A common(s) goal: How can citizens become actively involved in the energy transition through the mission of 50% local ownership of regional sustainable energy projects (RSEP) by 2030?

Master Thesis Sustainable Business and Innovation

Author
Céline Schaar
Student number: 5478863
c.m.m.schaar@students.uu.nl

Utrecht University
Dr. Joeri H. Wesseling
j.h.wesseling@uu.nl

Squarewise
Marlien Sneller
sneller@squarewise.com

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Utrecht University

squarewise.

Abstract

This thesis studies the mission of 50% local ownership set up in the Dutch Climate Accord of 2019. This mission falls under the overarching Mission A: ''*A carbon-neutral electricity system in the Netherlands by 2050''* (Climate Accord, 2019). Local ownership is defined as local stakeholders being the (partial) owner of solar parks or wind turbines (Hier Opgewekt, 2021).

By following the five analytical steps of the Mission-oriented Innovation System framework (problem-solution diagnosis, structural analysis, system functions (or key innovation activities) analysis, systemic barriers analysis, and analysis of governance actions), as well as by testing the eight Design Principles for Governing the Commons of Elinor Ostrom (1990), the following research question was answered: *What are the systemic barriers to achieving the mission of 50% local ownership (specifically by citizens) of regional sustainable energy projects (RSEP) in the Netherlands by 2030 and how are these addressed by past and current systemic instruments?* For this purpose, a qualitative single case study approach was chosen, including 30 interviews with various stakeholders involved in the mission as well as desktop research of policy documents, scientific publications and relevant websites.

Based on the data analysis, various barriers and their interrelatedness were identified which hinder the mission from being achieved. These are a missing central overarching financing structure, mobilising enough people willing to invest money into the risky development phase, the voluntary nature of an energy cooperative, a lack of legal obligation of the mission, the need for professionalising of energy cooperatives, discrepancy regarding the exact definition of local ownership, a lack of guidance on the execution of local ownership by municipalities, and a need for energy cooperatives to be recognised as a respected authority by other authorities.

It was concluded that some barriers are adequately addressed by governance actions (e.g. knowledge diffusion to the municipal level or supporting energy cooperatives during the risky development phase), but many of them are still insufficiently addressed. Final policy recommendations for both unaddressed barriers as well as insufficiently addressed barriers have been developed on the basis of this research, such as the need for a central financing structure by EZK and a further concretisation of the exact definition of local ownership by an evaluation task force, to prevent different interpretations, to shape clear guidelines for municipalities and to have clearer directions on how to measure and monitor the mission's progress.

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1. Introduction

To address complex types of problems such as climate change, often coined as ''grand challenges'', most current systems in place are in need of transformative change (Mazzucato, 2018). For a decade now, governments have acknowledged that their innovation objectives need to have a stronger focus on social and environmental challenges. Innovation is therefore now characterised by a stronger degree of directionality and a focus on transformative change (Schot & Steinmuller, 2018; Edler & Boon, 2018). Through the formulation of missions, governments strive to address these grand challenges. A mission is defined as *''an urgent strategic goal that requires transformative systems change directed towards overcoming a wicked societal problem''* (Hekkert et al., 2020, p.76).

A form of policy that focuses on addressing grand challenges is the mission-oriented innovation policy (MIP) (Mazzucato, 2017). MIPs are types of policies that are specifically aimed at achieving specific objectives in relation to a problem (Mazzucato, 2018, Hekkert et al., 2020). As a general basis of MIPs, the European Commission has installed a Mission programme as part of its key funding programme for research and innovation from 2021 until 2027 called European Horizon. The installed EU Missions function as research and innovation missions that contribute to the effectiveness of funding by pursuing clearly defined targets (European Commission, n.d.).

To be able to address societal challenges and stimulate transformative change, policymakers need a clear understanding of contemporary innovation dynamics related to the mission in question. A framework that has been recently developed to study the implementation and effectiveness of MIPs is the framework of mission-oriented innovation systems (MIS). Hekkert et al. (2020, p. 77) define a MIS as *"the network of agents and set of institutions that contribute to the development and diffusion of innovative solutions with the aim to define, pursue and complete a societal mission."* This relatively new framework is built on innovation systems (IS) literature and is mainly formed with the structural-functional approach of the technological innovations system (TIS) analysis as a basis (Hekkert et al., 2020; Wesseling & Meijerhof, 2021). The MIS framework follows five analytical steps to study the IS of a specific mission, namely a problem-solution diagnosis, a structural analysis, a system functions analysis, a systemic barriers analysis, and an analysis of governance actions (Wesseling & Meijerhof, 2021).

Following the 2015 Paris Climate Agreement and the programme European Horizon, the Netherlands has set various targets in its Climate Accord related to the reduction of greenhouse gas emissions, with the most ambitious target being a 95% reduction by 2050 (Sijm et al., 2019). In order to reach this ambitious goal, the current energy system the Netherlands is locked into will need to transition towards a carbon-neutral energy system by increasing the share of renewable energy sources (Nava Guerrero et al., 2019). Carbon-neutral is defined by the Intergovernmental Panel on Climate Change (IPCC) as *''a state of balance between the CO2 emitted into the atmosphere and the CO2 removed from the atmosphere''* (IPCC, 2018).

In relation to the energy transition, the Integral Knowledge and Innovation Agenda (IKIA) for Climate and Energy has developed several MIPs in 2019 as part of the Climate Accord with Mission A as the central overarching mission: A carbon-neutral electricity system in the Netherlands by 2050 (RVO, 2019; Ministry of Economic Affairs and Climate Policy, 2019). To achieve this, the usage and production of more renewable energy sources derived from sun and wind needs to be stimulated. One of the subgoals of Mission A is to generate a total of 35 renewable terawatt hours (TWh) by 2030. This is mainly done through regional sustainable energy projects (RSEP), which are either wind farms and solar parks (Climate Accord, 2019). The mission of local ownership is part of this

overarching goal to generate 35 TWh by 2030 (Climate Accord, 2019). Currently, the Netherlands is lagging behind other European countries when it comes to the production of renewable energy resources, which accounted for 14% of its gross energy production in 2020 (Eurostat, 2020).

To enable the energy transition in the Netherlands, thirty Regional Energy Strategy (RES) regions have been established. Through these RES regions, subnational governments, i.e. provinces, municipalities and water boards are responsible for working on achieving targets from the Climate Accord and designing policy, in particular for targets on large-scale electricity generation on land towards the primary goal year 2030. In these thirty RES regions, the subnational governments cooperate with network operators, businesses and households to form agreements on the regional choices regarding sustainable energy generation sources. To support all RES regions, the Dutch government (the Ministry of Economic Affairs and Climate Policy and the Ministry of the Interior and Kingdom Relations) has set up the National Programme Regional Energy Strategy (NP RES), in collaboration with co-governments Interprovincial Consultations (IPO), Union of Dutch Municipalities (VNG) and Union of Water Boards (UVW). The Dutch government sees itself as a partner of the co-governments in the RES process (Ministry of the Interior and Kingdom Relations, n.d.).

For renewable technologies to be widely applied in society, the active involvement of users, interest groups and other stakeholders is essential. Thus reaching out to all stakeholders is needed for a sustainable energy system to arise (Fagerberg, 2018). The energy transition will therefore be realised with the involvement of local stakeholders, i.e. citizens and local businesses. The target that has been set in the Dutch Climate Accord is to have at least 50% local ownership of regional sustainable energy projects (RSEP) by 2030 (Climate Accord, 2019). Local ownership is described by the NP RES as local stakeholders being the (partial) owner of solar parks or wind turbines. Local ownership is therefore an approach to the energy transition which contributes to the societal acceptance of the realisation of solar parks and wind turbines (Hier Opgewekt, 2021).

Local ownership is often in the form of collective ownership, such as a cooperative. The Netherlands has seen a rise over the past years in the creation of energy cooperatives by citizens and social groups (Hufen & Koppenjan, 2015). In 2021, the Netherlands counted 667 energy cooperatives with an estimated number of 112.000 members (HIER & RVO, 2021). These energy cooperatives are perceived as a niche innovation in the early stages and understanding the governance mechanisms of such local energy initiatives will highly likely gain importance as the country transitions into a low carbon economy (Acosta et al., 2018). The mission of local ownership is a mission that, next to the goal of the energy transition, aims to make energy more of a common good. A common is defined as *''a resource owned and managed by a community with a system of rules for production and consumption''* (Melville et al., 2017, p.1.). The definition ''local ownership'' has several interpretations of which one is to make energy more of a collective good, thereby making it a common. The aim of this research is to analyse the performance of the MIS of the mission of 50% local ownership in RSEP by 2030. In particular, the aim is to answer the following research question:

What are the systemic barriers to achieving the mission of 50% local ownership (specifically by citizens) of regional sustainable energy projects (RSEP) in the Netherlands by 2030 and how are these addressed by past and current systemic instruments?

Via this research question, it is analysed whether current governance actions effectively target the identified systemic barriers, and explores ex ante which MIS barriers should be (more sufficiently) targeted by a yet undefined set of mission governance actions. To guide the answering of this

research question, several sub-questions have been formed on the basis of the MIS framework and the Design Principles for Governing the Commons by Ostrom (1990). These theories are further described in the Theory Section, and the sub-questions can be found in the Methodology Section.

It is important to study local ownership of RSEP since, through this mission, the transition to renewable energy sources is stimulated to reach the overarching mission of a carbon-neutral energy system in the Netherlands by 2050, while also actively involving local stakeholders. This research is therefore focused on a mission that has the aim of solving two types of societal problems, namely climate change as well as the lack of local ownership of RSEP and the need for a support base for the energy transition. Much research has been done by the Dutch government on the latter but research on the implementation of the mission is lacking (NOS, 2021). This study adds to existing literature through the created analytical integrative framework (Section 3.7), which incorporates studying the analytical steps of the MIS approach, as well as testing the Design Principles for Governing the Commons to analyse how energy is governed as a common in the context of local ownership of RSEP. Through this theoretical combination, this research analyses the bottom-up approach to the mission and determines barriers in relation to the top-down and bottom-up approach of the mission. This research is considered an early-phase evaluation of a MIS, since this mission was established in 2019 and the goal year is 2030 (Ministry of Economic Affairs and Climate Policy, 2019).

2. Case description of local ownership in the Netherlands

Citizens are increasingly contributing to the provision of public services and goods all over the world. As negative effects of climate change are becoming more clear, citizens are increasingly taking matters into their own hands by uniting in initiatives and trying to tackle this grand challenge (Edelenbos & Van Meerkerk, 2016). Citizen initiatives, which can be defined as *''a form of self-organisation in which citizens mobilise energy and resources to collectively define and carry out projects aimed at providing public goods and services for their community''* (Igalla et al., 2019, p. 1176), are fully controlled by citizens but are often in contact with subnational governments such as municipalities or other formal institutions, since their activities are related to the public domain and public laws and regulations need to be taken into account (Igalla et al., 2019; Edelenbos & Van Meerkerk, 2016). Scientific research has shown that citizen initiatives contribute to closing the gap between governments and citizens, strengthen the awareness of democratic values, contribute to the societal agenda, contribute to economic and social capital of a (local) society and citizen collectives give substance to tackling issues on the level where the effects are most tangible, namely locally (Wennekers et al., 2019).

A popular form of a citizen initiative is the cooperative. A cooperative can be defined as *''an autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly owned and democratically controlled enterprise''* (ICA, n.d.). According to Jan Rotmans, professor of transitions, in the upcoming decades, a new societal order will erupt. Where society is now a vertically ordered, centrally governed, top-down society, this will slowly switch to a more horizontal, decentralised bottom-up society with communities such as cooperatives (Rotmans, 2021). Since around 2005, the number of cooperatives as a jurisdictional entity has been substantially growing (De Moor, 2015). These cooperatives are active in almost every societal field, e.g. healthcare, construction, energy and culture. Especially in the sectors of healthcare and energy, the number of cooperatives has become notably high (Rotmans, 2021). In relation to the energy transition in the Netherlands, a large movement at the bottom has begun to erupt. Within a decade, hundreds of energy cooperatives have been established, as can be seen in Figure 1 below (HIER & RVO, 2021).

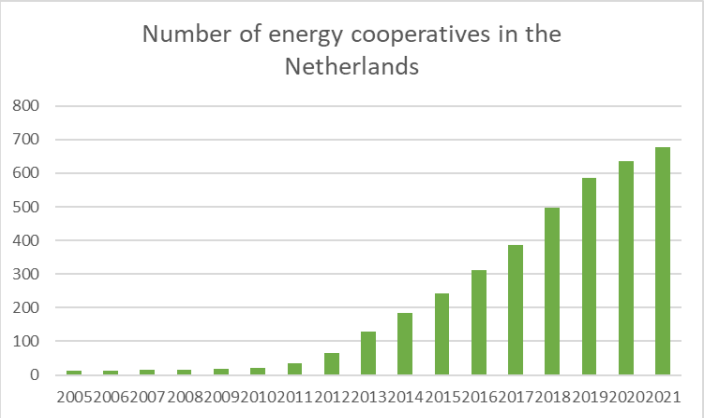

Figure 1: Number of energy cooperatives in the Netherlands by 2021, adapted from HIER & RVO (2021)

It is clear that in various countries, including the Netherlands, the energy transition sees a shift in the involvement of new actors. Although commercial energy corporations are still important actors in relation to the energy system, the substantial eruption and continuous growth of energy cooperatives shows that new forms of governance are emerging around renewable energy technologies (Becker et al., 2017). According to the Ministry of Economic Affairs and Climate Policy (2019), achieving 50% local ownership of RSEP by 2030 is possible due to this potential continuous growth of energy cooperatives and the necessary deployment of capital. The main focus of energy cooperatives is on production of renewable energy, after which the energy is usually sold to an energy supplier who distributes it among households, as can be seen in Figure 2 below. Energy cooperatives are well-rooted in the local community, can mobilise goodwill and capital, have an open and transparent decision-making form, think from the importance of consensus and have an eye for local employment (Hontelez & Ittersum, 2021). Next to their focus on producing sustainable energy, energy cooperatives also have the role of putting pressure on energy companies to lobby for the energy transition and changing the structure of power over energy (Rotmans, 2021).

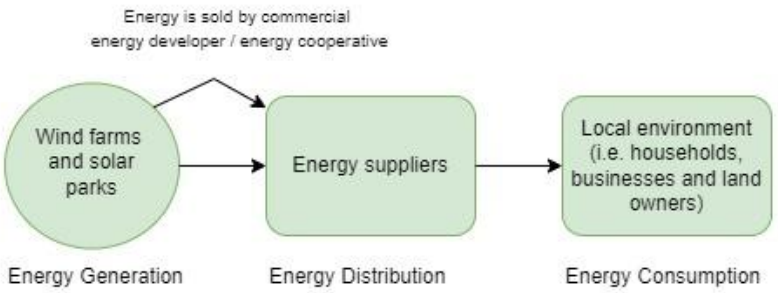

Figure 2: Value chain of energy in local ownership context, adapted from Hier Opgewekt (2021)

Goal and definition of local ownership

The main goal of local ownership, as described in the Climate Accord, is to enable the development and exploitation of RSEP successfully, through stimulating the support base among local stakeholders by giving them ownership (Climate Accord, 2019). Past experience as well as research has shown that involving local stakeholders contributes to the acceptance of an RSEP (Hier Opgewekt, 2020; Musall & Kuik, 2011). By striving for a support base (and not merely ''acceptance'') for RSEP, democratic decision-making is legitimised. Additionally, a support base can contribute to achieve policy goals more easily and faster. A third reason named for striving for a support base is that the local process can bring up new knowledge and with that lead to better planning, for which there is more support (PBL, 2021). According to an EU report, setting targets for community energy ownership is a very effective way of focusing government policy (European Union, 2018).

However, the exact definition of local ownership is still creating a lot of confusion. The definition of local ownership, as described in the paragraph regarding environmental law in the Dutch Climate Accord in 2019, is that local stakeholders, i.e. citizens and businesses, are the (partial) owner of a RSEP, with RSEP entailing wind farms or solar parks (Climate Accord, 2019). These two are the only types of renewable energy technologies looked at for this mission. What can be defined as an ''owner'', is when a person or an entity has influence over the RSEP in both the process (e.g. placement and quantity of solar panels or wind turbines) as well as what happens with the generated revenue of the RSEP (West-Overijssel RES, 2020). To be an owner also means to share all

the risks, as well as the revenues. Since the formulation in the Accord there is still a lot of discrepancy about the exact definition of local ownership. Local ownership is often described as being ‘’custom work’’ (Hier Opgewekt, 2020), since what is defined as ‘’local’’ differs per RES region and per RSEP (Hier Opgewekt, 2020). Every municipality decides for itself what local means (Hier Opgewekt, 2021). Currently local stakeholders are seen as the following group: citizens, local businesses, but also municipalities or water boards are seen as local parties and can be categorised as ‘’local ownership’’. Still, the main focus of the mission of local ownership is ownership by citizens, since the underlying thought is stimulating the creation of a support base among citizens for the energy transition, as well as having citizens profit from the revenue generated from the RSEP (HIER & RVO, 2021; I7).

Variants of local ownership

Officially, five variants of local ownership of RSEP have been established, as can be seen in Table 1 below. The first three variants of local ownership are where citizens are involved. In the two other variants of local ownership local stakeholders are other entities, i.e.. the municipality, water boards or local businesses (NP RES, n.d.).

Table 1: Variants of local ownership, adapted from Participation Monitor (2021)

Variants	**Owner of the RSEP (i.e. solar parks and wind farms)**	**Citizens involved**
Variant 1: Local ownership by citizens	Citizen collectives (energy cooperatives)	**Yes**
Variant 2: Shared local ownership	Commercial energy developer and energy cooperative	**Yes**
Variant 3: Local ownership in the exploitation phase	First commercial energy developer, then energy cooperative	**Yes**
Variant 4: Local ownership by public institutions	Public (municipalities, water boards, etc.)	No
Variant 5: Local ownership by businesses	Local businesses	No

Variant 1: 100% local ownership
The first variant where citizens have ownership over an RSEP, is 100% local ownership by citizens. 100% local ownership means that the authority over the RSEP lies 100% in the hands of an energy cooperative, as this is a citizen collective. Another possibility is a collective of cooperatives, for example with large projects which go above municipal levels (Participation Monitor, 2021).

Variant 2: Shared local ownership
In the case of shared local ownership, commercial energy developers develop RSEP in collaboration with energy cooperatives. Here, the ownership ratio can differ per RSEP. Often, the 50/50 ratio is chosen of a developer and an energy cooperative, in line with the mission described in the Climate Accord, but other ratios in ownership relationships are also valid (Participation Monitor, 2021).

Variant 3: Local ownership in the exploitation phase
It is also possible to realise local ownership in the exploitation phase. In this case, a commercial party realises an RSEP, after which full ownership is then handed over to an energy cooperative. In this type of local ownership, citizens do not have authority (or ownership) in the development phase. The degree of influence is in this phase therefore dependent on the developing party (Participation Monitor, 2021).

Variant 4: Local ownership by public institutions
The RSEP where a public institution is the owner (e.g. the municipality or waterboard) is the owner for 100% form a separate category. Here, local citizens are not an owner in this situation, however, it could be argued that in this case the municipality acts as a representative of the general local interest (Participation Monitor, 2021).

Variant 5: Local ownership by businesses
The final variant is when local businesses have developed an RSEP at their business terrain. Here, citizens are not involved. A local business can also be a farmer for example, which places an RSEP on their terrain. Parties of this variant usually produce the energy for their own production processes on their own terrain (Participation Monitor, 2021).

Other forms of participation
Local ownership is often confused with different forms of participation e.g. financial and process participation. Participation Monitor describes possible forms of participation in RSEP as can be seen in Figure 3 (next page). These forms of participation, however, should not be confused with local ownership (which falls under the category Co-ownership), since with the other forms local stakeholders do not have actual ownership over an RSEP but merely a form of participation is developed, where they either solely invest money (financial participation), give their opinion about the design and placement of the RSEP (process participation) or two other forms where a share of the generated revenue is used to social objectives in the neighbourhood (environmental fund) or immediate neighbours get a compensation (local residents arrangement). Local ownership can be seen as most similar to financial participation, but with additional actual control over the process (Participation Coalition, n.d.). Members of a cooperative usually live in the surroundings of the RSEP the cooperative is involved with. Also, in the case of local ownership there is often a combination of participation forms, since energy cooperatives usually set up environmental funds for social

objectives in the neighbourhood. This way, all citizens in the region around a RSEP can profit from a new cooperative RSEP, even if they are not a member of the cooperative (Rijne-Energie, n.d.).

Figure 3: Participation Range in relation to RSEP, adapted from Participation Monitor (2021)

3. Theory

In Section 3.1 the theory of the Innovation System (IS) is delineated as a theoretical basis on which the approach of the mission-oriented innovation policy (MIP) described in Section 3.2 is partly built. In Section 3.3, the framework of the Mission-oriented Innovation System (MIS) is described and compared with a Technological Innovation System (TIS), and why the MIS approach has been chosen as a theoretical basis for this research. This is followed by Section 3.4 containing the five analytical steps of the MIS, derived from Wesseling & Meijerhof (2021). In Section 3.5, the concept of the commons is explained, followed by Ostrom's theory of the eight Design Principles for Governing the Commons in 3.6. Finally, in Section 3.7 the analytical integrative framework of this research is described.

3.1 Innovation System (IS)

The notion of IS has been developed in the late 1980s and from then on has been widely used as an instrument for legitimising and formulation of policies related to research, technology and innovation (Weber & Rohracher, 2012). An IS can be defined in several ways, as it can be a national, regional, sectoral, or technological IS. The common traits of these types of IS are that they always involve the creation, diffusion and use of knowledge. Components are the operating part of the system, e.g. actors or institutions. Relationships are the links among these components, and these links are influenced by the properties and behaviour of the components (Carllson et al., 2002). By analysing the system and how it functions, it becomes clearer which functions of the system foster or hamper the innovation (Hekkert et al., 2020). A technological innovation system (TIS) is composed of actors, networks, institutions, and infrastructure oriented around a specific technological entity and delineates generation and diffusion of the specified technology (van der Loos et al., 2020; B. Carlsson and R. Stankiewicz, 1991). This technology is dependent on seven system functions which all have different inputs and outputs and have feedback on each other (Hekkert et al., 2007).

It is necessary to study processes of an IS since innovation can create economic growth and benefits for society. The technologies the world is currently locked into have negative side effects on the environment, as in the case of the world's total energy expenditure. By studying an IS, it can be analysed how innovations that result in sustainable changes can be facilitated (Grubler, 1998; Hekkert et al., 2007). Innovations are needed for the world to become more sustainable, however according to Mowery et al. (2010) it is much more challenging to provide good models for how policy may help in mobilising innovation for this purpose.

3.2 Mission-oriented Innovation Policy (MIP)

To address grand global challenges, Mission-oriented Innovation Policies (MIP) are developed. A MIP is defined as follows by Wanzenböck et al. (2020, p.3) as *"a directional policy that starts from the perspective of a societal problem, and focuses on the formulation and implementation of a goal oriented strategy by acknowledging the degree of wickedness of the underlying challenge, and the active role of policy in ensuring coordinated action and legitimacy of both problems and innovative solutions across multiple actors''*. MIPs bring together elements of two types of policies, namely innovation policy and transition policy (Klerkx and Begemann, 2020). To enable this transformative change of a MIP, governments need to provide active guidance for governing MIPs for the innovation in question to be successful (Mazzucato, 2016; Hekkert et al., 2020). Since the MIP framework

focuses on the articulation of the mission of interest, it lacks in describing how the envisioned impacts of the mission can be designed, monitored and what governance structures are suitable (Mazzucato et al. 2020; Wanzenbock et al. 2020). This shows that more research on the implementation of the mission is needed in order to build the framework further and be able to distinct stages in the trajectory of the mission (Robinson and Mazzucato, 2019).

3.3 Mission-oriented Innovation System (MIS)

The main framework that is used as an analytical basis for this research is the Mission-oriented Innovation System (MIS). This framework is relatively new, building on other theories related to MIP, and was formulated in 2020 by Hekkert et al. (2020). Principally, the MIS framework resembles other types of IS such as national or technological, but distinguishes itself by differences in the defined boundaries of the system, how the interactions within the system develop and the eventual outcome of the system, which has a focus on solutions in technological or behavioural terms. A MIS has a strong focus on solutions, since it focuses on addressing grand challenges (Hekkert et al, 2020).

Comparison between a MIS and a TIS

A MIS resembles a TIS in that both frameworks have a structural-functional approach, which analyses functions of the whole system to identify weaknesses and barriers to inhibit the innovation system from functioning. However, a TIS focuses on a single technology, while a MIS focuses on the solving of a societal problem (Wesseling & Meijerhof, 2021). Also, a MIS differs in that a MIS is time-bound to a goal and therefore a MIS is temporary (Frenken, 2017). With its strong focus on providing directionality, a MIS aims to provide solutions for societal problems.

Table 2: Differences between a MIS and a TIS, adapted from Wesseling & Meijerhof (2021)

Dimension	TIS	MIS
'Wickedness'	Involves uncertainty, complexity, and contestation within the scope of a single solution, involving competition between technological designs.	Involves uncertainty, complexity and contestation in terms of (a) the problem definition and prioritisation, and (b) the solution scope in which sets of different types of solutions interact
'Temporality and embeddedness'	Technologies emerge, mature and phase out, in one or more sectoral contexts.	Missions are formulated and completed or discontinued. They emerge around societal problems and aim to mobilise existing innovation system structures that can be part of the regime.
'Directionality'	Focuses attention on a technology and competition between underlying designs	Encompasses the attention for the mission formulation and underlying societal problem(s), as well as attention for the competing sets of innovative and 'phase-out' solutions.

The mission of this research has a solution-led approach, focusing on a social solution (i.e. local ownership), and falls under Type 1 of ''Transformer missions'', as defined by Witmann et al. (2021). ''Transformer missions'' emphasise socio-institutional transformation, while ''Accelerator missions'' focus on a narrowly identified scientific-technological solutions, as can be seen in Table 3. The

mission of local ownership is a socio-institutional transformation, since it asks for a transformation of the governance roles of the energy system and a change of social roles in the overall system, and it is a Type 1 Transformer mission, since the scope of the mission is confined and departs from an identified solution, i.e. local ownership (Witmann et al., 2021).

Table 3: Characteristics of different types of missions, adapted from Wittmann et al. (2021)

	Accelerator mission		Transformer mission	
	Type 1	Type 2	Type 1	Type 2
Mission definition: underlying motivation	Problem-oriented	Solution-oriented	Solution-oriented	Problem-oriented
Mission design: relative importance of science, technology, innovation	High	High	Medium	Medium
Mission implementation: governance requirements	Low	Medium	High	Very high

This research has chosen MIS as a theoretical basis due to various reasons. Since 50% local ownership was formulated in the Climate Accord, and emerged around the societal need for a support base for the energy transition, it is interesting to look at the target from a MIS perspective due to the fact that the directionality of the mission focuses on stimulating the energy transition as well as the goal of enabling local ownership. This is a social solution, which is a type of solution a TIS does not focus on. Inside this MIS of research, there are two TIS's, namely the two renewable energy technologies of sun and wind energy, in the formation of onshore wind farms and solar parks. Finally, the mission of research is time-bound, which makes it interesting to analyse what the general view is regarding whether the mission will be achieved or discontinued, and what the exact solution directionality of this mission is. This is done in the additional system functions of the MIS, namely SF4B Solution-directionality and SF4C Reflexive governance.

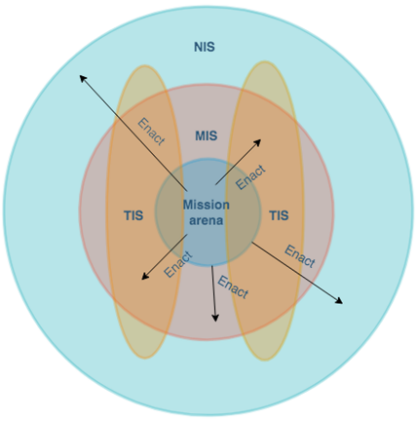

Figure 4: How MIS is related to other IS, adapted from Wesseling and Meijerhof (2021)

3.4 The five analytical steps of the MIS

The structure of this research will follow the structural-functional approach of the five analytical steps as set up by Wesseling and Meijerhof (2021). All the guiding diagnostic questions per step can be found in the Methodology.

3.4.1 Problem-solution diagnosis

To begin with studying a MIS, first it needs to be clearly sketched out what the exact societal problem is and how complex this problem is. In order to analyse a mission, it is important to pin down the origins of the mission, since a MIP is a product of the system that is supposed to change (Janssen et al., 2020). This relates to the idea of ''problem directionality'', which describes how various societal problems can be of influence for the formulated mission and which affects what solutions are relevant for the mission (Wesseling & Meijerhof, 2021). Following this analysis, it is important to study what technical and social solutions are essential for achieving the mission and how these solutions are related to each other in technical terms (Sandén and Hillman, 2011). In this research, this step has been approached differently since it is a solution-oriented mission, implying that there was a larger focus on contextual problems and how the mission can offer solutions to these problems.

3.4.2 Structural analysis

As a second step, the components of the system will be analysed. Here, the so-called mission arena is defined. This describes the actors who are directly or indirectly engaged in directing the MIS and whose role is of importance to keep in mind while analysing the system. Actors who take part in one or more of the following actions are seen as structural components of the MIS:

1. The formulation of the MIS: Actors who are involved in forming the concrete mission of the MIS to address a societal challenge.
2. Mobilisation of MIS components: Actors who are involved in mobilising other actors for achieving the goal of the mission.
3. Continued mission governance via monitoring, coordination, evaluation and reflexive redirection of the mission: Actors who are involved in the monitoring of the progress of the mission (Wesseling & Meijerhof, 2021).

Also, the overall MIS is described. The overall MIS is *''the actors, networks, institutions, and materiality that affect the rate and direction of both technologically and socially innovative solutions to the mission, including both supportive and opposing forces of change''* (Wesseling & Meijerhof, 2021, p.9).

3.4.3 System functions analysis

Corresponding with a traditional TIS approach, the third step of a MIS analyses several functions of the system which show a set of ''key innovation activities'', based on works of Bergek et al. (2008) and Wesseling and Meijerhof (2021), as structured in Table 4 (next page).

Table 4: Description of system functions for MIS analysis, adapted from Wesseling and Meijerhof (2021)

System Function	**MIS interpretation**
SF1: Entrepreneurial activities	Experiments with solutions to enable learning; entering markets for new solutions; engaging in business model innovations to the diffusion of solutions.
SF2: Knowledge development	Learning by searching and by 'doing', resulting in development and better understanding of new technical and social knowledge on problems and solutions, through R&D, social and behavioural science research.
SF3: Knowledge diffusion	Stakeholder meetings, conferences, governance structures, mission progress reports and other forms of disseminating technical and social knowledge for the mission's solutions and societal problems.
SF4: Providing directionality	Next to institutional structures that were already present, here the focus lies on the direction the mission arena provides for direction and mobilising support from the existing innovation system structures that comprise the overall MIS.
SF4: Providing directionality 4A: Problem directionality	The direction provided to stakeholders' societal problem conceptions and the level of priority they give it.
SF4: Providing directionality 4B: Solution directionality	The direction provided to the search for technological and social solutions, as well as the coordination efforts needed to identify, select and exploit synergetic sets of solutions to the mission.
SF4: Providing directionality 4C: Reflexive governance	Reflexive monitoring, anticipation, evaluation and impact assessment procedures, which provides the analytical and forward-looking basis for redirecting the system's problem framing and search for solutions based on lessons learned and changing context. It can be seen as second order directionality.
SF5: Market formation and destabilisation	Creating niche market and upscaling support for technical and social solutions; phasing out or destabilising markets for practices and technologies harmful to the mission.
SF6: Resources mobilisation	Mobilisation of human, financial and material resources to enable all other system functions.
SF7: Creation of legitimacy	Creating legitimacy for prioritising the problem the mission is targeted at and legitimising the creation and diffusion of solutions.

3.4.4 Systemic barriers analysis

After having analysed all the functions of the system, the barriers of the MIS need to be defined in order to delineate which functions of the system have a negative impact on the performance of the MIS, thereby inhibiting the mission from being successful. Here, it is also important to look at possible interrelatedness among systemic barriers (Kieft et al., 2016; Wesseling and Meijerhof, 2021).

3.4.5 Analysis of governance actions

In order to address the systemic barriers of the MIS effective policy interventions, i.e. systemic instruments need to be developed (Smits and Kuhlmann, 2004; Wesseling & Meijerhof; 2021). Here, governance actions will be analysed how systemic barriers of the MIS are currently addressed and what kind of function these actions have.

3.5 The commons

The notion of ''the commons'' originates from an essay written by the British economist William Forster Lloyd in 1833, who named common land a ''common'' and analysed what the hypothetical effects of unregulated grazing were on this common (Lloyd, 1833). As mentioned in the introduction, a common can be defined as *''a resource owned and managed by a community with a system of rules for production and consumption''* (Melville et al., 2017, p.1.). Even though the concept of commons originates from shared natural resources such as common land, it is now often applied to other human production resources (Dellenbaugh et al., 2015). Users of the common are the ones who choose the law for the collective, and management of the common is based on solidarity, mutuality and democratic decision-making (Ostrom, 1990; Bert Hellinger Institute, 2021). A context in which the term ''the commons'' is most well-known is the problematic situation called ''tragedy of the commons'', first highlighted by Garrett Hardin in 1968, which describes how the use of natural resources of the environment by many individuals will lead to degradation of this resource (Hardin, 1968). It is difficult to pin down who is the exact owner of a natural resource (the common) to which a large number of people have access, e.g. the air (Ostrom et al., 2002).

3.6 Ostrom's eight Design Principles Framework for Governing the Commons

Hardin's article on the Tragedy of the Commons is one of the most reprinted articles ever to appear in any scientific journal. He argued that the only solution to manage commons was to have them nationalised and managed by the state, or privatised. However, Elinor Ostrom saw a flaw in Hardin's logic, namely he assumed that commons are treated as a free-for-all by people. In reality, Ostrom saw many situations where commons were managed sustainably, by a community, by neighbours, who set their own rules and policed these (Harford, 2013). Ostrom has extensively researched the commons and how these need to be managed. She developed eight Design Principles (DP) for governing the commons, and with this she contested the general belief that the general usage of the commons automatically leads to the tragedy of the commons. Ostrom concluded that successful common-pool resource (CPR) institutions seem to have a certain set of similar features, on which she based her development of the DP's (Ostrom, 1990; Blomkvist & Larsson, 2013). Thus, the DP's describe the structural similarities of robust CPR institutions which were able to manage a common while also being able to adapt and be resilient to any form of social, economic or ecological disturbance (Blomkvist & Larsson, 2013).

The DP's include:
(1) Define boundaries clearly, both of the resource and individuals with access rights
(2) Match rules governing use of common goods to local needs and conditions
(3) Users are able to participate in modifying the rules
(4) Activities are monitored and CPR conditions are actively audited

(5) Develop graduated sanctions for violators
(6) Means for conflict resolution should be provided
(7) External government authorities recognize minimal rights to organise
(8) Responsibility should be built for governing the common resource in all layers of the system (Ostrom 1990).

The DP's have been formed by Ostrom based on empirical findings and have been widely used among scholars. Cox et al. (2010) analysed the use of the DP's by other scholars and were able to conclude that the DP's are perceived as a robust system and well supported empirically (Blomkvist & Larsson, 2013). In this research energy is conceptualised as a common, as done by Melville et al. (2017) in their work *''The electric commons: A qualitative study of community accountability''.* This research seeks to analyse how energy is governed more as a common by society, while transitioning towards a carbon-neutral energy system. Through incorporating the eight DP's of Ostrom (1990), this research tests how these principles are present in the MIS of local ownership in regards to governing energy as a common, specifically by energy cooperatives. This theory is relevant for combining with the MIS analysis, since it analyses the different form of governance (i.e. bottom-up) that is erupting in relation to the normative character of the mission. In the following section, this is further described.

3.7 The analytical integrative framework

Based on the analytical steps of the MIS as developed by Wesseling and Meijerhof (2021), diagnostic questions have been formed. Additionally, based on the eight Design Principles of Ostrom (1990), eight diagnostic questions have been incorporated to test how these principles are present in the MIS of local ownership in regards to the governing of energy as a common by an energy cooperative. This theory and the MIS approach combined is the analytical integrative framework of this research, seen below here in Figure 5. The diagnostic questions are shown in the Methodology section in Table 6 (p.20). The combination of the MIS approach and the DP's framework is made to show the functioning of the top-down governance structure of the mission (through the MIS approach), as well as the functioning of bottom-up governance of the mission (through the DP's framework) and how these interact to achieve the mission. Through combining this approach and framework, systemic barriers have been defined as well as their interrelatedness, these are further described in the Results Section.

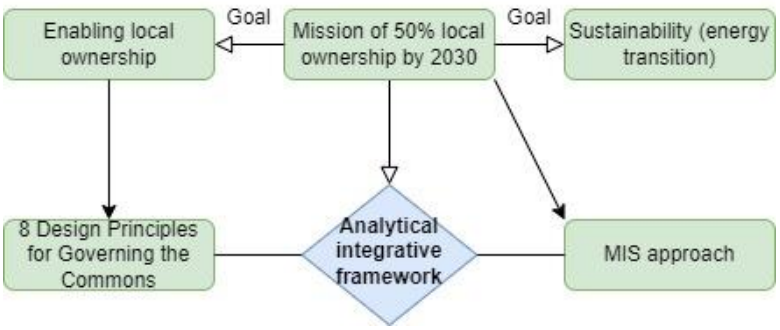

Figure 5: The analytical integrative framework of this research

4. Methodology

The goal of this research is to analyse the systemic barriers to achieving the mission of 50% local ownership of RSEP in the Netherlands by 2030. This is done through an analysis which combines the top-down and bottom-up approach to the mission, to show the different types of systemic barriers, how these are interrelated, and how they can be addressed. Due to the explanatory character of this subject, a qualitative research approach has been chosen as most suitable for answering the research question.

4.1 Research Design

To answer the research question, a qualitative single case study is used for this research (Bryman, 2016), focusing on the mission of local ownership in the Netherlands, formulated in the Climate Accord. As can be seen in Figure 6 below, the mission of local ownership is formulated in the Climate Accord as follows:

''This translates into a balanced distribution of ownership in an area aiming for 50% ownership by local stakeholders (citizens and business). This goal of this ownership ratio is a general aim for 2030''.

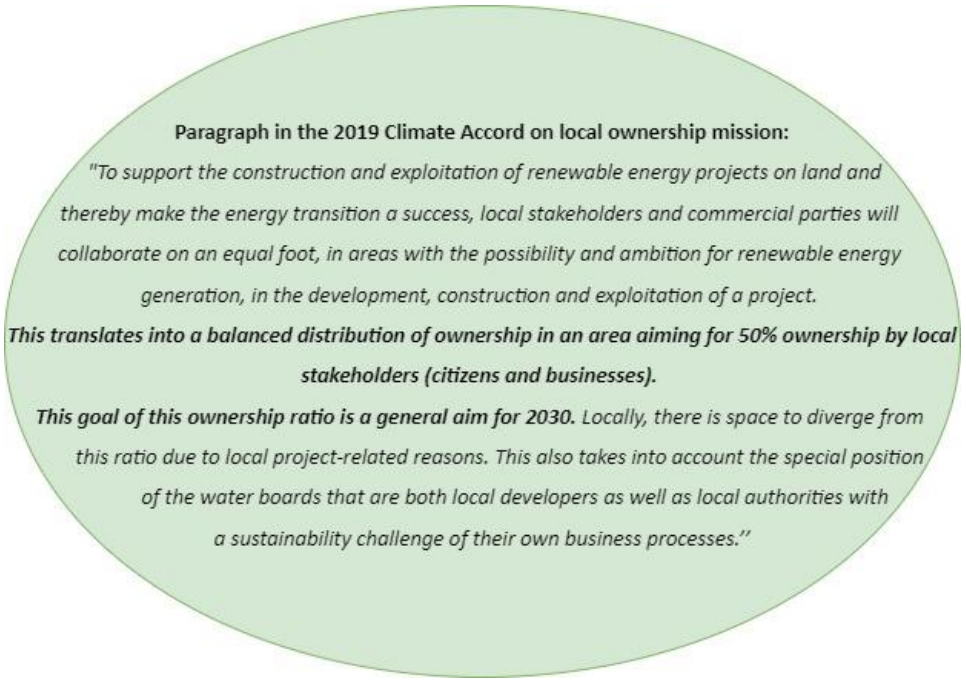

Figure 6: The paragraph on local ownership, adapted from Climate Accord (2019)

This case was chosen because it has a large social solution component with a normative character, next to two defined technologies (solar and wind RSEP). This is why the previously described integrative analytical framework has been formed, namely to analyse both the top-down orchestration as well as the bottom-up implementation of the mission of 50% local ownership by 2030 of RSEP and to determine the systemic barriers to achieving the mission.

4.2 Data Collection

This research is based on data collected through different sources of data such as literature reviews of the institutions and actors involved in the energy transition and the RES in the Netherlands, while also a large portion of the data has been collected through semi-structured interviews. Documents such as scientific documents, policy documents and other grey literature are obtained via Google (Scholar) or Worldcat Library. Grey literature includes documents from the websites of the Dutch government and its ministries, the Participation Coalition, various RES regions and the NP RES.

Participants for the interviews have been selected through purposive sampling, since this non-probability sampling is designed to enhance understanding of selected groups or individual's experiences for developing theories and concepts (Devers & Frankel, 2000). With purposive sampling, researchers seek to select ''information-rich'' individuals or organisations which can provide the greatest insights into the research question (Devers & Frankel, 2000). In total, 30 people have been interviewed who are relevant for studying the MIS and/or are involved in the MIS. A semi-structured approach has been employed (see Appendix A) through using a semi-structured interview guide which followed the diagnostic questions (see Table 6 next page), but deviated from this depending on the person's specific knowledge on the subject. Additionally, the diagnostic questions regarding the Design Principles framework were only asked to interviewees who are active in an energy cooperative (next to the other diagnostic questions).

Table 5: Types of interviewees

Type of interviewee	**Number of interviewees**
National Programme RES	2
Co-governments IPO, VNG, UVW	3
EZK	1
People active in parties of The Participation Coalition	5
People involved in energy cooperatives	5
People involved in execution of local ownership as part of the RES	3
Head researcher Local Energy Monitor (LEM)	1
Professor Social Enterprise & Institutions for Collective Action	1
Assistant professor of Law and Politics of the Energy Transition	1
Commercial energy developers	2
Energy supplier	2
Municipal officer	1
JONG RES	2
Squarewise employee	1
Total	30

Table 6: The guiding diagnostic sub-questions. Based on Wesseling and Meijerhof (2021) & Ostrom (1990)

Theory	**Guiding sub-questions**
MIS - analytical step 1: Problem-solutions diagnosis	- How do different societal problems and 'wants' relate to the mission and how are these addressed by the mission?
MIS - analytical step 2: Structural analysis	- What actors, networks and institutions are involved in the mission formulation and the mission implementation and how are they configured?
MIS - analytical step 3: Systems functions analysis (general sub-question, for the detailed diagnostic sub-questions see Appendix A)	- What are the weak and strong system functions of the overall system and of social and technological solutions?
MIS - analytical step 4: Systemic barriers analysis	- What are the main identified barriers to the development and diffusion of the mission? - What causes these barriers and how are the barriers related?
MIS - analytical step 5: Governance action analysis	- What are the current governmental actions to achieve the mission? - How are the systemic barriers addressed in governmental actions?
Design Principles for Governing the Commons by Ostrom (1990)	- (DP 1): Is it clear what is the defined community of people involved in energy cooperatives? And who makes use of energy from RSEP? - (DP 2): Are the rules of the energy cooperative matched with local needs and conditions? - (DP 3): Are users able to participate in modifying the rules of an energy cooperative? - (DP 4): Are activities of the energy cooperative actively monitored? - (DP 5): Are there types of sanctions in an energy cooperative, and if so what kind? - (DP 6): Are there means for conflict resolution within an energy cooperative? - (DP 7): Do external government authorities recognise minimal rights of the energy cooperative to organise? - (DP 8): Is responsibility built in governing energy from cooperative RSEP in all governance layers of the system?

To be in line with the GDPR regulations (GDPR, n.d.), at the beginning of each interview, each participant was asked whether they would agree with the interview to be recorded and transcribed. After an interview, if preferred, the transcript was sent to the interviewee, so he/she could check the data whether the transcriptions are in line with their beliefs. The data has been managed with care and names have not been disclosed in the transcriptions, only a description of the interviewee's position is included. When referencing interviewees, the abbreviation ''I'' is used, thus when quoting Interviewee 10 for example, it states ''I10''. The corresponding interviewee numbers can be found in Appendix D.

4.3 Data Analysis

This research has followed an iterative process where simultaneously data has been collected, analysed while also new data sources were consulted, which appeared to be of relevance during the process of data collection and data analysis. Additionally, the three steps for conducting research interviews by Rowley (2012) have been followed during this qualitative research.

Figure 7: The three steps for conducting research interviews, adapted from Rowley (2012)

To make sense of the interview data, the collected data has been analysed through semi-open coding, which was guided by the diagnostic questions. Some codes had been predetermined (related to the system's functions), but during the coding process additional relevant codes were formed which gave new insights on the opinions of interviewees on the mission (e.g. codes in relation to the other analytical steps). Additionally, an intercoder reliability check has been done on the collected data to increase the level of reliability of the research and prevent a confirmation bias. Reliability can be checked by comparing similarities and differences in interpretation of data with various researchers. Reliability is indicated when there is a substantial agreement of the results among several researchers with diverse personalities of the results (Mouter & Noordegraaf, 2012). This was the case in this research, since the Krippendorf's Alpha was higher than 0.8 (0.816), see Appendix E. The database that was developed to apply the diagnostic questions to is composed of 30 interview transcripts, as well as data collected through literature reviews of academic literature, as well as desktop research of the previously named (policy) documents. These various sources for the collected data are to ensure triangulation, i.e. a higher level of credibility and validity of the research findings (Lauri, 2012).

5. Results

The Results Section is correspondingly structured as the five analytical steps of the MIS. Firstly, problems and wants relating to local ownership are described, followed by an overview of how local ownership can contribute to solving these problems and stimulating the wants. Secondly, the structural analysis details the involved actors, institutions and defined structures of the MIS. This is followed by an analysis of the system functions, after which the barriers of the system are described which hinder the system from functioning.

5.1 Problem-solution diagnosis

In this section, the various contextual problems related to the mission of 50% local ownership by 2030 are described, followed by the various ''wants'' of the mission, which entails what the mission of local ownership aspires to address and how, in relation to the contextual problems. The suggestions of Wesseling & Meijerhof (2021) for diagnostic questions for this step mostly focus on analysing technological solutions, however, since local ownership is a mission which is seen as a solution for creating a support base for the energy transition, for this research it is described how local ownership contributes to the contextual problems through a social solution manner. Also, the two technologies employed for this mission are clear, namely wind- and solar energy. These employed technologies of the mission are further described in detail at the end of this chapter.

5.1.1 Problems and wants

Need for increased local support base for the energy transition

The proposed measures in the Climate Accord have an effect on the lives of citizens at various levels. This is why the wishes and concerns of the public need to be taken into account when making choices during the various transitions, including the energy transition. This needs to happen at all levels of the Dutch governance system (nationally, regionally and locally), to ensure that citizens feel heard and the support base for the energy transition is substantiated. A broad and active involvement of citizens is essential for the energy transition to be successful in the Netherlands (Climate Accord, 2019). A 2020 research done by the Central Bureau for Statistics (CBS) on how Dutch citizens viewed the energy transition showed that a large share of Dutch citizens is supportive of the transition from natural gas to renewable energy sources. Especially the switch to solar energy (83%) and wind energy (72%) had the most support (CBS, 2021).

However, when push comes to shove, research shows citizens are hesitant about the realisation of more RSEP. One of the biggest factors which prevents the acceleration of the energy transition is the Not in My BackYard - effect (NIMBY), which means people do support renewable energy generation, but prefer to not have it affect their direct environment (Stadszaken, n.d.). According to the Public Monitor Climate and Energy, a monitoring research in 2021 commissioned by the Ministry of Economic Affairs and Climate, the support base for new RSEP in the living environment has decreased in comparison with 2019. Research shows that Dutch citizens are feeling less positive about the installation of solar parks (the support base went from 47% to 37%) and wind farms (the support base went from 30% to 23%). However, nine out of ten of the interviewees indicated that, if certain conditions (e.g. no health damage or hindrance) were met, they would be acceptable of RSEP in their living environment. What was also concluded from the research was that the level of acceptance of RSEP would be higher, if citizens would have a say in the placement of the

RSEP. 75% of Dutch citizens want to be involved in choices around new RSEP (Ministry of Economic Affairs and Climate Policy, 2021).

Independence in energy production

Next to the need to transition to more renewable energy sources due to the problem of climate change, currently there is also an emphasis on a political reason why the Netherlands needs to rely more on their own production of (renewable) energy sources. A large share of the Dutch energy consumption of gas and oil derives from Russia, and due to the Russian violent take-over of Ukraine and escalation of the conflict which has resulted in a war, the Netherlands as well as the other EU countries want to break all ties with Russia and reform their own energy system. Currently, there is a worldwide withdrawal of capital from Russia's energy industry as a form of sanctioning in support of Ukraine (Liadze et al., 2022). Breaking ties with Russia brings difficulty, since the Netherlands relies heavily on Russia for its energy provision. About 26% of the Dutch domestic gas supply is from Russia (Modern Diplomacy, 2022). Therefore, the Dutch government has decided to take several measures to fasten the independence of the Netherlands on other countries for energy production. One of the measures the Dutch government is planning on taking is to make the Netherlands less dependent on Russia, by fastening the energy transition. There is especially a focus on reducing the usage of gas by generating renewable energy sources within national borders (Rijksoverheid, 2022; Modern Diplomacy, 2022). It is already apparent that the energy demand system in all of Europe is suffering from the conflict. The conflict is currently leading to higher prices for energy, bolstered by the international sanctions, also in the Netherlands (Liadze et al., 2022).

Next to the Russian-Ukrainian conflict, what is also a stimulance for more (sustainable) energy generation within the Netherlands is that often revenues from wind farms and solar parks go to external partners from foreign countries. Foreign investors and commercial energy developers from countries such as China, Germany, England and Scandinavia own a large share of wind- and solar parks in the Netherlands (Rotmans, 2022; AD, 2021). None of the benefits of the RSEP flow back to the local stakeholders, only the burdens, which leads to a higher level of resistance to the RSEP and in turn the energy transition (I5, I17; Mast & Steinfort, 2021).

Energy poverty

Energy poverty is becoming a more prominent problem in the Netherlands, due to the rising energy prices. Energy poverty is mostly related to a level of energy consumption that is inadequate to meet the basic needs of an individual or household. Reddy (2020, Chapter 2) defined energy poverty as follows: *"the absence of sufficient choice in accessing adequate, affordable, reliable, high-quality, safe and environmentally benign energy services to support economic and human development".* According to research done by TNO, in 2021 over 550.000 Dutch households live in energy poverty and are struggling to pay their energy bills each month. This is about 7% of the total number of Dutch households. It is expected that this number will only continue to grow, keeping in mind the increasing energy prices due to the Ukrainian-Russian conflict. Households which live in energy poverty usually live in a house that is not well isolated and their incomes are low. It is also estimated that there are about 14.000 households in the Netherlands that live in hidden energy poverty. This group consists of people who consume less energy than they would like to, due to financial problems (TNO, 2021). The Dutch government strives to create more local authority leadership to reduce the level of energy poverty in the Netherlands, but the topic is still seen as an underaddressed topic in national policy when discussing energy transition measures (Feenstra et al., 2021).

Realising spatial quality through RSEP

One of the overarching goals of the RES is to realise as much spatial quality as possible while also ensuring that plans and projects can be translated to the physical environment by finding search areas and locations for RSEP. These locations are not only needed for energy generation, but also for energy storage and transport. Space is scarce in the Netherlands, and decisions need to be made to translate the energy transition to the spatial environment (NP RES, n.d.). According to NP RES, timely anchoring the RES in the spatial legal framework needs to be more of a focus point. To take on large challenges such as the energy transition which have an influence on the physical environment of the Netherlands, The National Strategy on Spatial Planning and the Environment (NOVI) has been formed by the Dutch government to stimulate a collaborative approach for a sustainable living environment. The NOVI is an instrument of the new Dutch Environmental and Planning Act, which is currently still in development and will come into effect on January 1st, 2023 (Rijksoverheid, n.d.). The Environmental and Planning Act is one law which bundles all laws for the living environment and which makes it compulsory for provinces and municipalities to set up their environmental vision plans (Rijksoverheid, n.d.). The spatial implications of the task of implementing renewable energy in the Netherlands can be substantial, and realising spatial quality is thereby one of the main focal points of the RES (NP RES, n.d.).

5.1.2 Description of technologies employed and solutions of the mission

In this section, the two relevant technologies for this mission (wind- and solar energy) are briefly described and how these are currently employed in the Netherlands. These two technologies are the only types of renewable energy sources used in relation to projects with a focus on the mission of local ownership. Naturally, these technologies are not the solution to local ownership, but are merely the sole two technologies used in relation to the mission, which is a mission of social nature. Additionally, this section describes how the different variants of local ownership[1] address the previously named contextual problems.

Employed technologies of the mission

Wind and solar energy are well-developed technologies wind and solar are well-developed technologies and are fully commercialised (Iskandarova et al., 2021). Nearly 75% of all energy cooperatives are involved in RSEP focused on solar energy. In 2021, 7.3% of the Dutch energy consumption derives from solar energy (RVO, 2021). Solar panels turn the radiation of the sun into electricity, without any form of CO2 emission. Together with wind energy, it is currently the most important form of renewable energy source which the Netherlands has employed to create a sustainable energy system (Rijksoverheid, n.d.). Many RES regions have expressed a preference for solar parks and want to maximally utilise spaces such as parking spots and dumping sites (NP RES, n.d.). Only 12% of energy cooperatives are involved in RSEP focused on wind energy (the remaining % of energy cooperatives do not focus on production of energy but rather on other activities in relation to the energy transition). This great division in focus can be largely attributed to the high costs of the development of wind parks, and due to the higher resistance among the public for wind farms (HIER & RVO, 2021).

[1] Recap of previous Table 1 (page 8): **Variant 1:** 100% local ownership by citizens, **Variant 2:** shared local ownership (cooperative and commercial developer), **Variant 3:** local ownership in the exploitation phase, **Variant 4:** local ownership by public institutions, **Variant 5:** local ownership by businesses (Participation Monitor, 2020).

Solutions

In this subsection, it is explained how the various variants[2] of local ownership address the contextual problems around local ownership and the energy transition in general.

Creating a support base for the energy transition

To achieve the subgoal of 35 TWh by 2030 (Climate Accord, 2019), a support base for RSEP is crucial among Dutch citizens. This is largely the biggest want of the mission of 50% local ownership by 2030, to enable participation and ownership among citizens, which in turn will lead to a higher acceptance level among citizens of RSEP. Local ownership is a means to enhance support among citizens for the energy transition, due to a few reasons. Firstly, the benefits of the RSEP stay in the region. Local ownership does not solely mean financial ownership, but also the joint responsibility of the local stakeholders to develop an RSEP from the start. Thus, it contributes to an equal, open and transparent cooperation with other parties (Participation Coalition, n.d.). A statistical research by Wierling et al. (2018) confirms that energy cooperatives are a key player when it comes to creating a support base for the energy transition and claim the group are important enablers. Energy cooperatives can also play a decisive role in raising awareness in local communities about themes such as energy transition and democracy, and show how the energy transition does not have to have a top-down approach but citizens can actively participate, express their needs and have an authoritative say in regards to RSEP (Energie Samen, 2021). Various research has shown that community ownership can have a positive effect on public attitudes towards developments of RSEP and that it stimulates a support base for the energy transition (Warren & McFadyen, 2010; Musall & Kuik, 2011).

The variants 1,2,3, 4 (where citizens are involved) are most likely to solve this societal problem, since these variants represent citizen's wants and needs the most, either through cooperatives, or public authorities. It is often argued for the public authorities variant that these act in the name of the citizens and share the same goal regarding generating as much renewable energy as possible as energy cooperatives. In variant 5 (businesses), there is less focus on the opinions of citizens regarding RSEP, as this variant is mainly focused on generating energy for own production processes.

Independence of energy production and keeping profits local

Due to the Russian-Ukrainian conflict, the Dutch government has gotten a political incentive to find ways to gain more independence in their energy system, e.g. through transitioning to renewable energy sources. According to Jan Rotmans, professor in transition studies, it is likely that the Dutch government will need to shift their focus mainly to wind- and solar energy to meet the growing demands for energy in the country (Rotmans, 2021). Local ownership can contribute to a higher support base for RSEP, which in turn will lead to an acceleration of the energy transition in the Netherlands, thereby indirectly contributing to a higher level of independence of energy production. Next to having authority over RSEP, local ownership also enables the local stakeholders to receive a share of the benefits, thereby keeping the profits of RSEP local and preventing the benefits from flowing back to energy developers and investors from abroad. The bigger the share of ownership is of citizens (i.e. energy cooperative), the more shares remain in their local municipalities (Energie

[2] Recap of previous Table 1 (page 8) : **Variant 1:** 100% local ownership by citizens, **Variant 2:** shared local ownership (cooperative and commercial developer), **Variant 3:** local ownership in the exploitation phase, **Variant 4:** local ownership by public institutions, **Variant 5:** local ownership by businesses

Samen, 2020). Also, many energy cooperatives have small financing programmes which provide subsidies to local associations and clubs (such as the previously described environmental clubs). One of the main goals of energy cooperatives is to support local initiatives or producers, and thereby strengthen the local community (Energie Samen, 2021). Additionally, through the creation of more RSEP, there is a large security of supply since the energy sources are renewable. All variants of local ownership address this contextual problem, since all variants enable the development of RSEP and ensure that the profits are kept locally.

Diminishing the rate of energy poverty

Local ownership can be a means to solving the problem of energy poverty in the Netherlands, since energy cooperatives also aim their activities at energy saving. Out of the 667 cooperatives, 108 provide information on their energy saving activities. These cooperatives organise activities directed at awareness and provision of information on saving energy, advise citizens on how they can make their houses more sustainable and guide and support citizens with the execution of the energy saving measures. For this, energy coaches are deployed, which can advise citizens individually. In regards to energy saving, the cooperation between energy cooperatives and municipalities has also increased, mostly through neighbourhood projects and sometimes due to the Regulation Reduction Energy (RRE) and Regulation Reduction Energy Building (RREW) subsidies. Also from energy counters, which are usually managed by either an energy cooperative or the municipality, or in collaboration between the two. On a national level, energy cooperatives collaborate on their energy saving activities under the cooperative association Hoom (HIER & RVO, 2021).

Also, as was previously described, local ownership has as one of the main wants to keep the profits of RSEP local, which in turn can lead to more money flowing to environmental funds for the local community, possibly helping those in the municipality who live in energy poverty. The number of environmental funds is substantially increasing, with 84% of cooperative RSEP in 2020 having created an environmental fund (Participation Monitor, 2021). Variants of local ownership that address this contextual problem best are variants 1,2,3, since in these cases, often environmental funds are set up, or there is a focus on energy saving activities. RSEP of other variants (public or businesses) usually do not have an environmental fund. These parties produce energy on their own terrain with relatively small installations (Participation Monitor, 2021). Finally, it is often argued that through the mission of local ownership, local employment is stimulated with the creation of new RSEP (Energie Samen, 2021).

Spatial planning

Local ownership can be a lever for quality improvement of the spatial environment. This is for example given substance with the pilot programme Energy Generation on Government Property (OER), to set up RSEP on governmental grounds, in collaboration with the RES regions. In these pilot projects, chances are being explored to combine spatial functions, such as combining an RSEP with a focus on wind energy with the realisation of a forest or nature or placing solar panels on noise barriers to integrate energy generation in the landscape. Additionally, when constructing a new forest, the combination with energy generation can create opportunities, since this energy generation can serve as an earnings model for landscape management (Rijksoverheid, 2020). Research argues that increasing the level of participation of local stakeholders in spatial planning of RSEP can decrease opposition (Schreuer & Weismeier-Sammer, 2010). The mission of local ownership accelerates the energy transition (Energie Samen, 2020) and thereby contributes to the quality

improvement of the spatial environment, since local ownership is seen as a means to reconcile acceptance of RSEP. This contextual problem is addressed by all variants of local ownership, since in all variants local stakeholders have a say about the spatial planning of an RSEP and how they think the RSEP is best integrated in the spatial environment. A local farmer can for example combine spatial functions of agriculture and RSEP.

5.2 Structural analysis

In this section, first, the mission arena members are defined and their roles explained, after which the MIS and its connections to the previously described mission arena are delineated.

In 2018, the EU developed the Renewable Energy Directive, which acknowledged different types of new actors on the energy market such as energy cooperatives. One of the aims of this directive was to strengthen the role of renewable energy communities, i.e. energy cooperatives. The EU states that the involvement of local stakeholders is becoming even more essential when the renewable energy capacity increases, to create a support base for the energy transition. EU countries need to ensure that these energy communities can participate in support schemes, on equal footing with large commercial participants (European Commission, n.d.). Additionally in 2019, the Directive on common rules for the internal electricity market also included new rules which enable active consumer participation, to make it easier for citizens to integrate as active participants in the energy system.

Starting from 2021, the European Commission will report back every three years to the European Parliament and Council regarding the energy transition, in which the Commission will principally research whether tender procedures for RSEP are able to adhere to a few crucial conditions, among which ‘’enabling a local support base’’, is one (European Commission, n.d). Following these directives, The operationalisation of the European guidelines has then been incorporated in the Climate Accord, as the mission of 50% local ownership by 2030 (Comets, 2020).

To achieve the overarching mission of a carbon neutral electrical system and its sub-goals, the Dutch Topsector Energy has given practical form to these goals by creating thirteen perennial mission-driven innovation programmes (MMIPs) (Topsector Energy, n.d.). To achieve the sub-goal of 35 renewable TWh by 2030, two MMIPs have been installed by the Dutch government, of which the one of importance for this research is ‘’Renewable energy generation on land and in the built environment’’, highlighted in Figure 8 (next page). Here, the usage and production of more renewable energy sources derived from e.g. sun and wind need to be stimulated. This is mainly done through the development of RSEP (Climate Accord, 2019). According to the Topsector, it is crucial to involve citizens early in the process of RSEP. Early involvement of citizens, the implementation of innovative participation models (e.g. local ownership) and the correct spatial planning of RSEP with conservation or improvement of biodiversity, are conditions to keep societal enthusiasm for an RSEP (Topsector Energy, 2019).

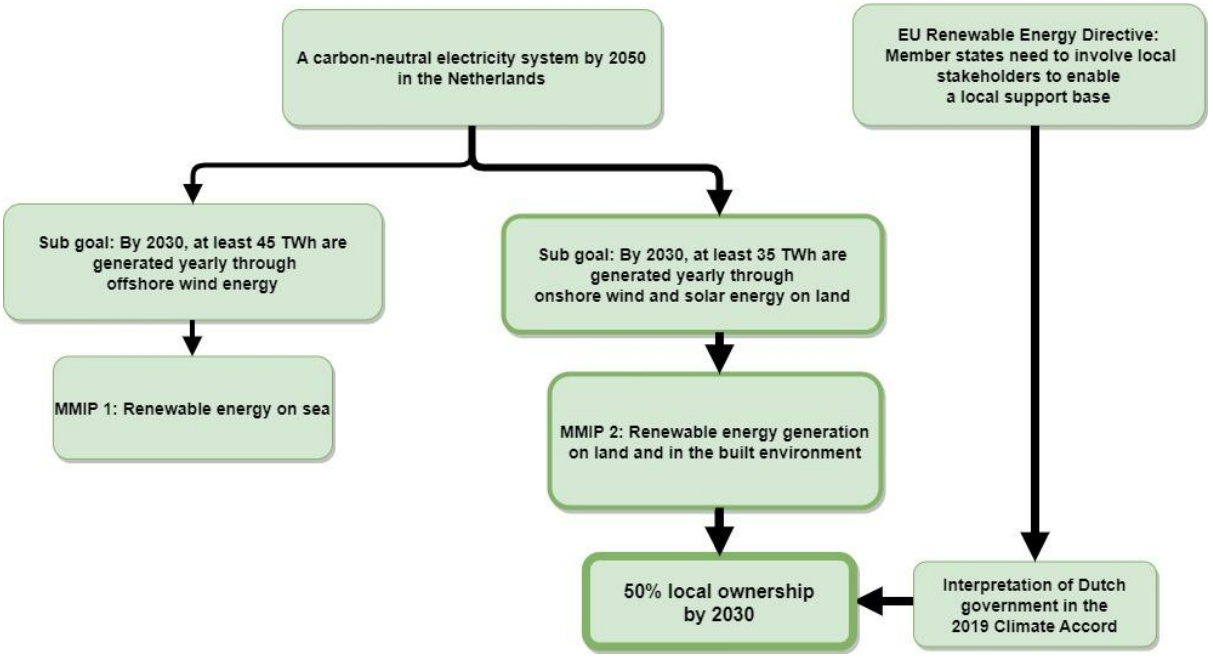

Figure 8: Overarching mission A + EU local ownership ambitions, corresponding MMIPs and the mission of research, adapted from European Commission (2018) and Climate Accord (2019)

Under MMIP 2, the mission of 50% local ownership of RSEP by 2030 was formulated by the following governmental actors: The Ministry of the Interior and Kingdom Relations and Ministry of Economic Affairs and Climate Policy, in collaboration with co-governments Interprovincial Consultations (IPO), Union of Dutch Municipalities (VNG) and Union of Water Boards (UvW). The Dutch government sees itself as a partner of the co-governments in the RES process (Ministry of the Interior and Kingdom Relations, n.d.). These actors are the commissioning parties for the National Programme RES (NP RES), which was created to support the thirty RES regions.

Ministry of Economic Affairs and Climate Policy (EZK) and Ministry of the Interior and Kingdom Relations (BZK)

The Ministry of Economic Affairs and Climate Policy (EZK) and the Ministry of the Interior and Kingdom Relations (BZK) are, as mentioned above, two of the five governmental actors that have formulated the mission of local ownership and are co-commissioners of the NP RES. In 2019, the former minister of Economic Affairs and Climate Policy stated that 50% local ownership by 2030 was a viable target, taking into account the potential growth of energy cooperatives and necessary capital (Letter to the House of Representatives, 2019). Next to setting up the mission, the ministries support local energy initiatives, monitor local ownership, but largely have shifted authority for executing of policy and monitoring of the mission to the Netherlands Enterprise Agency (RVO), and implementation of the mission to the Participatie Coalition, another important actor group of the mission arena (Letter, 2019). RVO is an agency of BZK and the Ministry of Agriculture, Nature and Food Quality (LNV) and is the commissioner for monitoring documents as described above, but also an adviser to local government on themes as participation (RVO, n.d.). RVO instructs researchers or organisations for monitoring documents on local ownership of RSEP such as the Participation Monitor (Participatie Monitor, 2021). Another monitoring document is the Lokale Energie Monitor,

executed by AS-I Search and commissioned by RVO. Furthermore, the Ministries also finance the Participation Coalition (HIER Jaarverslag, 2020).

Netherlands Environmental Assessment Agency (PBL)
Netherlands Environmental Assessment Agency (PBL) is the national institute for strategic policy on environment, nature and space (PBL, n.d.). PBL is a monitoring actor of the mission of local ownership, and has various ongoing researches related to the subject (Interviewee 6). The government, provinces, municipalities and water boards monitor the goals of the RES regions and thereby local ownership with the help of the PBL (Rijksoverheid, n.d.).

Interprovincial Consultations (IPO)
The Interprovincial Consultations (IPO) is a co-government involved in the formulation of the mission. IPO acts in the interests of all Dutch provinces in the national government and is an association for and by provinces, where the provinces are members of the IPO. IPO has an informative and guiding role during the formal preparation of policy which is of importance for the provinces, but also by knowledge- and information sharing with provincial partners and stakeholders (IPO, n.d.).

The Association of Netherlands Municipalities (VNG)
The Association of Netherlands Municipalities (VNG) is a co-government involved in the formulation of the mission. The Association of Netherlands Municipalities (VNG) is the representative of all 345 municipalities of the Netherlands. VNG acts in the interest of municipalities in a lobby form towards the Dutch Kingdom, where the VNG listens to what the bottlenecks are for municipalities on legislative and policy issues (I8).

Union of Water Boards (UVW)
The Union of Water Boards (UVW) is a co-government involved in the formulation of the mission. UVW is the overarching association of all 21 Dutch water boards, its members (UVW, n.d.). The water boards have a special position when it comes to the mission of local ownership. Water boards can be local developers as well as a subnational government that also have the job to make their own business processes more sustainable (Climate Accord, 2019).

National Programme RES (NP RES)
The National Programme RES was installed by the previously named five (co-)governments as an overarching functional organisational body, which supports the RES regions by developing and sharing knowledge, offering process support and facilitating a learning community. Through this, the programme tries to connect parties, identify bottlenecks and signal pairing opportunities to realise the ambitions (Ministry of Economic Affairs and Climate Policy, 2021). NP RES needs to give a practical interpretation of the plans made in the NOVI, which give direction to the RES regions. This is done by the formulation of guidelines. NP RES is partly a mobilising actor by acting as a supportive and coordinating body for the RES regions and stimulating the execution of the RES plans, but is also an actor that is involved in continued mission governance via monitoring and coordination (Rijksoverheid, n.d.).

The Participation Coalition

The Participation Coalition can be coined as a mobilising actor of the MIS. The Coalition consists of five parties[3] who focus on the involvement of citizens in the energy transition, and is thereby a mobilising actor in the MIS. Especially Energie Samen and HIER are considered to be the most influential mobilisation actors of this coalition. The Participation Coalition provides knowledge and examples of successful energy projects in neighbourhoods, gives practical advice on citizen participation in the RES, advice and support for involving local citizens in RSEP and forming local ownership of RSEP. The Participation Coalition also supports municipalities with advice and support on how to involve citizens. Finally, they also guide citizen collectives which are focused on making their neighbourhoods natural gas free (Participation Coalition, n.d.).

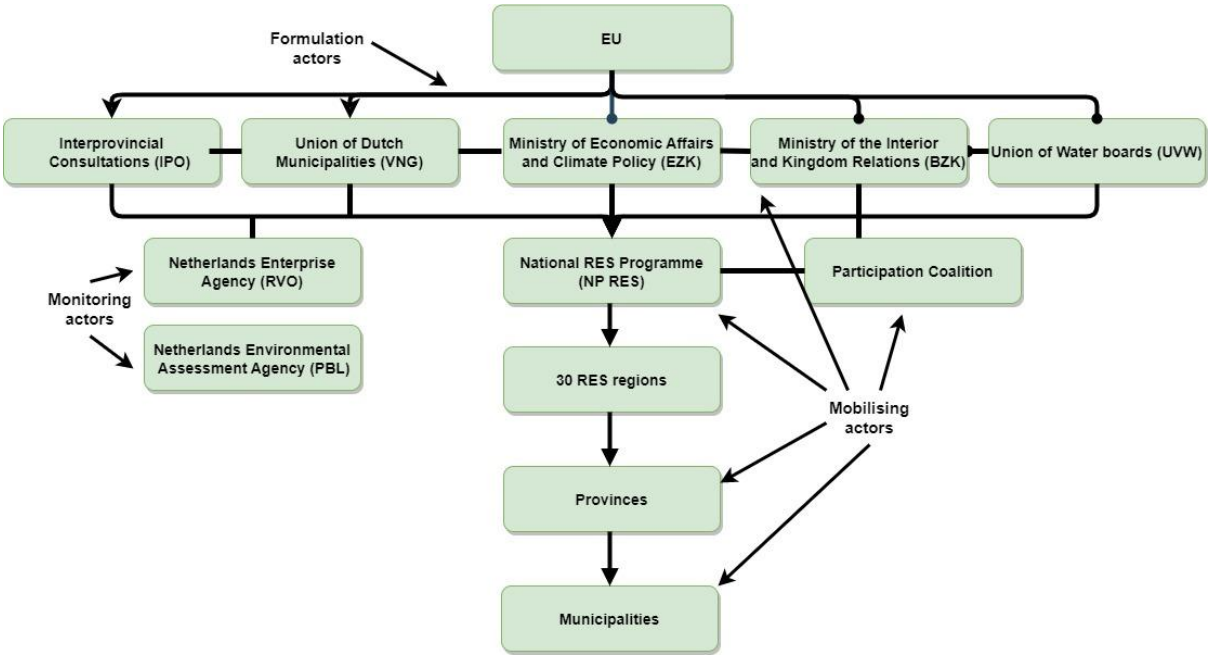

Figure 9: An overview of the mission arena actors, adapted from Participation Monitor (2021)

Provinces and municipalities

Under the RES regions, the provinces and municipalities are categorised as subnational governments. In regards to the energy transition, provinces are mostly responsible for spatial planning of RSEP and guiding the municipal level in regards to execution (Europa Decentraal, n.d.). Municipalities are seen as the ''directors'' of local ownership in the Netherlands and are granted a major executive role in the implementation of the energy transition plans decided on in the Climate Accord (Straver et al., 2020; Feenstra et al., 2021).

[3] See Appendix C for the description of all 5 parties of the Participation Coalition.

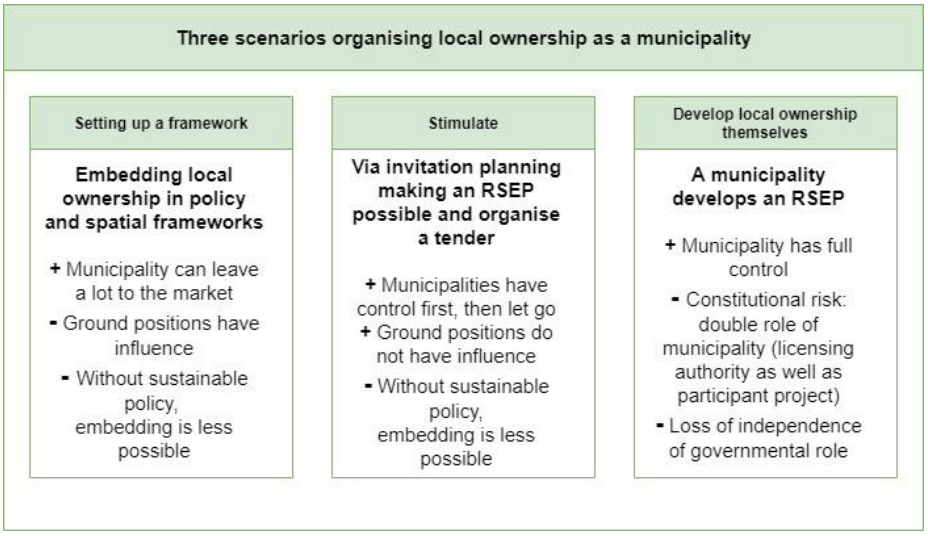

Figure 10: Three scenarios of organising local ownership as a municipality, adapted from RES West Overijssel (2021)

Three scenarios have been developed for how municipalities can implement local ownership. Scenario 1 describes the situation where the municipality solely organises local ownership by creating clear policy and spatial frameworks. Each RSEP is evaluated whether it adheres to the policy and is possibly steered towards the preferred percentage of local ownership. The legal enforcement of local ownership is limited in this scenario. Scenario 2 describes how municipalities can take a stimulating role where invitation planning is maximally steered by the municipality, by for example calling for a tender for specific locations for an RSEP, also called a ''social tender''. Here, a municipality actively takes the lead by inviting parties along a methodological way. This way, a municipality can express a preference for local parties, however local ownership cannot be made a obligatory condition. In Scenario 3 the municipality acts as the local party and becomes a developer of the RSEP. This is done by conducting an active ground policy on locations and investing money in the RSEP (RES West Overijssel, 2021).

The overall MIS

The overall MIS is *'' the actors, networks, institutions, and materiality that affect the rate and direction of both technologically and socially innovative solutions to the mission, including both supportive and opposing forces of change"* (Wesseling & Meijerhof, 2021, p. 9). Here, the more societal focus of the MIS is focused on, where it is required to study the impact of civil society, since societal challenges (such as the energy transition) impact the entirety of society (Wanzenböck & Frenken, 2020; Wesseling & Meijerhof, 2021). First, the RES will be further described in detail, since this is the overarching governance structure that was set up in relation to the mission of local ownership. This is followed by descriptions of three relevant actors (commercial energy developers, energy cooperatives and energy network operators) of the overall MIS (see Figure 11 below).

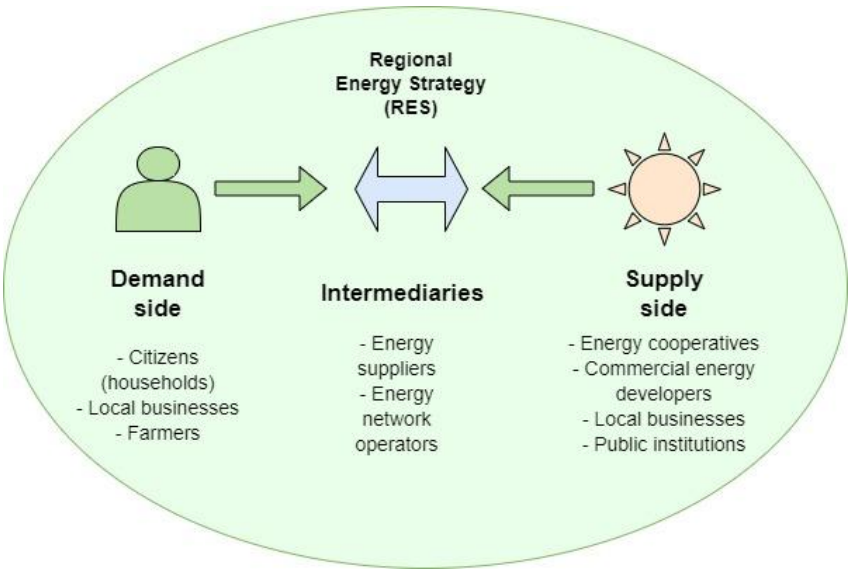

Figure 11: The overall MIS, adapted from NP RES (n.d.)

To obtain the goal of a CO2 neutral electricity system by 2050, thirty energy regions, or so-called Regional Energy Strategy (RES) regions were formulated to analyse where and how in the Netherlands sustainable energy can be best generated on land, with a focus on wind- and solar energy (NP RES, n.d.). To stimulate the energy transition and local ownership, the RES regions are seen as the most prominent elaboration and knowledge development tool in the Netherlands. In a RES region, subnational governments, i.e. provinces, waterboards and municipalities work together with energy corporations, businesses and citizens to execute the goals set up by the Climate Accord. This includes the topics of renewable energy generation on the land, the heat transition in the built environment and the necessary storage- and energy infrastructure (NP RES, n.d.). In regards to renewable energy generation on the land, each region develops its plans on how to achieve the goal of 35 TWh of the Climate Accord. With all the RES plans summed up, it should be equivalent to or more than 35 TWh in total per year (Climate Accord, 2019).

The RES has been established with four overarching goals in mind. First, as previously described, is to stimulate a societal and governmental support base for the choices in the RES. To achieve this, the mission arena actor NP RES aspires to involve various parties and governments, but the biggest focus lies on involving citizens. Second, the RES has as a goal to realise as much spatial quality as possible by translating energy plans and projects to search areas for RSEP. Thirdly, the RES aspires to strive for energy system efficiency. RES regions need to focus on coordinating the supply and demand of energy, infrastructure of energy, affordability of energy, adaptability and planning of the energy system. Finally, the RES has as a goal to contribute to achieving the quantitative goals of the RES as described in the Climate Accord (NP RES, n.d.).

RES regions

In the RES, the previously named governments work together with network operators, local businesses and citizens to implement regionally decided choices on RSEP. The implementation of the RES is under the responsibility of the municipalities as the competent authority for spatial planning. Provincial governments and municipalities cooperate with businesses and citizens to make regional choices for the energy transition in their region (Feenstra et al., 2021).

Figure 12: The 30 RES regions of the Netherlands (NP RES, n.d.)

The RES can only be successful if it involves a participatory process in which citizens and local parties are involved and activated from the start. Also, one of the goals of the RES is to keep the benefits of RSEP locally, and the RSEP should be blended carefully into the landscape with attention to local people and nature. According to the Participation Coalition, experience shows that when citizens work along on the energy transition, they in turn become ambassadors of the energy transition (Participation Coalition, 2021). The mission of 50% local ownership is gaining in importance in all RES regions (HIER & RVO, 2021), due to the possible contribution local ownership can have to create and stimulate societal involvement with the RES, and to create a regional energy plan that is formed through a participatory process together with citizens.

Commercial energy developers

Commercial energy developers are an important actor group when discussing the implementation of the mission of local ownership. In 2004, energy was privatised to stimulate competition between commercial energy developers (Essent, n.d.). Now that municipalities often express a preference for local ownership in their environmental policies, commercial energy developers are starting to feel the pressure to cooperate with energy cooperatives and facilitate local ownership (I3;I23). According to Rommert Stellingwerf, board member of two energy cooperatives, the combination between energy cooperatives and commercial energy developers has become indispensable for the instalment of RSEP. Commercial developers have the knowledge as well as the finances and networks, but cooperatives consist of volunteers from the local environment who know the needs and wants of the local environment. When these two parties seek contact in an early stadium and exchange knowledge, it is the ideal circumstances for the development of an RSEP (GroenLeven, 2022).

Energy cooperatives

Energy cooperatives are the most important implementation actor group to further describe in detail in relation to the mission of local ownership. Energy cooperatives are spread out everywhere over the country and account for 18% of the Dutch gross domestic product (Hier Opgewekt, 2018). Energy cooperatives aspire that everyone is able to partake in the energy transition, with the goal of a support base for the energy transition (Hier Opgewekt, 2020). To realise an RSEP and give ownership to citizens, a cooperative is seen as the most suitable jurisdictional entity for the organisation of citizens as owners by Dutch law, since it is an entity that has democratic control as its leading jurisdictional form (Participation Coalition, n.d.). A cooperative is an enterprise that is managed and financed by its members. All members have authority through participating in General Members Meetings about the cooperative. A cooperative is a democratic enterprise. The International Cooperative Alliance (ICA) has set out seven guiding principles[4] on how to create a well-functioning cooperative. The Dutch energy cooperatives also cohere to these seven principles (ICA, n.d.).

Energy network operators

Energy network operators are an intermediary actor group of the mission of local ownership. The Netherlands has one national network operator, which is TenneT. TenneT is responsible for the balance between supply and demand on high voltage grids and where needed, corrects imbalances on the grid. The other regional network operators are responsible for the construction, exploitation, management and maintenance of distribution grids. Network operators are also the actor group which connect producers and consumers to the grid and are responsible for the transport of energy and gas from the place of generation until the place of consumption, such as households, and manage all necessary electricity cables and gas pipelines (Netbeheer Nederland, n.d.). The energy system has always been very centralised in the Netherlands, where energy normally flows from one side namely from supply to demand. However, with the need to switch to more sustainable energy sources, and thereby the development of RSEP all across the country, the system is transforming to a more decentralised form (NP RES, n.d.). When realising local ownership, RSEP need to be able to be installed, and energy network operators play a crucial role in this process.

[4] See Appendix B for the seven guiding principles of the International Cooperative Alliance (ICA, n.d.).

5.3 System functions analysis

SF1: Entrepreneurial activities

As described in Chapter 2 (page 6), the main underlying goal of the mission of local ownership is making citizens the owner, and this is usually in the form of an energy cooperative. According to Gijs Termeer, director of the climate foundation HIER, the energy cooperative as a jurisdictional entity is increasingly becoming an important actor in the energy transition in the Netherlands. Currently, there are 676 energy cooperatives in the Netherlands. Over the past years, the growth in the number of energy cooperatives has been stagnating slowly, and the number of members of an energy cooperative is increasing steadily. This is due to the fact that in every municipality an energy cooperative is active now, hence if someone wants to become active in an energy cooperative they do not have to set up a cooperative but simply join one in their municipality (HIER & RVO, 2021). Between the years 2016 and 2021, the number of energy cooperation members has doubled to 112.000 members in 2021 (see Figure 13 below), and these energy cooperatives are active in 84% of the Dutch municipalities (HIER & RVO, 2021). The RSEP governed by these energy cooperatives generate enough energy for 380.000 households, where 65.000 is generated through an RSEP of solar energy and 315.000 through wind energy. Now that the number of energy cooperatives is reaching a stable number but the number of members is increasing, it shows that the trend is switching from quantity to quality (Hier Opgewekt, 2021). It also shows that there is a will among the public to transition to a sustainable energy system and to have an active part in this transition.

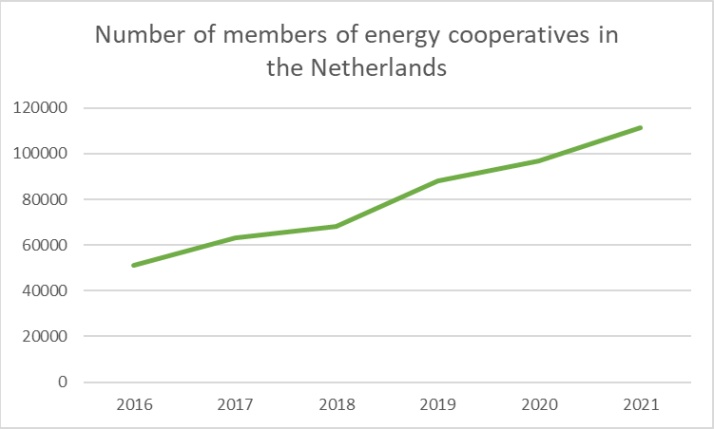

Figure 13: The growth in the number of members of energy cooperatives since 2015, adapted from HIER & RVO (2021)

In 2021, the number of RSEP which were owned by energy cooperatives has increased. Together, these RSEP generate enough energy for nearly half a million Dutch households, or 4.5% of all households. These RSEP are partly financed by the local citizens, and a large share of the profit flows back to the local environment, i.e. the local stakeholders, with a focus on neighbourhoods (HIER & RVO, 2021). However, even though the number of cooperative RSEP has increased, many interviewees (10) are sceptical about whether experiments (RSEP) in local ownership are set up quickly enough to achieve the mission of 50% local ownership in 2030. As stated by I1: *''There is still a large hole between ambition and reality''*. Many interviewees agree that there are numerous pending RSEP in local ownership ongoing, however that the rate at which these are set up is not fast enough to achieve the mission by 2030. The reasons for this are often related to other systemic functions which are not functioning well, such as SF6 (Resources mobilisation) or that priority (SF4A:

Problem directionality) is given to simply set up an RSEP without local ownership, since there is a sense of haste in relation to the energy transition and a somewhat dominating view that local ownership is just slowing down the transition. I25: *''Yes, the lead times for an RSEP are enormous, and not just the lead times, but also the financing. And if we don't tackle that problem and give cooperatives more space in terms of financing, then I am not sure whether we will achieve the mission''.*

As stated by Rotmans (2022) in his essay ''RES regions: from Goal to Movement'', insufficient time is taken by municipalities to scale up experiments such as local ownership and make them part of the governance structure of the energy system. Taking the time to scale up experiments and make them part of the system is just as important as experimenting as an activity in itself (Rotmans, 2022). Municipalities, who are the ones who grant authorisation for the development of an RSEP, should make use of the possibility of imposing a best efforts obligation, i.e. the commercial energy developer have to show how they have done their best effort to involve the local stakeholders in the process of the development of the RSEP (Hier Opgewekt, 2021). Other reasons that were named by interviewees for local ownership projects to not be developed fast enough was that sometimes realising 50% local ownership in some areas is simply not possible, since there is no willing energy cooperative or their capacity is not enough. Another reason mentioned was political reasons and lack of courage among municipalities to stimulate local ownership. Additionally, various interviewees have stated that procedures are a reason why local ownership projects are not set up fast enough. Oftentimes, interviewees name it as a problem that energy cooperatives are not involved enough yet at the start of the development of an RSEP.

SF2: Knowledge development

In the Climate Accord, the Accord mentions ''lack of knowledge'' as one of the two barriers for participation of local stakeholders, and states that initiators (e.g. energy cooperatives) need to make use of the knowledge and expertise of the Expertise centre which then needed to be set up (Climate Accord, 2019). However, what has become clear from analysing the collected data is that, since the formulation of the 2019 Climate Accord, a lot of knowledge has been developed and is available (online) on local ownership, in the form of reports, monitoring documents, fact- and worksheets and articles. Especially stakeholders such as the five involved parties in the Participation Coalition (with a focus on Energie Samen and Hier Opgewekt) have taken up the role of knowledge development of local ownership. Additionally, larger and more professional energy cooperatives are also often named in relation to knowledge creation. Many interviewees (17) have scored this function a 3 or higher.

Most interviewees state that the Climate Accord was the starting point, but some also argue that the RES is also an important governance structure which has stimulated knowledge creation on the mission. To quote I24: *''I think since the last year since the RES 1.0 has been defined and we are now working towards RES 2.0, that knowledge creation is speeding up as well as knowledge exchange about local ownership''*. Also organisations such as the VNG and NP RES are named to play an important role in relation to this function, which have a focus on bundling experiences of municipalities on local ownership and how they can incorporate local ownership in their environmental policy. Overall, interviewees did not name this function as a weak part of the system. Next to this, the right knowledge and competence is needed to make an RSEP profitable and keep it that way in the long-term. Here, professionals who have knowledge on the technical aspects of how to develop an RSEP, as well as professionals from other energy cooperatives who have previous

experience in the development of an energy cooperative are needed. Interviewees have indicated that this is an important area where knowledge is lacking in relation to local ownership.

SF3: Knowledge diffusion

Opinions about the knowledge diffusion on local ownership differ per interviewee. Some scored it relatively high, with saying that many actors and institutions of the mission arena are highly committed to knowledge diffusion, especially actors such as NP RES and the Participation Coalition. Through masterclasses, e-learnings, fact- and worksheets and events, knowledge is diffused at various levels by these actors. The level of governance that is most often named where knowledge has not been sufficiently diffused to, is the executing level of local ownership: municipalities. As I22 said: *''There is a lot of knowledge out there and stakeholders really try to share, but whether that knowledge ends up rightly with the people who need it, that is a good follow-up question''*. Various interviewees name municipal officers as the people who often know too little about local ownership and how to facilitate it. Rotmans (2022) also points out in his paper *''RES regions: from Goal to Movement''* that municipalities learn relatively little from one another and that this could be a reason why upscaling of local ownership (SF5) does not take place. Naturally, the context of every municipality is different, but often the dominant idea remains of the ''not invented here'' syndrome, meaning every municipality wants to do it by themselves in their own way which results in a missed chance of learning from experiences from other municipalities (Rotmans, 2021).

Additionally, interviewees state that more knowledge diffusion needs to take place between energy cooperatives. This way, smaller and less professional cooperatives can learn from the bigger more professional ones, to prevent having the wheel being reinvented at every municipality. This type of knowledge diffusion is happening, but needs to be stimulated even more. Lastly, knowledge about local ownership among the general public is often named by interviewees as the group of stakeholders where knowledge should be diffused. How can the number of members of energy cooperatives and their capacity grow, when the majority of people have no idea of the possibility of becoming an owner of an RSEP? Energy cooperatives try to reach as many people as possible and employ multiple communication means such as websites, newsletters, social media and send press releases. Next to this, they organise local meetings and webinars to share as much knowledge on local ownership as possible with the public (HIER & RVO, 2021). Still, many interviewees say knowledge about local ownership needs to be marketed even more to the general public. However, I2 stated in the interview that he expects that energy cooperatives can only, if they are lucky, reach 10% of the total Dutch population which already have an intrinsic motivation for sustainability. He thinks that to reach the masses, energy cooperatives need to offer a cheaper and better consumer product than regular energy, since people see a membership as a lot of work.

SF4: Providing directionality

The overarching governance structure that was set up for local ownership is the RES. The RES is seen as an instrument to organise spatial planning of the energy transition as well as the involvement of local stakeholders. One of the key challenges of achieving such a mission as local ownership is to bridge the national-local divide by translating national policy objectives into locally accepted policies (Wüstenhagen et al., 2007). Various interviewees (10) and sources mention the RES to be a bit of an additional, unnecessary governance structure, which until now has not resulted in a bottom-up movement, but rather again a more top-down approach to the energy transition (Rotmans, 2022). Also, there is no blueprint which role the RES region, the province or the municipality needs to take

in relation to local ownership (Energy Participation, n.d.). According to a research by the project Comets[5], the RES procedure demotivates energy cooperatives, since it is associated with unclear communication (Comets, 2020). Interviewees acknowledge that large efforts are made by NP RES to stimulate local ownership, however that there is still a lot that can be improved in governmental guidance. All levels of governance need to work together to enable local ownership (Energy Participation, 2021), but oftentimes interviewees state more guidance is needed at a national or provincial level, since municipalities often lack the knowledge or means to implement local ownership correctly. To quote I25: *''I would be interested in what role the national government can take, or the province. Since then, you can appoint tasks better, which could help speed up the progress. Now it is just enormous mismash, therefore it would be very good to know who has what role, and how can this role best be executed?*'' Furthermore, interviewees often state that trust in the professionality of energy cooperatives by subnational governments as well as ''political courage'' to implement local ownership is lacking.

SF4A: Problem directionality

It is clear that societal problems related to the energy transition are increasingly getting attention. This is firstly due to the clear negative impact our current energy systems are having on the climate, but the biggest reason why the energy transition is higher on the political agenda is due to the Russian-Ukrainian conflict. Ten interviewees have named the conflict as a societal problem that relates to the prioritisation of the mission's problem (the lack of support base for RSEP). Since there is a pending gas crisis, the Netherlands needs to fasten the process of making the energy system carbon neutral by 2050 (NOS, 2022) and thereby continue and fasten the development of RSEP. As said by I17: *"Crises are always a window for opportunities, and this also applies to stimulating local ownership''.* Local ownership is expected by multiple interviewees to get more attention with the formulation of the new Dutch cabinet in 2021 as well. To quote I11: *''Especially with the new cabinet, I expect local ownership to be prioritised. The situation in Ukraine, the new cabinet, Minister Jetten who put 35 billion euros in the climate fund.''*

However, some interviewees question whether the bottom-up movement of energy cooperatives (and thereby local ownership by citizens) will continue getting as much attention as before the political crisis. They argue the political situation is counterproductive to the enabling of local ownership, since they state that some parties think setting up RSEP with local ownership will slow down the energy transition, and not fasten it. However, as research has shown, to fasten the energy transition, it is crucial that the support base for RSEP is as substantial as possible (Warren & McFadyen, 2010; Musall & Kuik, 2011). In practice, cooperatives see the prioritisation of the energy transition to be a stimulans for local ownership. For example, in 2022 an RSEP in 100% local ownership (by an energy cooperative) has been set up within 14 months, and 600 people have put in 1,65 million euros. The head of the energy cooperative says this quick set up of the RSEP is due to the increased awareness about energy provision: *''People are starting to notice that they can have an effect on the energy transition. Why would we leave everything to the government and the market, when we can also arrange everything ourselves?''* (Rijnland Energy Cooperative, 2022).

[5] Comets (Collective Action Models for the Energy Transition and Social Innovation) (Comets, 2020).

SF4B: Solution directionality

As described in Chapter 2 (Table 1, page 8), there are multiple forms of local ownership. In the Climate Accord, it is simply stated that ''the local environment'' (i.e. local stakeholders) needs to have 50% ownership of RSEP, and no distinction was made about what form of local ownership should be prioritised.

In practice, the direction given by the existing system structures and the mission arena lies on the forms where citizens are involved, i.e. energy cooperatives. This is mainly due to the want of the mission to create a support base for the energy transition. As described, Involving citizens is mostly done in the context of the energy cooperative. The other forms, i.e. local ownership through public authorities or local businesses, are stimulated less by governmental actions. In practice, the most chosen form of local ownership is shared local ownership, with the 50/50 ratio of commercial energy developer and energy cooperative. This way, the strengths of both parties are combined. For example, the strength of a commercial energy developer is to provide a strong business case, and the strength of the local party is to develop a support base and to invest in the livelihood and level of sustainability of the neighbourhood. When these parties collaborate on equal foot on focus on their own strengths while doing so, the strengths of all partners are used optimally (Energie Participation, n.d.). The other forms of local ownership where citizens are not involved, are described in interviews to be a good option when the willingness of citizens to become an owner in the nearby area of an RSEP is not present, or when population density is too low. Since you cannot force ownership upon citizens, it is sometimes better to opt for a different form of local ownership and let the local stakeholders profit from the RSEP in different ways.

Some sense of contestation between what form of local ownership is preferred was also present in answers of interviewees. A quote from I20: *''Of course, when you ask someone from Energie Samen whether governments such as municipalities or waterboards are local ownership, he will not be very positive. But personally, the municipality is 100% the local ownership which you should want since they act in the name of their residents and can use the revenues for the neighbourhood. But energy is not seen as a governmental task, and that is why most municipalities do not want to have ownership over an RSEP''.* Local ownership in the exploitation phase (Variant 3) is seen as least preferable by interviews, since this does not match the description of local ownership in the Climate Accord, which describes 50% local ownership is when parties cooperate on an equal basis during development, construction and exploitation (Climate Accord, 2019). When a commercial energy developer sells an RSEP to a local party after the development phase, it will set a high price, since the developer is the one who has gone through the most risky phase.

Another important point to discuss in relation to the solution-directionality of the mission, is that there is a discrepancy in the definition of local ownership, which can be coined as a *''lost in translation*'' case. Various interviewees mix up the definition (sometimes unknowingly) with other forms of participation (i.e. financial or process), say they do not know the exact definition or state it themselves that the definition is unclear and interpreted in various ways. I7: *''That definition of local ownership in the Climate Accord is ambivalent yes, it has just been decided to say ''50%'' and to be interpreted openly. It needs to be decided in the policy framework of the municipality and when this has been decided, only then is it an established policy.''* This discrepancy in definition does not have to be negative per se. According to I2, this was to have multiple interpretations possible so different types of stakeholders would support the solution directionality of the mission and for it to be able to be included in the Climate Accord. To quote the Energie Samen interviewee: *''When you read the paragraph in the Climate Accord, you can see it is two different sentences, namely first ''in that area*

we strive for local ownership'', which means at project level, however the next sentence is that the mission is a general goal for 2030 on a national level. Well, that first sentence derives from me, and the second sentence is from commercial energy developers so they could be like, ah so it does not have to be every project of mine, as long as someone else does it, then it is weighted average. This is how you can see the text is unfinished, this way different parties can read something in it and agree with the mission, which also causes total confusion about what is exactly said in the Accord.''

It is clear that the mission acts as a ''boundary object', which is a concept that carries some shared meaning but is also open enough to be interpreted in various ways by different actors (Star and Griesemer, 1989; Nicolini et al., 2012; Janssen et al., 2022). However, from the interviews it shows this discrepancy about the definition of local ownership now results in confusion, especially among municipal officers, which can hinder effective implementation of the mission. Additionally, through the unclarity regarding the definition, commercial energy developers can also interpret in their favour, since if is monitored as a weighted national average, commercial developers can develop an RSEP with 100% ownership, and simply say that if other projects (not theirs) do meet the 50% (or more) local ownership, it will be weighed out, and there is no consequence.

SF4C: Reflexive governance

As described in the structural analysis, the mission of local ownership is monitored by various mission arena actors. Firstly, local ownership is monitored as part of the RES, by the PBL commissioned by the Ministry of Economic Affairs and Climate Policy (PBL, 2021). The first concept version of the RES (RES 1.0) was published on July 1st, 2021 and RES 2.0 is expected to be published in July 2023. RES 1.0 has stated how in the previous concept RES documents, there was too little focus on local ownership and that this was one of the specific points which needed more elaboration in RES 1.0. Since the RES 1.0, it is clear that the focus on local ownership has grown and many interviewees indicate that municipalities are actively incorporating their preference for local ownership in their policy frameworks (PBL, 2021).

Additionally, the Ministry of Economic Affairs and Climate is responsible for monitoring participation and has commissioned the Netherlands Enterprise Agency (RVO) to monitor participation annually in the form of the Participation Monitor[6]. The Participation Monitor gives insight on how substance is given to participation by local stakeholders in RSEP. In this Monitor, there is a specific focus on the status of local ownership (Participatie Monitor, 2020). The two questions that are central to the monitor are whether the mission of 50% local ownership has taken shape in practice, and whether participation contributes to more support and/or acceptance for RSEP (Hier Opgewekt, 2021). The results of the last monitor have been shared with the Dutch House of Representatives to give insights on the development of local ownership and other forms of participation. Another type of monitoring of the mission is the Local Energy Monitor (LEM), which is the annual progress report of energy cooperatives in the Netherlands, commissioned by monitoring actor RVO. The main goal of this report is to sketch a clear picture of the cooperative energy movement (HIER & RVO, 2021). The LEM is commissioned by climate foundation HIER and RVO, in collaboration with the Ministry of Interior and Kingdom relations, and executed by head researcher Anne Marieke Schwencke.

The overall consensus among interviewees is that the MIS is not on track to meet the mission. However, I7 (head researcher of LEM), states that we are actually on track to meet the

[6] The Participation Monitor is executed by researcher Annemarieke Schwencke and consultancy agency for sustainable energy Bosch & van Rijn (Participation Monitor, 2021).

mission, if you count all forms of local ownership. This shows again the discrepancy about the definition of local ownership in the answers of the interviewees, since they solemnly thought of local ownership by citizens. Granted, it is understandable that this is the first form of local ownership that comes to mind, since this is also seen as the main focal group of the mission of local ownership. However, when summing up RSEP in all forms of local ownership, the current status is that 23,8% of all RSEP with a focus on solar energy is in local ownership, and 24,3% of all wind RSEP (Participation Monitor, 2021). I2 states the same by saying: *''well 2030 I do not know, it is a bit dependent on how you count things''*. Subsequently, I2 states that he thinks the mission will not be achieved, since a lot of RSEP have already been developed and are largely in the hands of commercial energy developers. Converting those RSEP into local ownership is possible, however the most profitable phase, the development phase, is then skipped and most of the revenue of the RSEP goes to a commercial energy developer, meaning this is not a true form of local ownership as described in the Accord, which describes how an ''equal collaboration'' is key.

SF5: Market Formation

As was shown in Chapter 2 and SF1, the number of energy cooperatives has explosively grown over the past decade(s) and the number of cooperative RSEP is increasing. However, since the share of RSEP in local ownership is still relatively small (specifically by 4.4%, see Table 7 below) it is clear there is still room for upscaling of cooperative RSEP. I6 says energy cooperatives overall definitely have gained more experience over the years, but now upscaling really is the next step. I16 supports this statement by saying *''Now is the time for upscaling, while also incorporating more types of people from all layers of society''*. Upscaling is often named as a challenge for cooperatives in general (De Moor et al., 2020). According to Hufen and Koppenjan (2015), for energy cooperatives to be widely accepted by the general public, it depends on a few conditions. Firstly, the energy cooperative needs to have a comparative advantage in comparison with other energy suppliers, there needs to be a lack of complexity in terms of that it is less attractive to become a member if substantial efforts need to be done in order to participate and finally the energy cooperative needs to be compatible with the usual habits of citizens.

Table 7: Results of types of local ownership in solar and wind RSEP of total production by the end of 2020 (Adapted from Participation Monitor, 2021)

Type of local ownership	**% of total production of solar RSEP**	**% of total production of wind RSEP**
Energy cooperatives	4.4%	12.3%
Public authorities (municipalities, water boards)	4.2%	0%
Local businesses	15.2%	12%
No local ownership	75.9%	66.1%
Ownership unknown	0.3%	9.5%

In regards to the market formation of energy cooperatives, the degree of professionality of the energy cooperative matters. According to many interviewees (12), the degree of professionality varies greatly between energy cooperatives, and is definitely an important focal point that needs to be worked on for the future. Experienced cooperatives have an advantage over younger ones, since they have more members, members that have already participated in earlier projects and thereby trust their cooperative more and are satisfied with the profit (Participation Monitor, 2021). To quote I9: ''*Yes you can have all types of energy cooperatives, the diversity is great. Sometimes in a region there is a well-organised cooperative which has a lot of knowledge and expertise and accumulated capital, while in another situation there could be a cooperative which is just starting with less expertise and capacity. Then you are dealing with a completely different situation.*'' According to I22, energy cooperatives need to be organised well in order for them to be respected as an authoritative entity by other stakeholders, however due to the great variety in professionality, it is difficult to upscale local ownership. Energy cooperatives also indicate that the dependence of volunteers makes them vulnerable. When the number of RSEP increases, it also demands more from an energy cooperative. Since energy cooperatives rely on volunteers (further described in SF6), this makes scaling up a difficult process. Since the number of cooperatives as well as the number of cooperative RSEP is increasing, but the cooperative RSEP are only 4.4% of all RSEP, shows that the mission of local ownership has gotten started in terms of the number of cooperatives and members, however the true upscaling is still lacking.

SF6: Resources mobilisation

Many interviewees (14) have indicated this function to be one of the most problematic of the whole system, with the main focus on human and financial resources. In regards to human resources, a substantial problem that is often named is the voluntary nature of local ownership, correspondingly the willingness of citizens to become an owner of an RSEP. Ownership means a lot of responsibility as well as a share in risks of the project. Becoming an active member of an energy cooperative is always on a voluntary basis. Owners need to invest money and if the project fails, those who invested, lose their money. Additionally, people who live in (energy) poverty will likely not be interested in joining an energy cooperative, even if oftentimes membership costs around 10 to 15 euros per year.Next to this, owning an RSEP, and all the associated tasks consumes time. This is also one of the main reasons why the general picture of active members of an energy cooperative and their general board is depicted as old (retired), white and male. Energy cooperatives also indicate themselves that the dependence of volunteers makes them vulnerable (De Moor et al., 2020).

Next to the willingness to put time into managing an RSEP, people need to be willing to invest money. In areas where there for example is a low population density, a high level of energy poverty, a high level of reluctance towards the development of RSEP, or a low level of knowledge about the possibility of local ownership, it can be a challenge to obtain investment money to finance the 10 to 20% for the risky development phase of an RSEP (see Figure 14 below). What is also an important problem to name here, is that to be an owner of an RSEP, also means you will share risks, there is a possibility an investor will lose his or her money. This makes local ownership more complex to the general public, and thereby less attractive.

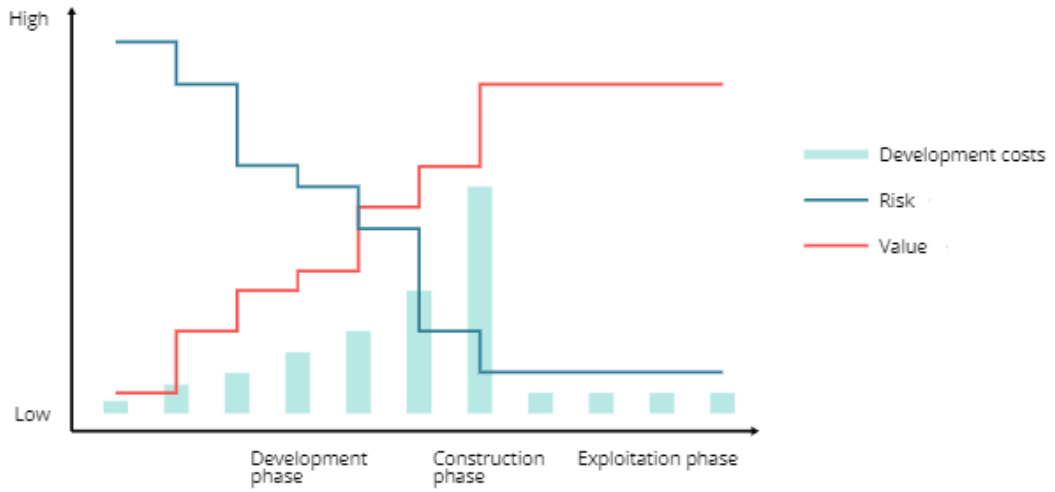

Figure 14: Risks and revenues per phase, adapted from RES West Overijssel (2021)

What was named as the most poignant problem in relation to achieving the mission of local ownership, more than human resources, is financial resources. Pre-financing costs of setting up an energy cooperative is described by the Climate Accord as the second main barrier for local ownership (next to lack of knowledge). For wind farms and solar parks, costly preliminary investigation is needed which cannot be reimbursed from investment costs when the plans of the project do not go through and a permit is not granted. Some cooperatives finance this risky development phase by themselves from revenue generated from earlier RSEP, and invest this money with permission of their members in the development of new RSEP. Another option is that they ask for new member capital from members who are willing to take that risk. The share of ownership also determines the share that needs to be invested. However, local ownership does not mean that all costs need to be invested by the members. When an energy cooperative builds an RSEP in 100% local ownership, this means that 10 to 20% of total costs need to come from equity, and the rest is financed by external financiers, mostly banks. When an energy cooperative is 50% the owner of an RSEP, the needed equity is also halved (so 5 to 10% of total costs) (RES West Overijssel, 2020). However, even though equity only has to be around 10%, to set up an RSEP, this can still mean millions of euros. It differs per type and size of RSEP, but average equity that is needed ranges from 20.000 euros to 3.5 million euros. Most cooperatives give out obligations, which is when members give out a loan to the cooperative and receive interest. These obligations vary from 50 to 500 euros.
Hard to get the money together in comparison with commercial energy developers (Hufen and Koppenjan, 2015).

According to the Dutch Association of Banks (NVB), banks finance RSEP more and more. However, in regards to innovative ownership structures such as energy cooperatives, contracts between the provider and customer are not always solid which makes the business case not convincing enough (NVB, n.d.). According to I3 (NP RES), after an energy cooperative has gotten the permit from the municipality for an RSEP and it is certain a net grid connection is possible, the risk that an RSEP is cancelled is very small. In this case, banks are benevolent towards energy cooperatives. Even though several funds and regulations have been established (these are further explained in Section Governance Actions) to support energy cooperatives, still, financing the mission is named as a remaining struggle. To quote Interviewee 2: *''it is still very unstructured, so subsidy here, subsidy there, there is no structural financing on this whole procedure, even the Development*

Fund is not for all provinces of the Netherlands. This is an aspect that could go better.'' It is clear that the government does make clear attempts to support the mission of local ownership, but that a central overarching financing structure is still missing.

SF7: Creation of legitimacy

This function scores high in comparison with the other functions, with 15 interviewees scoring this function with a 4 or higher. Almost all interviewees agreed that the lobby for local ownership is substantial, with the main starting point being the lobby of Energie Samen to include the mission of local ownership in the Climate Accord. Energie Samen is by far the party named most often in interviews in relation to lobbying for local ownership. Next to including the mission of local ownership, Energie Samen also lobbied for the creation of the Development Fund for Energy Cooperatives, a good follow-up to the Postcoderoos Regeling which has resulted in the SCE regulation to support energy cooperatives in the RES (these regulations are further described in Section Governance Actions) (REScoopnl, 2019). Also, the Participation Coalition was named frequently as an actor group that lobbies a lot for local ownership.

Opposition is described by interviewees to mostly come from commercial energy developers, who sometimes hesitantly want to work together with an energy cooperative, or, as described by I29: *''Commercial energy developers, not all of them but some, cooperate with energy cooperatives with fresh reluctance''*. It is often argued by interviewees that these developers see local ownership as a subtraction of their own profit and do not take cooperatives seriously. I2 states that he sometimes hears commercial energy developers at conferences interpret local ownership in a toned down way. According to I7, this is also the reason why the definition of local ownership is so ambivalent, so that multiple parties can find a suitable definition for themselves. Municipalities can oblige commercial energy developers to make an effort to incorporate participation in RSEP, however interviewees describe how in practice this is sometimes done incorrectly by the developers. Oftentimes, developers ask in general neighbourhood clubs with people who have nothing to do with energy cooperatives who want to participate in the development of an RSEP. It is understandable that in these types of cases, no one is interested to join in.

However, the majority of interviewees stressed that the lobby for local ownership is strong and has become a prominent point on the political agenda. In March 2022, for example, there was a large event in the Netherlands on local energy initiatives with hundreds of attendees with important public figures such as His Majesty the King, which shows the level of recognition the importance of local ownership is given (Trouw, 2022). Still, as described in SF3, energy cooperatives actively try to reach the masses, however many interviewees state that the mission of local ownership is still relatively unknown to this group. Even though mission arena actors such as NP RES and the Participation Coalition are actively focusing on knowledge diffusion of local ownership, an important problem to name is the willingness of the general public to become active in an energy cooperative. The people which are currently active are as described often retired, white and male, mainly since this group has the time, money and the interest to be active in an energy cooperative. This high level of time, money and interest is simply not present among all groups of society (e.g. think of people who live in (energy) poverty or people with a busy work schedule). Energy cooperatives also aspire to have members from all layers of society, also since this will in turn likely lead to attraction of more lobby support, since then people can identify themselves more easily with these types of groups.

Table 8: Strengths and weaknesses of each respective system function

System function	**Strength / weakness**
SF1: Entrepreneurial activity	(+) Number of energy cooperatives has explosively grown over the past 15 years (-) Setting up RSEP takes a lot of time. A wind farm for example can take around 8 years to build (and the mission's goal year is 2030).
SF2: Knowledge development	(+) Since the formulation of the mission in the Climate Accord, a lot of knowledge has been developed and made available (online) in the form of reports, monitoring documents, factsheets, articles (-) Lack of specialist knowledge on implementation of local ownership among energy cooperatives
Sf3: Knowledge diffusion	(+) Parties of the Participation Coalition focus a lot on activities related to knowledge diffusion (-) Knowledge can be better diffused to the municipal level (-) Knowledge about local ownership is not diffused (well) enough to the general public
SF4: Providing directionality	(+) Large governance structure has been set up for local ownership (RES) (-) Execution of local ownership is lacking
SF4A: Problem directionality	(+) Energy transition is prioritised more and more (-) Some interviewees argue local ownership will get less of a focus due to the idea it will slow down energy transition
SF4B: Solution directionality	(+) Interviewees state many stakeholders support the mission's solution-direction (-) Discrepancy about the exact definition of local ownership
SF4C: Reflexive governance	(+) Local ownership is closely monitored by various mission arena actors (-) Mission progress is not going fast enough
SF5: Market formation	(+) Number of cooperative RSEP has grown (-) Even though number of cooperatives is growing (as well as members), real upscaling of number of cooperative RSEP is still lacking (see Table 7)
SF6: Resources allocation	(+) Number of energy cooperative members has doubled over the past ten years (-) Mobilising people to invest in risky development phase is difficult (-) Overarching financing structure is still missing
SF7: Creation of legitimacy	(+) Strong lobby power from parties such as Energie Samen and other parties of Participation Coalition (-) Some commercial energy developers cooperate with fresh reluctance (-) Lack of willingness of citizens to become active in an energy cooperative, now only very specific group of society is often active

5.4 Analysis of presence of Design Principles for Governing the Commons

Based on desktop research and additional questions asked to interviewees who are active in an energy cooperative, the presence of the DP's of Ostrom (1990) were analysed in relation to the mission of local ownership, specifically with the focus on energy cooperatives and how these govern energy as a resource. This was done to understand which DP's are absent in relation to energy cooperatives, and could potentially form a systemic barrier to achieving the mission. Since energy cooperatives are a highly important implementation group of the MIS, it is crucial to study this bottom-up movement to see what their issues are in terms of governance and the normative nature of the mission.

Table 9: Presence analysis of DP's in relation to local ownership

Diagnostic questions on Design Principles (DP)	**Presence analysis**
DP 1: Is it clear what is the defined community of people involved in energy cooperatives? And who makes use of energy from RSEP?	Firstly, all energy cooperatives have a clear overview of who their members are. This is always documented by energy cooperatives in their statutes (I24;25;29). However, oftentimes it is unclear who makes use of the generated energy of RSEP, since the energy is sold to energy suppliers, who then add the energy to the general energy mix and distribute it among households and businesses, as was shown in Figure 2 (Value chain, p. 7) in the case description. Ideally, the generated energy is also consumed by the members of the cooperative that own the RSEP that it concerns (I16). For example, Rijne Energie is now setting up an RSEP where members will get the first possibility to obtain the generated energy of that specific RSEP (Rijne-Energie, 2022). However, by far in most cases, energy cooperatives sell their energy and do not know who ultimately consumes the energy (HIER, 2019). There are some collectives of energy cooperatives that have evolved into professional energy supply companies as well, such as Energie VanOns and OM Energie. Next to generating the energy for the local community, they supply it and do not resell it to an external energy supplier (Hier, 2019). However most energy cooperatives merely generate, and then resell the energy. Energy cooperatives do state that they can make deals with energy suppliers where their members can pay a lower price for the energy. Currently, energy is not immediately directed to the members, but in the future this could become an interesting value chain, since the energy grid is getting fuller by the day. Also, energy storage will very likely become more interesting. It was concluded that this DP does not cause a systemic barrier, since it is not seen as a problem by interviewees that it is unclear who consumes the green energy from a RSEP. It does not hamper the progress of the mission.

Diagnostic questions on Design Principles (DP)	Presence analysis
DP 2: Are the rules of the energy cooperative matched with local needs and conditions?	DP 2 is present. Energy cooperatives have as their distinctive strength that they focus on local needs and conditions, and act in favour of the local environment. Energy cooperatives are well-rooted in the local community, can mobilise goodwill and capital, have an open and transparent decision-making form, access to expertise, are not focused on fast profit, think from the importance of consensus and have an eye for local employment (Hontelez & Ittersum, 2021). Additionally, through e.g. environmental funds, energy cooperatives strive to stimulate social and sustainable goals of the neighbourhood (HIER & RVO, 2021; Participation Monitor, 2021).
DP 3: Are users able to participate in modifying the rules of an energy cooperative?	DP 3 is partly present, since this relates to DP 1, namely that often members of an energy cooperative do not equal users of the energy. Members of an energy cooperative are definitely able to participate in modifying the rules through attending general meetings (ALV's), and have a say about all decisions made by the cooperative (I7; 11; 20; 25).
DP 4: Are activities of the energy cooperative actively monitored?	Yes, DP 4 is present. Activities of the energy cooperative are always monitored by the board of an energy cooperative (I25, 29; Statutes Energie Cooperatie Loenen, 2019). Additionally, the overall status of all cooperatives are monitored well by various actors described in SF4A.
DP 5: Are there types of sanctions in an energy cooperative, and if so what kind?	Yes, DP 5 is present. Forms of sanctioning have been established in the statutes of energy cooperatives. Energy cooperatives have the authority to cancel the rights of a member in case of conflict or misbehaviour (I29, Statutes Energie Cooperatie Loenen, 2019).
DP 6: Are there means for conflict resolution within an energy cooperative?	Yes, DP 6 is present. Energy cooperatives do have means for conflict resolution, written down in their statutes (I7; 11; 20; 25, Statutes Energie Cooperatie Loenen, 2019).
DP 7: Do external government authorities recognise minimal rights of the energy cooperative to organise?	As described in the structural analysis and as was shown in the system's functions, this DP is not fully present. According to Ostrom (1990), more powerful big systems should recognise the rights to organise a small governance form such as an energy cooperative (Ostrom, 1990). External government authorities do recognise minimal rights of an energy cooperative to organise, however in practice, it shows that energy cooperatives are often not seen as a respected authority. Even though a large governance structure (RES) has been set up to stimulate local ownership, energy cooperatives are often not taken seriously, and interviewees describe that ''political courage'' is lacking to really stimulate this group and the mission. Next to this, another group in the overall MIS that also sometimes views energy cooperatives not as a respected authority are (some) commercial energy developers , which sometimes cooperate with fresh reluctance and see local ownership as a subtraction of their own profit. In conclusion, this DP creates a systemic barrier.

Diagnostic questions on Design Principles (DP)	Presence analysis
DP 8: Is responsibility built in governing energy from cooperative RSEP in all governance layers of the system?	No, DP 8 is not fully present. As was described in the structural analysis and the system's functions, responsibility is not equally built in all governance layers regarding local ownership. Municipalities have the most responsibility regarding the execution of local ownership. Various interviewees state that guidance from higher governance levels needs to be increased and that municipalities lack knowledge as well as capacity to execute local ownership well. Additionally, a large share of the responsibility lies with the uptake by local stakeholders, mainly in the form of energy cooperatives. However, since energy cooperatives are on a voluntary basis, this creates difficulty to compete with professional energy developers. More guidance from higher governmental layers is needed in the form of clear frameworks for implementation. In conclusion, this DP creates a systemic barrier.

5.5 Systemic problems analysis

After having discussed the main strengths and weaknesses of the system (Table 8, page 45), as well as having analysed the presence of the Design Principles, the most important systemic barriers are discussed in this section and their interrelatedness. A distinction is made between mission arena action barriers, barriers related to the DP's from energy cooperatives, and what are barriers of the overall MIS.

The most prominent systemic barriers are *''A missing central overarching financing structure'', ''Mobilising enough people willing to invest money into the risky development phase'', ''Lack of willingness of citizens to become active in an energy cooperative'', ''A lack of legal obligation of the mission'', ''The voluntary nature of an energy cooperative'', ''The need for professionalising of energy cooperatives'', ''Discrepancy regarding the definition of local ownership'', ''Municipalities lack guidance on execution of local ownership'',* and *''A lack of view of energy cooperatives as a respected entity by other authorities (and by commercial energy developers)''.*

With 14 interviewees scoring SF6 as the lowest function, it is clear that there are systemic barriers related to both human and financial resources. To be able to compete with other professional commercial parties, technical knowledge, a professional organisation and financial resources are required (Hufen & Koppenjan, 2015). Since being a member of an energy cooperative is on a voluntary basis, it results in a problem in human resources. Even though the non-commercial spirit and the participation of volunteers is a key aspect of cooperatives, it is also a weakness. People need to have the intrinsic motivation to be an active part of the cooperative and the willingness to invest their free time (this relates to SF7). Adding to this, as was described in the previous section, a common critique on energy cooperatives is that, even though they are a democratic entity and aspire to be a representative form of citizens, they are not seen as an inclusive group since the people who are active in the cooperative is so specific (old, retired, white, mostly male). This is a clear initiator group and should not be criticised since it is applaudable that these people invest time and money in this mission, however, energy cooperatives aspire to have active members from all layers of society, in order for people to be able to identify with the group and to in turn grow their legitimacy and total number of members. The reason that the type of people active in energy cooperatives is so specific,

is related to the voluntary nature barrier as well as financing. This brings us to the other important barrier of the MIS, namely difficulty with mobilising enough people to invest and share risk. Especially financing the development phase is the most risky, and being an owner means sharing all risks. Still, as was previously described, after it is certain an RSEP will be developed, it is a very safe investment due to the certainty of continuous energy generation.

What is also related to the voluntary nature barrier, is that the professionality level of cooperatives is often lacking, since there is a lack of people with expertise about setting up an RSEP in local ownership (SF6). To really enable the process of professionalisation, people with expertise are needed, either from the most professional cooperatives which can aid other less professional cooperatives, or supporting regional project offices. However, since an energy cooperative is on a voluntary basis and finances are a struggle, it is also a struggle to be able to hire these people or offices with specialist expertise. Some interviewees argue that active members of an energy cooperative need to be compensated, however, this also creates a new problem, since how can energy cooperatives stay close to citizens, but also become more professional? It needs to be prevented that cooperatives transform into normal companies (Comets, 2020). However, several interviewees as well as literature shows that professionalisation is now essential to enable true upscaling of energy cooperatives. Additionally, to enable professionalisation, more knowledge diffusion needs to happen between energy cooperatives. It became clear from the data analysis that also here, much can be gained from intergroup learning. Furthermore, I2 has indicated that there is a need for setting up training programs to educate people in energy cooperatives about all the phases of an RSEP and management.

Another level where knowledge is fragmentary diffused (SF3), is at the municipal level. Lack of knowledge among municipal officers is often named as a hindrance to the implementation of cooperative RSEP. This shows that, even though a lot of knowledge is developed on local ownership, it is not always rightly diffused to the municipal level. Additionally, several interviewees were in doubt whether the capacity of municipalities was enough to fully carry the execution of local ownership. It is clear that municipalities lack guidance on the execution of the mission and that responsibility regarding the mission is not evenly built in all governance layers, which relates to the absence of DP 8. This relates back to the fact that local ownership has not been made a legal obligation, since it was argued by the mobilising governance actors that you cannot oblige local stakeholders to have ownership. If a citizen or local party does not want to be the owner of an RSEP, you cannot make them. What is also connected to these systemic barriers related to the municipal level, is the fact that there is a clear discrepancy about the definition of local ownership (SF4B). Since local ownership can be interpreted in various ways, it makes it difficult for municipalities to execute it well and to prioritise what solution. This way, it is hard to draw a general structure for municipalities, since every municipality does it in their own way. What also relates to the lack of legal obligation of local ownership, is that it is still difficult for energy cooperatives to be taken seriously by higher-level authorities as a respected authority (DP 7). This also relates back to the variety in levels of professionality of energy cooperatives. Whereas in the Netherlands (and in the interviews), the overall consensus is that participation (and local ownership for that matter) cannot be made obligatory, this is actually the case in Denmark. The Danish Renewable Energy Act requires all new wind projects to be owned by at least 20% of local people (Climate Policy Info Hub, n.d.).

Besides higher-level authorities not taking cooperatives seriously, the view of some commercial energy developers regarding local ownership is also a barrier. This relates back to DP 7, which describes how smaller systems (i.e. energy cooperatives) need to be recognised as a respected

authority by other larger systems. This shows in the fact that energy cooperatives are sometimes not involved in the early stages when a shared local ownership form has been chosen, which many interviewees often named as an important issue. This relates to the idea of ''participation paradox'', where in the beginning phase of an RSEP, the level of interest by professionals, i.e. commercial energy developers as well as municipalities and provinces, is high. While the plans in the beginning phase are still abstract, overall the interest of the citizens of the area of the RSEP is still low. However when a project approaches the realisation phase, the level of involvement of citizens increases. The paradox entails that, as the RSEP progresses, the possibility to let citizens participate actually decreases (Bert Hellinger Institute, 2021). Cooperatives need to be involved from the start of development of RSEP by municipalities by creating appropriate conditions in their environmental laws for energy cooperatives and local ownership (Hontelez & van Ittersum, 2021). This relates back to the fact that local ownership is not made obligatory and that the definition is so ambivalent (SF4B), therefore it is easy for developers to make up their own rules and interpretation of the mission (for example: if it is a weighted average, developers can easier develop an RSEP without an energy cooperative.

What also became clear from the systems functions analysis (see SF4), is that the governance structure, and the division of responsibility is also causing problems. This barrier relates to DP 8, which describes that for a common to be governed properly, responsibility should be built in all layers of governance. The RES structure creates an additional governance layer, next to the already existing (sub)national government layers. Now, the municipal level has the largest responsibility, but this level often lacks the knowledge and/or capacity and is in need of clearer guidance of the higher levels of governance. This is connected to the barrier of discrepancy regarding the exact definition of local ownership. Municipalities sometimes interpret local ownership in their own way, or mix it up with the other forms of participation. This shows again that there is a discrepancy about the definition, which was first chosen so that various types of stakeholders could interpret it in their own way and for the mission to be included in the Climate Accord, however now, it is creating confusion and sometimes an interpretation by commercial energy developers that is most suitable to them, and not to local parties.

Finally, two additional systemic problems that were often named in interviews are net grid congestion and lack of space. These two are more general problems related to the energy transition, but are thereby also large systemic barriers for achieving 50% local ownership. Net grid congestion is highly often named by interviewees as one of the biggest problems of the energy transition and thereby also for local ownership. The Dutch energy network has been designed for a central production of energy, however, the energy transition is resulting in a decentralised energy system, with RSEP being built all over the country (Hufen & Koppenjan, 2015; PBL, 2021). Grid congestion happens when the demand for transportation of electricity (by consumer as well as the producer) is larger than the total transport capacity of the grid, leading to an overload on the grid system. This leads to not enough capacity on the energy grid for all RSEP to be connected. Many initiators of RSEP are unable to connect their solar- or wind farms to the energy grid or experience problems (RVO, n.d.). Actors are asking the government for more guidance (SF4), since there is a great sense of urgency for solving net congestion, plans need to be developed faster by network operators and the grid needs to be used more efficiently (Letter to the Climate and Energy Minister, 2022). Next to grid congestion, lack of space is often named as one of the biggest problems of being able to develop

enough RSEP to meet the goal of 35 TWh by 2030. The Netherlands has one of the highest population densities in the world, and many spatial assignments (Rotmans, 2022).

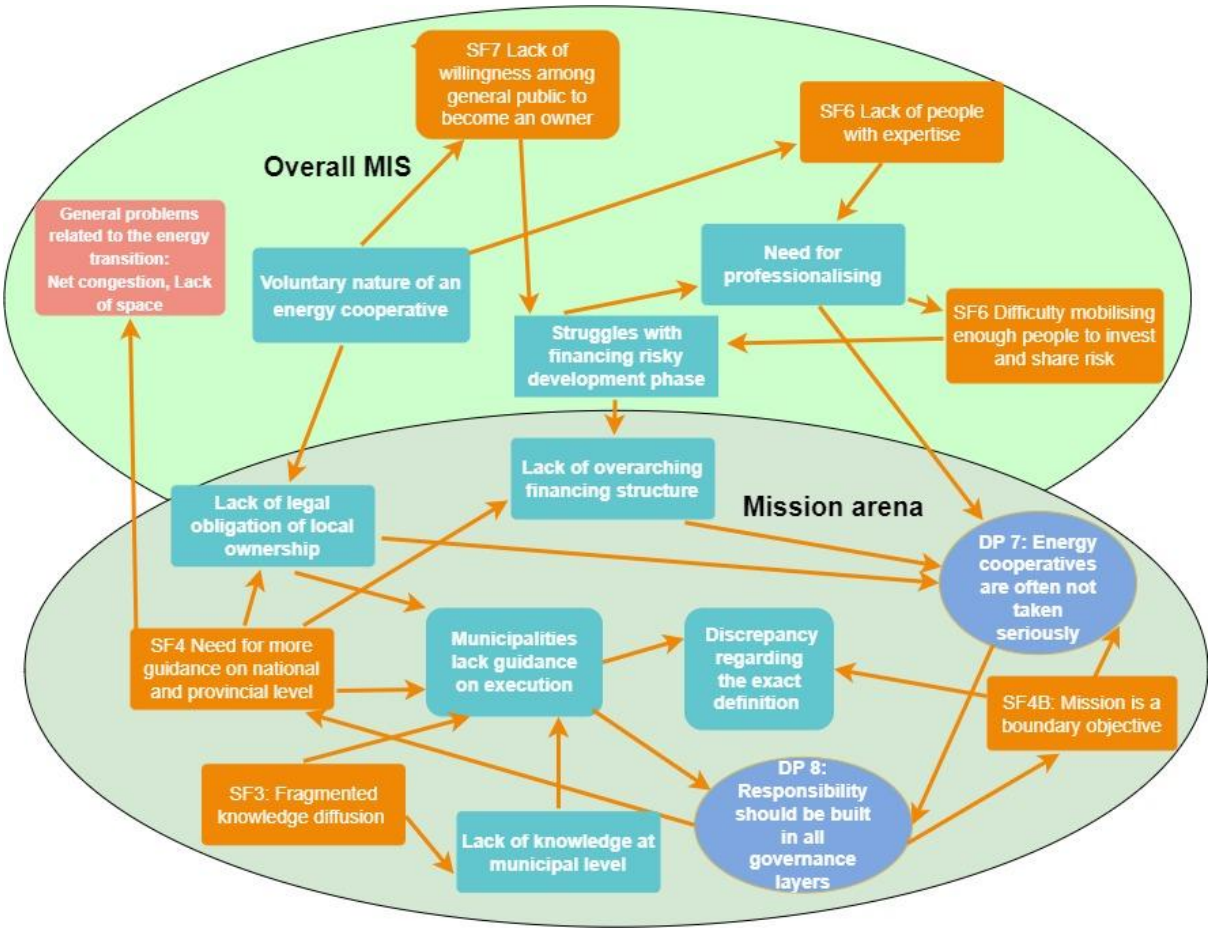

Figure 15: Causal loop diagram of the systemic barriers

Table 10: Overview of the three types of systemic barriers of the MIS

Mission arena barriers	**Design Principle (DP) barriers**	**Overall MIS barriers**
- Lack of overarching financing structure - Lack of knowledge at municipal level - Municipalities lack guidance on execution - Lack of legal obligation of local ownership - Discrepancy regarding the exact definition of local ownership	- **DP 7:** External governments (and commercial energy developers) often do not take energy cooperatives seriously as an authoritative entity - **DP 8:** Responsibility for governing local ownership is not built in all layers of the system	- Need for professionalising of energy cooperatives - Voluntary nature of an energy cooperative - Struggles with financing risky development phase - General problems related to the energy transition (net congestion, space)

5.6 Governance Actions analysis

In this last section of the Results, the mission governance actions are analysed in relation to the main identified barriers of Section 5.5.

To address the barrier *''Need for professionalising of energy cooperatives''*, more and more regional project offices are developed to aid energy cooperatives (Hier Opgewekt, 2020), and more uniting platforms are created such as the Projectcentrale, established by mobilising actor Energie Samen in collaboration with project office Energie van Utrecht and the bank Rabobank (De Projectcentrale, n.d.). Through these project offices, cooperatives can hire project leaders with professional knowledge and expertise. This way, the volunteers of a cooperative get support and will feel less worn out (Energy Participation, 2021), thereby also addressing the barrier *''Voluntary nature of an energy cooperative''.* Additionally, in the Climate Accord, it was stated that an Expertise centre Energy Transition Would be developed for local initiatives, e.g. cooperatives to enable knowledge and expertise exchange (Climate Accord, 2019), but this expertise centre has never been developed. Ultimately, it was decided that NP RES fulfils these tasks, in collaboration with RVO. In regards to actions done by the EU related to the barrier *''Need for professionalising of energy cooperatives''*, there are two different projects set up by the European Commission. In April and June 2022, the Energy Communities Repository and the Rural Energy Community Advisory Hub were launched, both to diffuse best practices for energy communities e.g. energy cooperatives, and to encourage their development through technical and administrative advice. Both advisory hubs are only implemented for a period of 24 months (European Commission, n.d.).

To address the barrier *''Lack of knowledge about local ownership at municipal level''*, the governance actor NP RES tries to facilitate knowledge diffusion as much as possible and aid municipalities in how to embed local ownership in policy. Additionally, all parties in the Participation Coalition are highly active in knowledge development and diffusion regarding local ownership, especially Energie Samen and HIER. Finally, co-government VNG focuses a lot on bundling all the experiences of municipalities with local ownership and helping municipalities on how to implement local ownership. All these parties focus a lot on knowledge creation and diffusion and are aware that it is important for the municipal level to have guidelines, therefore there is a strong focus on the creation of factsheets, best practice examples and masterclasses. More and more municipalities are embedding local ownership in their policy, and concretising their preference for what type of local ownership, therefore it is clear that governance actions are currently very targeted at aiding knowledge diffusion to the municipal level, especially with the large focus on local ownership in the RES 2.0 (West Overijssel, 2021).

This also relates to the systemic barrier ''*Municipalities lack guidance on execution'' and ''DP 8: Responsibility for governing local ownership is not built in all layers of the system''.* Next to NP RES and the Participation Coalition, RES regions also focus a lot on aiding municipalities in their region, and often seek external advice and develop roadmaps or guidelines which can help municipalities with the execution of local ownership. Additionally, the RES 1.0 has helped concretise the mission of local ownership and for all RES regions to express their goal of the percentage of local ownership they will strive for. In various RES regions[7], a social tender is often named in their RES 1.0 as an option to incorporate local ownership in municipal policy. In other RES regions[8], the option to

[7] RES regions Achterhoek, Cleantech, Arnhem Nijmegen, Noord-Veluwe en Foodvalley (PBL, 2021).
[8] RES regions Hart van Brabant, Noord and Midden-Limburg (PBL, 2021).

develop a public development company for RSEP is also sometimes named (PBL, 2021). Now, the regions are working towards RES 2.0 (needs to be ready July 1st, 2023), which focuses on the execution of the plans of RES 1.0. Mainly through social tenders, RES regions as well as provinces and municipalities try to address the systemic barrier ‘’*Lack of legal obligation of local ownership*’’ as much as possible, however interviewees do state it makes it difficult to stimulate local ownership, since there is no legal obligation. Here, an example could be taken by looking at the case of Denmark (described in the previous section). However, as became clear from the interviews, there is still a substantial need for clearer guidance from higher governance layers and a clear division of responsibility in all layers. Provinces could provide more guidance to the municipal level, ask energy cooperatives and municipalities what is needed as support and develop instruments with concrete measures to promote local ownership. Some provinces are active in this, for example Utrecht supports energy cooperatives with professionalisation through project offices, service points, and support to municipalities with legal checks by law firms, independent testing of local ownership and visualisation tools (Energie Participation, n.d.).

To address the barrier *’’Struggles with financing risky development phase’’*, various funds have been formed for energy cooperatives. The most important one is the Development Fund for Energy Cooperatives, which was developed in 2020 by EZK, InvestNL, Energie Samen and Groenfonds. This fund has made 15 million euros available for energy cooperatives in the provinces South-Holland, Utrecht, Drenthe, and Limburg to finance the most risky phase of an RSEP. Energie Samen say they expect that more regions and provinces will later join the fund (Energie Samen Annual Report, 2020). Additionally, in other provinces there are also funds available which cover risk bearing development loans as well as loans for the construction- and exploitation phase, for example the Energiefonds Overijssel or the Energy fund of Brabant. In 2020, Energie Samen has worked on financial possibilities for RSEP in the construction- and exploitation phase in collaboration with banks and investment funds, which resulted in the following three funds: Equity fund (100 million euros), Debt fund (200 million euros) in collaboration with Rabobank, Triodos and ASN and the Equity fund (500 million euros) (Energie Samen Annual Report, 2020). Also, in 2021 the Realisation fund has been developed in which three banks (Triodos, Rabobank and ASN) cooperate and help energy cooperatives during the construction- and exploitation phase. Next to funds, several regulations have been implemented to support energy cooperatives and the generation of sustainable energy, as can be seen in Table 11 on the next page. However, these financial measures do not solve every financing weakness of the mission, as can be seen in their weaknesses description.

Table 11: Regulations by the Dutch government

Regulation	**Description**	**Strength / Weakness**
Subsidy Scheme Cooperative Energy Generation (SCE)	In April of 2021, the Subsidy Scheme Cooperative Energy Generation (SCE) became operational and replaced the earlier Postcoderoos Regeling, which was a regulation imposed by the government to support cooperatives or associations who want to generate sustainable energy together. This subsidy was lobbied for by Energie Samen. The budget of the SCE is 150 million euros (RVO, 2021) and provides energy cooperatives subsidy per produced kWh for 15 years (Energie Samen, 2021). The SCE is a more simple and flexible form of the previous subsidy, which makes it more interesting for citizens to partake in an energy cooperative (PBL, 2021). The subsidy has been well received as was shown by the LEM as well as responses of interviewees. To quote I2: *''it gives energy cooperatives the opportunity to strengthen their organisation by having less of a financial worry''.*	+ The regulation is received well by cooperatives, it is more simple than its predecessor + It helps the upscaling of energy cooperatives - The lead time (half a year) between the granting of the subsidy and the moment of delivering the right of superficies and member's list (HIER & RVO, 2021)
Stimulating Sustainable Energy Production (SDE ++)	For larger RSEP, cooperatives make use of the subsidy regulation Stimulating Sustainable Energy Production (SDE) provided by the Dutch government. This regulation steers on cost efficiency, where the large RSEP are in the advantage since the subsidy stimulates to generate as much sustainable energy to the lowest possible project costs. The working group of NP RES advised to expand the SDE++ with a quality budget which is regionally deployable. It is currently still being researched if and how this can be executed (NP RES, 2021).	+ According to Topsector Energy, the Netherlands is catching up with the development of large RSEP, due to the very important stimulating role of the SDE regulation (Topsector Energie, 2019). - Large RSEP often experience more resistance from local stakeholders - Since many cooperatives realise relatively small RSEP it can be more difficult for them to make the project profitable
Salderingsregeling	Since solar panels are still relatively expensive, the government has created the Salderingsregeling, which allows households and companies to deliver generated energy back to the energy grid and can be subtracted from the energy taken from the grid, which is called ''salderen''. From 2025, the regulation will slowly be phased out until 2031, since solar panels are getting cheaper (Rijkoverheid, n.d.).	+ Helps stimulate solar RSEP - This regulation will be phased out quite soon

NP RES has advised the Dutch Enterprise Agency to adjust the SDE regulation with a framework with societal conditions for RSEP in the RES and to expand the regulation with a quality budget that is regionally deployable (NP RES, n.d.). In the Dutch Coalition Accord of 2021, the Dutch government has formulated a climate fund of 35 billion euros for the upcoming ten years for the stimulation of the energy transition, in addition to the SDE subsidy. On a side note, the Accord also states that the government wants to stimulate participation of citizens to create a support base by focusing on solar roofs, due to the lack of space for wind farms and solar parks (Coalition Accord, 2021). However, solar roofs are not incorporated as an employed technology in relation to local ownership. Overall, it is clear efforts are made to solve the financial problems related to the mission and this is effective in regards to the barrier ''*Struggles with financing risky development phase'',* but a central financing structure is still missing, taking into account the fact that the Development Fund is available in only four provinces, therefore *''Lack of overarching financing structure*'' remains an insufficiently addressed barrier.

Governance actors are also aware of the overarching systemic barrier ''*General problems related to the energy transition (net congestion, space*)''. NP RES is collaborating with TKI Urban Energy and Network Management Nederland on the development of needed innovations, next to a knowledge- and information platform that is developed around the substantial problem of network congestion (NP RES, 2021). Also, The Dutch Enterprise Agency (RVO) focuses on researching solutions for net congestion. For example, cable pooling is researched, which is when multiple RSEP are connected to one energy connection point, with direct leverage to a large consumers in its surroundings. Curtailment is another optional solution, which is when a sun installation is temporarily turned off when the production is above a certain maximum, also called ''peakshaving'' (RVO, n.d.). Dynamic returning of energy is to signal a network operator that the grid is overloaded and it is necessary to return generated energy back. According to IPKW (2022), the crux of the energy transition is energy storage, due to the high variability of energy generated by RSEP. Still, even though there are experiments with various solutions, net congestion remains a highly prominent, technical (and urgent) problem of the energy transition. In regards to the issue of space, this still remains a wicked problem in the Netherlands related to spatial planning. NP RES is researching opportunities and bottlenecks regarding space. Here, NP RES looks at the possibilities of combining spatial functions as much as possible, for example through growing certain suitable crops under solar panels, as well as stimulating solar roofs (NP RES, n.d.).

Table 12: Overview of governance actions per systemic barrier

Systemic barrier	**Mission arena's supportive mission governance actions**
Insufficiently addressed: ***Need for professionalising of energy cooperatives***	- Regional project offices are created with professional project leaders, by mission arena actors as well as non-governance actors - More uniting platforms of these regional project offices are formed - Two different expertise hubs set up by European Commission
Insufficiently addressed: ***Voluntary nature of an energy cooperative***	- Through addressing systemic barrier ''*Need for professionalising of energy cooperatives'',* this also partly addresses this systemic barrier, since it relieves volunteers partly - Still, this barrier is seen as largely unaddressed by interviewees

Systemic barrier	**Mission arena's supportive mission governance actions**
Sufficiently addressed: ***Lack of knowledge about local ownership at municipal level***	- Large focus on knowledge diffusion by NP RES, Participation Coalition - VNG focuses on bundling experiences and aiding implementation - Creation of many factsheets, guidelines, masterclasses - RES 2.0 has large focus on local ownership
Insufficiently addressed: ***Municipalities lack guidance on execution*** ***Relates to DP 8: Responsibility for governing RSEP in local ownership is not built in all layers of the system***	- Mission arena actors such as NP RES, Participation Coalition and VNG focus on creating guidelines for municipalities - Next to NP RES and Participation Coalition, RES regions focus a lot on aiding municipalities where possible Through factsheets, masterclasses - However as became clear from the interviews, there is a substantial need for more guidance to the municipal level and a clearer division of responsibility in all governance layers of the system
Unaddressed: ***DP 7: External governments (and commercial energy developers) often do not take energy cooperatives seriously as an authoritative entity***	Not addressed
Insufficiently addressed systemic barrier: ***Discrepancy regarding the exact definition of local ownership***	- Through knowledge sharing activities of actors such as NP RES and Participation Coalition, they attempt to diminish confusion around the exact definition of local ownership - However in practice, local ownership can still be interpreted in various ways, how to measure it differs and confusion remains. This barrier is largely unaddressed
Unaddressed systemic barrier: ***Lack of legal obligation of local ownership***	- Municipalities are stimulated to embed local ownership clearly in their policy (e.g. Environmental and Planning Act), through e.g. a social tender - Still, interviewees see the lack of legal obligation as a hindrance, suggesting this barrier is largely unaddressed
Addressed: ***Struggles with financing risky development phase***	- Various funds have been formed (Development Fund, Realisation fund), specifically for energy cooperatives - Several regulations also facilitate the mission, the SCE regulation that is created specifically for energy cooperatives is especially well-received
Insufficiently addressed: ***Lack of overarching financing structure***	Funds are not available everywhere, which creates uneven chances for energy cooperatives, and a clear overarching financing structure is missing according to interviewees. This barrier is insufficiently addressed
Insufficiently addressed: ***General problems related to the energy transition (net congestion, space*****)**	- NP RES collaborates with TKI Urban Energy and Network Management the Netherlands on development of needed innovations - Also a knowledge- and information platform that is developed around the substantial problem of network congestion - RVO focuses on researching solutions as well - Combining spatial functions is researched by NP RES

6. Discussion

In this section, first final policy recommendations regarding the mission of local ownership are stated, in relation to the unaddressed and insufficiently addressed systemic barriers. Then, theoretical contributions made by this research are described, as well as limitations of this research and interesting directions for future research.

6.1 Recommended policy actions

It is clear from the governance actions Section that efforts are made, especially regarding finances and knowledge diffusion, to address systemic barriers in relation to achieving the mission of local ownership. It has shown that the barriers *''Lack of knowledge about local ownership at municipal level'' and ''Struggles with financing the risky development phase''* are sufficiently addressed currently, since mission arena actors are aware of the importance of solving these barriers and adequately focus on them. The analysed systemic instruments of this research are relatively new, since the mission itself also has been formulated in 2019 (three years ago). Overall, the identified barriers of the system do not change in a few years but it is clear that previously named barriers are being adequately addressed. Also in relation to the other systemic barriers, governance action efforts have been made, but often insufficient. To achieve the mission of 50% local ownership by 2030, the following policy recommendations are made for unaddressed or insufficiently addressed systemic barriers. Additionally, two insufficiently addressed barriers are related to Design Principles, which shows how the two theories used are connected in the systemic barriers.

Table 13: Policy action recommendations

Unaddressed or insufficiently addressed systemic barrier	**Policy action recommendation**
Unaddressed systemic barrier: **Lack of legal obligation of local ownership**	Incorporating 50% local ownership in the Climate Accord was a good start and has definitely set things in motion. However, to meet the mission, it is recommended to develop a clear legal framework that governs the functioning and access to the energy market for local energy communities, such as in the case of the Danish Renewable Act (Climate Policy Info Hub, n.d.).
Insufficiently addressed: ***Central overarching financing structure***	It is recommended that the involved Dutch ministries create an overarching central financing structure to aid energy cooperatives and make this financing structure the same over the whole country. Through this levelling, all energy cooperatives get equal chances, and it also facilitates easier knowledge exchange between energy cooperatives. This will in turn also help the professionalisation of energy cooperatives.
Insufficiently addressed systemic barrier: **Discrepancy regarding the definition of local ownership**	It is recommended for the definition of local ownership to be further concretised by e.g. an evaluation taskforce, to prevent ambivalence and open interpretation, by clearly stating whether it needs to be 50% local ownership per project, or a weighted national average. This way, commercial energy developers will need to adhere to a clearer guideline set-up by the government and give municipalities clearer guidelines on execution of local ownership.

Unaddressed or insufficiently addressed systemic barrier	**Policy action recommendation**
Insufficiently addressed: **Lack of guidance on municipal level** ***Relates to DP 8:*** **Responsibility should be built for governing the common resource in all layers of the system**	It is recommended to enlarge the focus on guidance on the execution of the mission to the municipal level. Provinces could provide more support to municipalities, ask energy cooperatives and municipalities what is needed as support and develop instruments with concrete measures to promote local ownership. Some provinces are active in this, for example Utrecht supports energy cooperatives with professionalisation through project offices, service points, and support to municipalities with legal checks by law firms, independent testing of local ownership and visualisation tools (Energie Participatie, n.d.). Also, as much knowledge as possible needs to be diffused by NP RES and VNG to municipal officers regarding local ownership. As for the municipal level itself, municipalities need to focus on local ownership as much as possible in their Environmental and Planning Act, through e.g. social tenders. Here, municipalities should keep in mind the needed conditions for local ownership: cooperatives need to be professional enough to be able to handle RSEP, and municipal policy needs to provide space for cooperative RSEP. Also, it is advised that the creation of environmental funds is stimulated by municipalities, to have the local environment profit as much as possible from a RSEP. The variant of local ownership that needs to be stimulated by municipalities the most is Variant 2: ''Shared local ownership'', to combine strengths of both a local party, and a commercial energy developer. Furthermore, municipalities should prevent RSEP being bought over by an energy cooperative after the development phase, this results in uneven power balance and is a mismatch with the definition of local ownership (equal footing).
Insufficiently addressed systemic barrier: **External governments (and some commercial energy developers) often do not take energy cooperatives seriously as a respected authority** ***Relates to Design Principle 7:*** **External government authorities recognize minimal rights to organise**	It is recommended for all governance layers to take energy cooperatives seriously as a respected authority, by involving energy cooperatives in the early stages of developing an RSEP and make sure they get the same opportunities as commercial energy developers. This can also be done by stimulating and subsidising a supportive system of regional project offices which can aid energy cooperatives with needed expertise and aids the process of professionalising.

Unaddressed or insufficiently addressed systemic barrier	**Policy action recommendation**
Insufficiently addressed: **Need for professionalisation of energy cooperatives**	To further stimulate professionalisation, it is advised to develop an education programme to increase the number of people with expertise on how to develop an RSEP in local ownership. This could be a good task for NP RES. It is recommended that formulation of new energy cooperatives is to be discouraged, the numerous cooperatives that are already present all over the country need to be strengthened since there is a lot of knowledge and expertise already present in existing cooperatives regarding local ownership. Also, collaboration between cooperatives, but also partnerships with local governments (e.g. provinces and/or municipalities) needs to be stimulated as much as possible, since they share the same goals concerning renewable energy. Creating strong partnerships with municipalities is promising for energy cooperatives due to the access to legal licences, spatial reservations for renewable energy, and ownership of the energy network (Hufen & Koppenjan, 2015). Such strong partnerships can provide cooperative RSEP legitimacy which RSEP developed by commercial energy developers lack.
Insufficiently addressed: **Voluntary nature of energy cooperatives**	Through addressing the *''need for professionalising''* barrier, this barrier is also partly addressed. Still, the voluntary nature remains a difficult aspect of the mission, since it is unattractive to invest a lot of time and money in an energy cooperative when it is on a voluntary basis. Here, it is advised for the implementation mission arena actors to create a financial compensation scheme for board members, as part of the overarching financing structure. An additional recommendation is to create safety nets for energy cooperatives. As RSEP get bigger, so do the financial risks. This makes it less attractive for active members of energy cooperatives to get involved, therefore it is advised to create a safety net such as a guarantee fund. Additionally, governments could function as a guarantee for the energy cooperatives, which is done in the case of Denmark (Participation Monitor, 2021).
Insufficiently addressed: **General problems of the energy transition (net congestion, space)**	In regards to the highly complex problem of net congestion, it is advised to the Dutch government to open up the current rigid regulations around management of the grid (so network operators have more room for making changes in connections to the grid) and stimulate energy (battery) storage innovations. A final recommendation regarding the problem of space is for NP RES and RVO to continue delving into the possibility of combining spatial functions.

6.2 Theoretical contributions and future research

This research has created new insights on the mission of local ownership by analysing both the top-down as well as the bottom-up approach to the mission. By studying the commons movement of local ownership from a MIS approach (since MIPs are typically orchestrated with a top-down approach), in combination with testing the presence of the Design Principles framework in relation to energy cooperatives (bottom-up approach), the study has given new insights into how this mission needs to be guided and executed. This research has shown that, in order for the progress of this mission to be adequately stimulated, it needs to be looked at from both present governance forms, that is top-down as well as a bottom-up, and the different types of barriers related to these approaches. This is due to the normative solution directionality regarding the uptake by citizens (in the form of energy cooperatives), and can only function well if this group is aided correctly with the right systemic instruments by mission arena actors. Since citizen collectives such as cooperatives are described as an important actor group in relation to influencing the trajectories of sustainable transitions (Campos & Marín-González, 2020; Hoppe & Warbroek, 2021), it is crucial that these groups are adequately supported by (local) authorities (Haf & Robison, 2020).

Local ownership is a mission expected to be mainly reached through a strong bottom-up approach to the energy transition, but only bottom-up would highly likely not fully facilitate the energy transition, due to the need for governance incentives and instruments (e.g. regulations, subsidies, coercive instruments). Only a combination of both top-down and bottom-up can lead to a successful energy transition in the RES regions (Rotmans, 2022). Ostrom agreed on this, since she described how the higher levels of governance action are often essential to solve problems related to managing commons.

Elinor Ostrom emphasised that there is no ideal blueprint for how to govern a common and that it is dependent on the local context, and that there are no ‘’panaceas’’ or cure-all (Ostrom 1990; Harford, 2013). There are multiple real-life cases where it has shown that commons are governed sustainably, where not all DP’s were present (I15). This research has confirmed that the Design Principles for Governing the Commons are no perfect blueprint through showing that a common can be governed in a sustainable way, even when not all Principles are present. For example in this research, Design Principle 1 was not present, but this did not inhibit the functioning of energy cooperatives. In regards to such an intangible common as energy, it is not seen as a problem that it was unclear who the direct users of the generated energy of RSEP are. Additionally, I7 and I15 also described how Design Principle 5[9] is also usually not present in many empirical researches on cooperatives, and that this is often also not experienced as an issue. Still, the usage of this framework has contributed to giving new insights into how the bottom-up governance of energy can be improved in the context of local ownership, by finding that some missing Design Principles do in fact have a negative effect on other systemic functions and barriers and vice versa, as was shown in the systemic barriers section.

The importance of the role of citizen collectives is increasingly emphasised by supranational organisations such as the EU, as well as the Dutch national government in relation to achieving missions (European Commission, n.d.). This relates to the concept of polycentrism, a concept developed also by Elinor Ostrom in connection with governing the commons, which describes how local decision-making groups such as cooperatives need to be ‘’nested’’ in higher level governance

[9] DP 5: ‘’Design graduated sanctions for violators’’ (Ostrom, 1990).

structures[10]. These governance structures help make local governance efficient through providing e.g. coercion, provide an arena for negotiating which enables enforceable agreements, or to help monitor compliance in the implementation phase (Ostrom, 1990; Mansbridge, 2014). Ostrom stressed the need for so-called ''compound systems'' and for ''institutional variety'', where there are layers within layers and where large scale governance and small scale governance are embedded in and next to one another (Ostrom, 1990). Polycentric theory argues that neither ''bottom-up is good and top-down is bad'' nor that ''top-down is good and bottom-up is bad'' (Ostrom, 1990; Mansbridge, 2014), which is confirmed by the results of this research. It is argued that societal challenges are best pursued at subnational levels due to the contextual nature of problem-solving and contested nature of problem identification (Wanzenböck & Frenken, 2020), but that guidance is also needed for higher governance levels. This relates to the subsidiarity principle, which is described by the statutory law of the EU as when an objective cannot be sufficiently achieved at national, regional or local levels, it is better to be achieved at Union level (Wanzenböck & Frenken, 2020). It could be interesting for future MIS research to delve deeper into the concept of polycentrism, for example by analysing governance actions per each government level in step 5 as well as including local decision-making groups actions, and how these interact with one another.

Additionally, through combining the analysis of the Design Principles and the MIS approach, an inductive and deductive approach was used to analyse the combination between the top-down and bottom-up approach, to get a more complete understanding of the implementation of the normative mission. Researchers sometimes combine an inductive and deductive approach to answer a research question in a complementary way (Scientific Inquiry in Social Work, n.d.) and to gain new insights through looking at a topic in two different ways. The combination of these approaches was useful for this research since there is a lot of information available on local ownership but there were no concrete conclusions yet regarding an overview of systemic barriers, hence it is useful to use inductive reasoning via the MIS approach. Regarding managing commons, there is already a large theoretical basis, which makes it more interesting to test a theory here, which is done by deductive reasoning. Through this combination of the two research approaches, the research question was more adequately answered by identifying barriers in an inductive way by making generalised conclusions from the data collection, but also by deductive testing whether certain conditions (i.e. the Design Principles) are met and whether the absence of such a Principle, causes a barrier.

Through choosing the MIS approach for this research, it became apparent how the whole innovation system around the normative social mission of local ownership is structured, what the barriers are and how these are currently addressed by governance actions. The MIS approach has shown how mission arena actors and other involved stakeholders perceive the progress of the mission and whether local ownership is on track to be 50% by 2030, and highlighted the barriers related to the division of responsibility of executing and guiding of the mission among the various installed governance levels. It became apparent that missions, often set at national levels, are sometimes not well-thought out in the execution and guiding at local levels. Additionally, by studying a solution-oriented MIS instead of a traditional problem-oriented MIS, it gave the benefit of the research to be confined in its scope of the solution (Witmann et al., 2021), causing the research to be able to analyse the solution in-depth and how this solution is guided by governance actions, instead of having to focus on various solution directions and reducing . Also, this research has implemented a more summative approach, by describing the most important barriers of the system and how these

[10] Relates to DP 7: ''External government authorities recognise minimal rights to organise'', which is an application of the principle ''polycentricity'' by Ostrom (1990).

are currently targeted, instead of a formative approach. This approach was more suitable for this mission as the mission was installed three years ago, meaning governance actions are relatively new and the identified barriers of the system will likely not change in a few years. A final benefit of choosing the MIS approach for this research is that it became clear that the mission of local ownership has a predefined solution directionality, namely local ownership by citizens, as was shown in SF4B. Furthermore, a differentiation in how the mission is monitored (in SF4C) was found in this research, since there is discrepancy in how the mission's progress needs to be measured, as the mission of local ownership is a boundary objective (again SF4B). These results of the system functions SF4C and SF4B show another added value of using the MIS approach for this research, since a MIS approach incorporates an analysis of these two specific additional functions (next to the traditional system functions).

As a reflection on the relationship between state action and local initiatives, as a researcher, I noticed many interviewees seemed to agree that local ownership was important, but that other forms of participation (see Figure 3 page 10), were just as good. It was often stated that 50% local ownership was too high (the percentage), or that the reason why the focus on this type of participation is currently so high by governance actors simply is due to the mission being connected to a clear percentage (which is not the case regarding the other forms of participation). Oftentimes, other forms of participation such as process participation or financial participation are sometimes more feasible, taking into account that likely not a high percentage of the general public wants the responsibility of becoming an owner. This brings another theoretical contribution to MIS research, namely it has also shown that in this research, oftentimes the mission itself and its normative nature was critiqued. Is 50% local ownership really the right mission in regards to participation, or are other forms also accepted? For future MIS research, it could be interesting to incorporate a reflexive part in the analytical steps on whether the mission itself is viewed as valid or whether the general consensus is that it needs to be given a different shape.

Finally, for future research on local ownership, systematically examining the effectiveness of local ownership in terms of creating a support base could be interesting, since quantitative research of citizen ownership forms to the energy transition is very limited (Gorrono-Albizu et al., 2019), and this has often been named both in interviews as well as academic literature to give new insights regarding the relation between the energy transition and citizens (Top Sector Energy, 2019). Here, it is also interesting to look at how location-specific characteristics can be an influential factor, such as the landscape, population density and a prehistory with RSEP in a region (Participation Monitor, 2020). Additionally, no research has been done on opinions of Dutch citizens on the normative nature of the mission of 50% local ownership. This could give interesting new insights to examine the level of willingness among the public to become an owner of an RSEP and how governance actions could facilitate this process. This could give interesting new insights to examine the level of willingness among the public to become an owner of an RSEP and how governance actions could facilitate this process, since it is important to take into account that a democratic basis for directionality of a mission is required for successful implementation (Braams et al., 2021).

6.3 Limitations

Limitations of this research include the following. This research was based on qualitative sources of desktop research, academic literature and 30 interviews which could contain bias and needed to be interpreted by the researcher, potentially influencing reliability. Through using an interview guide, a coding scheme, and intercoder reliability check, this research has made an effort to come to generalised conclusions and limit this bias. Another limitation of this research is that local ownership is not the typical choice for a mission, since missions are usually problem-oriented, and this mission is solution-oriented with one clear predefined solution direction (citizens as owner in the form of an energy cooperative), namely stimulating a support base for the energy transition and ultimately has as a goal to reduce the CO2 emissions caused by the current energy system, as well as reducing energy poverty and increase independence of the Dutch energy system. This resulted in a different interpretation of the problems-solutions diagnosis, where instead of describing various solutions to contextual problems, the various variants of local ownership were used as to how these address contextual problems.

Also, in the system functions analysis, oftentimes guiding questions were reformulated to be directed solely at local ownership, and not the diffusion and synthesis of different solutions. The consequences of this were that the analytical steps did not follow the typical approach as is normally done with the MIS approach, as the MIS normally focuses on *''the development and diffusion of different sets of technologically and socially innovative solutions, each interacting in various way''* (Wesseling & Meijerhof, 2021, p. 4). For future MIS research, it could be interesting to determine whether the MIS approach could be constructed more clearly on also analysing solution-oriented missions, and not solely problem-related missions, since missions can differ and each mission is unique (Janssen et al., 2020; Larrue, 2021; Mazzucato, 2018; Witmann et al., 2021).

7. Conclusion

In this thesis, the research question was: ''*What are the systemic barriers to achieving the mission of 50% local ownership (specifically by citizens) of regional sustainable energy projects (RSEP) in the Netherlands by 2030 and how are these addressed by past and current systemic instruments?*'' The Mission-oriented Innovation System (MIS) of the mission '50% local ownership by 2030' was studied through the five analytical steps of the MIS approach to determine what the systemic barriers are to achieving this mission and whether these are currently adequately targeted by governance actions. Next to this, the framework of the Design Principles (DP) for Governing the Commons (Ostrom, 1990) was incorporated, to test whether these DP's are present in the context of local ownership by an energy cooperative, in regards to governing energy as a common. This way, systemic barriers were also looked at from a bottom-up perspective, next to the top-down character of the MIS approach.

Firstly, in the problems-solutions diagnosis, it was described how the mission has a focus on stimulating a support base among stakeholders for the energy transition and is part of the overarching mission of making the energy system of the Netherlands carbon neutral by 2050. Contextual problems around local ownership were described such as decrease of a support base for the creation of RSEP, the rising level of energy poverty and the Russian-Ukrainian conflict. Research shows that local ownership can stimulate independence of energy production, prevent generated revenue from RSEP to flow to foreign investors and keep profits local, and help those in energy poverty through using the generated revenue of the RSEP to invest in environmental funds and that citizen ownership does in fact contribute to a support base for the energy transition.

Secondly, in the structural analysis, the roles of various key actors of the mission arena were described, with commissioning actors being the Ministry of the Interior and Kingdom Relations and Ministry of Economic Affairs and Climate Policy, in collaboration with co-governments IPO, VNG and UVW. These actors are the commissioning parties for the NP RES, which was created to support the thirty RES regions. It is mainly NP RES that plays a large mobilising role regarding the mission, as well as the Participation Coalition. An important supranational organisation to name is the EU, which expressed the need for citizen participation in the energy transition in its 2018 Renewable Energy Directive, which ultimately led to the mission being incorporated in the 2019 Dutch Climate Accord. Thirdly, the system's functions were analysed, mainly based on the data collected through the 30 interviews, as well as through desktop research. This showed that especially SF4, SF6 and SF7 were weak functions of the system.

In step 4 and 5, the research question was answered, where the most important systemic barriers have been identified, what the interrelatedness between these barriers are, and how they negatively affect the system's functioning (as depicted in the causal loop diagram).

In these steps it became clear that the most important systemic barriers of the MIS are a missing central overarching financing structure, mobilising enough people willing to invest money into the risky development phase, the voluntary nature of an energy cooperative, a lack of legal obligation of the mission, the need for professionalising of energy cooperatives, discrepancy regarding the exact definition of local ownership, a lack of guidance on the execution of local ownership by municipalities, and a need for energy cooperatives to be recognised as a respected authority by other authorities. These barriers are often interrelated (as was shown in the causal loop

diagram, p. 51), such as how a need for professionalising relates to why energy cooperatives are often not seen as a respected authority.

In the final analytical fifth step of the MIS, current governance actions targeting systemic barriers were described. It is clear that government actors are picking up on the barriers and are making several attempts to address these, especially regarding finances, by for example creating the Development Fund for Cooperatives or the SCE regulation. Also, actors such as NP RES, the Participation Coalition and VNG focus a lot on solving barriers related to knowledge diffusion and helping municipalities embedding local ownership in their policy. However, current governance actions do not (sufficiently) address all barriers. Based of the analysis in step 5 which has mapped current governance actions to address systemic barriers, final policy recommendations for both unaddressed barriers as well as insufficiently addressed barriers have been developed on the basis of this research such as the need for a central financing structure by EZK, as well as stimulating and subsidising the creation of a supportive system through regional project offices. Furthermore, the definition of local ownership needs to be further concretised by an evaluation task force, to prevent different interpretations, to shape clear guidelines for municipalities and to have clearer directions on how to measure and monitor the mission's progress. A difficult aspect of the MIS remains involving as many people from the general public as possible, however it became clear from the interviews as well as from literature research, that due to the global changes in terms of war and climate change, people are becoming more aware and interested in the energy they consume on a day to day basis and increasingly are taking matters into their own hands.

8. References

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9. Appendix

Appendix A. Interview guide with guiding diagnostic questions

Note: This is a **general** interview guide. This guide differentiated per interviewee and was tailored to each interviewee's specific profile.

Table A: Interview guide

INTERVIEW GUIDE	
Introduction interview and personal introduction of the interviewer	**1 Who am I and introduction of thesis research** Thank you very much for this interview, I really appreciate it that you have some time to have a conversation with me. My name is Céline, I am a student of the master Sustainable Business and Innovation and I am currently writing my thesis on the mission of the Dutch government of 50% local ownership of regional sustainable energy projects in the Netherlands by 2030.
Explanation goal of the interview	This interview is mainly to gain new insights on the current situation of achieving the target of local ownership in the Netherlands. The interview will take about half an hour to an hour.
Confidentially, make clear that interview will be recorded, asking for consent	I would like to ask you whether it is possible for us to record this interview so we can transcribe it. This way I do not have to focus on writing down your answers, but listen carefully to your answers and engage in the conversation. In the transcriptions your name will not be named. This means that when a person reads our report it can not read who said what. Everything discussed in this interview will solely be used for our project and will be handled confidentially. So, I would like to ask your permission to record this interview. Are you okay with this? By saying ''I agree'' you agree with this interview being recorded .' **Start recording after consent.**
START of interview	
Subject 1: Personal Information	**1 Could you briefly introduce yourself?** (name, expertise, where you work?)
Subject 2: Questions per analytical step of the MIS and the 8 Design Principles	**Questions related to problem-solutions diagnosis** - How do different societal problems and 'wants' relate to the mission and how are these addressed by the mission? **Question related to structural analysis** - What actors, networks and institutions are involved in the mission formulation and the

Subject 2: Questions per analytical step of the MIS and the 8 Design Principles	mission implementation and how are they configured? **Questions related to system functions analysis (Score from 1-5)** *SF1: Entrepreneurial activities* - *Are local ownership experiments set up quickly enough with local ownership to achieve the mission?* *SF2: Knowledge development* - Is knowledge created fast enough about local ownership to complete the mission? *SF3: Knowledge diffusion* - Is knowledge on local ownership diffused sufficiently rapidly amongst all stakeholders, to complete the mission? *SF4: Providing Directionality* - Have the governance structures been set up to establish an influential and well-embedded mission arena, in which different stakeholder interests are reflected, to direct and help mobilise the overall MIS? *4A: Problem directionality* - Do stakeholders prioritise the mission's problem and framework conditions in relation to other societal problems? *4B: Solution directionality* - Which form of local ownership is prioritised most by governance structures? - Do stakeholders agree on the prioritised form of local ownership? *4C: Reflexivity* - Is the mission's progress monitored and is the MIS on track to meet the mission? *SF5: Market formation* - Is upscaling of local ownership going fast enough to complete the mission? *SF6: Resources mobilisation* - Are sufficient human and financial resources mobilised to fulfil the other system functions? *SF7: Creation of legitimacy* - Are stakeholders advocating or lobbying to prioritise the mission's problem over other societal problems and wants? **Questions related to systemic barriers analysis** - What do you see as the largest barriers to the mission? And what causes this? **Questions related to governance action analysis** - What are the current governmental actions to achieve the mission? - How are the barriers addressed in governmental actions?

Subject 2: Questions per analytical step of the MIS and the 8 Design Principles	**Following questions only for interviewees involved in an energy cooperative** **Questions related to the Design Principles (DP):** - **(DP 1):** Is it clear what is the defined community of people involved in energy cooperatives? And who makes use of energy from RSEP? - **(DP 2):** Are the rules of the energy cooperative matched with local needs and conditions? - **(DP 3):** Are users able to participate in modifying the rules of an energy cooperative? - **(DP 4):** Are activities of the energy cooperative actively monitored? - **(DP 5):** Are there types of sanctions in an energy cooperative, and if so what kind? - **(DP 6):** Are there means for conflict resolution within an energy cooperative? - **(DP 7):** Do external government authorities recognise minimal rights of the energy cooperative to organise? - **(DP 8):** Is responsibility built in governing energy from cooperative RSEP in all layers of the system?
Closing the interview	1 Would you like to add something? 2 Do you think there are any other subjects that are important for our interview which haven't been discussed? 3 Do you have any feedback for me regarding this interview?
What's next?	Then this is the end of our interview. As I mentioned at the beginning of this interview I will transcribe the interview, and I can send this to you, in case you would like to check if you agree with the transcription. If there is anything related to the subject that comes up after the interview or if you have any questions or remarks, you can always reach me through email. If I have any questions in a later stage of my research, would it be possible for me to contact you again via email? Or for setting up a possible short follow-up interview?
Thanking for interview	Thank you again very much for your time and your interesting insights!

Appendix B. The seven guiding principles of the International Cooperative Alliance

Table B. The seven guiding principles of the International Cooperative Alliance (ICA) (ICA, n.d.).

ICA principle	**Description of the principle**
ICA-principle 1: voluntary and open membership	Cooperatives are voluntary organisations that are open to all people of society. Any form of sexual, social, racial, political or religious discrimination is prohibited.
ICA-principle 2: Democratic control by the members	Cooperatives are democratic organisations controlled by their members, which actively take part in policy creation and decision-making. The members of the cooperative are all equal in that everyone has a say, irrespective of their contributed capital.
ICA-principle 3: Economic participation of the members	Members of a cooperative are shareholders as well as users of the rendered services. The capital of a cooperative is characterised by contributions and democratic control by the members. Members receive a limited return on their contributed capital. Next to this, the profit of a cooperative is used for one or more of the following goals: the development of the cooperative, creating reserves for the cooperative, and/or supporting other activities after approval of the cooperative's members. Here, the service for the cooperative's members is central.
ICA-principle 4: Autonomy and independence	Cooperatives are autonomic organisations that are controlled by their members. When cooperatives form deals with other organisations, including governments, such as attracting capital from external sources, then these deals are done in the way that the democratic control by their members and the autonomy of the cooperative is secured.
ICA-principle 5: Education, formation and information provision	Cooperatives provide members, executives and employees education, in order for them to truly be able to contribute to the development of their cooperative. Also, cooperatives need to inform the general public about the nature of the cooperative and its advantages.
ICA-principle 6: collaboration between cooperatives	By cooperating in local, regional, national and international structures, cooperatives strengthen the cooperative movement.
ICA-principle 7: Focus on the community	Cooperatives focus on the sustainable development of society by acting in favour of local communities. Here, profit is a means and not a goal.

Appendix C. Overview of parties in the Participation Coalition

Table C. Overview of parties in the Participation Coalition

Name of actor group in Participation Coalition	**Description**
HIER	HIER is a climate foundation. The main aim of HIER is to create a carbon neutral country, and their vision is that this is only possible if the whole society is involved. The organisation has a large focus on the development and sharing of knowledge. (HIER, 2020).
Natuur en Milieu federaties	Natuur en Milieu federaties is an organisation which aims to stimulate a nature-inclusive energy transition (NMF, n.d.).
Energie Samen	Energie Samen, which is the umbrella organisation for all energy cooperatives in the Netherlands. The main goal of the organisation is to strengthen the cooperative sustainable energy movement in the Netherlands and remove the barriers as much as possible for the realisation of collective RSEP and create good conditions for cooperatives involved with RSEP. Energie Samen also has a focus on knowledge development and -sharing, making access to finance possible energy cooperatives and functioning as an overall network organisation for energy cooperatives that connects and facilitates them. The organisation is also perceived as the knowledge institute of citizen initiatives in the energy transition (Jaarrapport Energie Samen, 2020). Additionally, it was the director of Energie Samen, Siward Zomer, who sat at the roundtable during the formulation of the Climate Accord in 2019, and who has stimulated the mission of 50% local ownership by 2030 to be included in the Accord.
Buurkracht	Buurkracht is a social non-profit initiative that has the goal to connect citizens in neighbourhoods and support them with improving the neighbourhood. The activities and the employees of Buurkracht are financed by municipalities, provinces and network energy operator Enexis. Buurkracht has developed various programmes to strengthen the position of citizens and stimulate citizen participation (Buurkracht, n.d.).
LSA Bewoners	LSA Bewoners is an association of active residents groups who are involved within neighbourhood projects. The association also has a large focus on contributing to an inclusive and social energy transition (LSA Bewoners, n.d.).

Appendix D. Interviewee numbers

Table D. Interviewee numbers

Job description / actor group	**Interviewee Number**
NP RES	3, 27
Head researcher Local Energy Monitor (LEM)	7
Participation Coalition	2, 9, 17, 19, 28
Energy cooperative	3, 12, 20, 24, 25
People involved in execution of local ownership as part of the RES	1, 26, 27
UVW	18
VNG	8
IPO	5
EZK	13
PBL	6
Assistant professor of Law and Politics of the Energy Transition	4
Professor Social Enterprise & Institutions for Collective Action	15
Municipal officer	14
JONG RES	11, 23
Commercial energy developers	21, 22
Energy supplier	16
Squarewise employee	10

Appendix E. Calculation of Krippendorff's Alpha

Table E below shows how the fragments were coded by the other three researchers for the calculation of Krippendorff's Alpha (Krippendorff, 2014). The numbers are the system functions. On the basis of this table, Krippendorff's Alpha was calculated, of which the score was sufficient (0.816).

Table E: Coded fragments used for the calculation of Krippendorff's Alpha

Fragment	**Coder 1**	**Coder 2**	**Coder 3**
1	3	3	3
2	6	6	6
3	7	7	7
4	4	4	5
5	3	3	3
6	4	4	4
7	3	3	3
8	4	4	4
9	4	4	4
10	4	4	4
11	6	6	6
12	4	4	4
13	3	3	3
14	1	1	1
15	7	7	7
16	4	4	4
17	4	4	4
18	6	6	6
19	5	1	3
20	5	3	3
21	3	3	2
22	1	1	1
23	4	4	5
24	4	4	4
25	7	7	4

26	3	3	3
27	6	6	6
28	1	1	1
29	4	4	4
30	7	7	7
31	6	6	6
32	4	4	4

```
> datafinal2 <- read.csv("Intercoderfinal.csv", sep = ';', head= TRUE)
> data4 <- as.matrix(datafinal2)
> data5 <- t(data4)
> library(DescTools)
> KrippAlpha(data5, method= "nominal")
$method
[1] "Krippendorff's alpha"
$subjects
[1] 30
$raters
[1] 3
$irr.name
[1] "alpha"
$value
[1] 0.8160183
$stat.name
[1] "nil"
$statistic
NULL
$cm
     [,1] [,2] [,3] [,4] [,5] [,6] [,7]
[1,]   18    0    1    0    1    0    0
[2,]    0    0    2    0    0    0    0
[3,]    1    2   28    0    3    0    0
[4,]    0    0    0   58    4    0    2
[5,]    1    0    3    4    0    0    0
[6,]    0    0    0    0    0   30    0
[7,]    0    0    0    2    0    0   20
$data.values
[1] "1" "2" "3" "4" "5" "6" "7"
$nmatchval
[1] 180
$data.level
[1] "nominal"
attr(,"class")
[1] "irrlist
```