy and Sustainability Research Institute Groningen, ESRIG

Nijenborgh 6

9747 AG Groningen

T: 050 - 363 4760

W: [www.rug.nl/research/esrig](http://www.rug.nl/research/esrig)