THE ROLE OF TRUST IN ENERGY COMMUNITIES

Final Version – MSc Thesis Land Use Planning

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Study program: Urban Environmental Management

Date: 05-09-2024

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Abstract

The energy transition is rapidly advancing, working towards a local sustainable energy system. Energy Communities (ECs) provide opportunities for citizens to participate in the transition towards renewables while promoting locally owned energy. The ECs focus on technological aspects but especially also on the social part of the energy transition, which is also the focus of this thesis. There is currently a lot of variation between features ECs consist of, therefore was a framework used from Vega & Van Twillert (2023), distinguishing typologies like local energy cooperatives and production cooperatives, while this research added community initiatives to research. The social part focuses on collaboration between members to do collective projects, which needs trust to be successful, as described by the literature. This thesis elaborates on how trust develops and at its role for collaboration within and between ECs. In order to analyse trust, a division was made between interpersonal, institutional and inter-organisational trust, which further operationalised as well. The research was done by analysing eight cases within the three typologies mentioned, giving insights through interviews on the subtypes of trust. These insights were compared within a specific context, whereas interpersonal trust was linked to the level of participation, institutional trust on passive and active collaboration, and interorganisational trust on the dependency relation. These results were used to describe the development and role of trust within and between ECs.

Keywords: Trust, Energy Communities, Collaboration, Energy transition

Picture from title page: (European Commission, 2022)

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1. Introduction

1.1. Context

The energy transition is rapidly advancing, while the need to switch from fossil fuel to renewable energy is globally agreed upon. Technological developments provide solutions but require a transition of the current energy system (Pitt & Bassett, 2014). The general view on the transition is that it will only be successful if it includes citizen acceptance and support (Soeiro & Dias, 2020). This is also visible in multiple policy documents, which are striving for participation and local ownership (Wirth, 2014).

The Paris Agreement from 2016 states that fifty per cent of the sustainable energy generation should be owned locally by 2030, supporting local participation (Vega & Van Twillert, 2023). To put this into practice, the Clean Energy Package from the EU forms a legal framework to support collective citizen participation in the energy sector (SmartEn, 2022). The Clean Energy Package stresses the importance of collaboration among citizens for the effectiveness of renewable energy policy (Caferra et al., 2023). An Energy Community (EC) creates opportunities for citizens to participate in the energy transition (Soeiro & Dias, 2020). The Clean Energy package also stresses the benefits of ECs to make energy systems more sustainable (Blasch et al., 2021) as ECs can be beneficial for multiple sustainable development goals (Caferra et al., 2023).

The growing effort from governments in policy promoting climate initiatives is leading to technological and social innovations (Gui &MacGill, 2018). Therefore, the importance and relevance of ECs have grown over the last years, especially due to policy shifting towards decentralised and local energy systems with the fast development of renewable energy (Blasch et al., 2021; Gui &MacGill, 2018). An EC is an example of these developments, as it invests in the generation of renewable energy to cover its own local needs (Dóci et al., 2015).

The first EC in the Netherlands was already found in 1986, called the Union for Collective Ownership of windmills (Vereniging voor collectief bezit van windmolens in Dutch). The establishment of ECs was limited until around 2010 (Vega & Van Twillert, 2023). This was visible in the energy market, which was focused around large-scale generation with centralised transmission and distribution (Gui & MacGill, 2018). There have been possibilities for new market entrants, although the large operators continued to have the largest share in the energy system (Walker et al., 2010). However, in the last decade, there has been significant growth in the amount of ECs (Dóci et al., 2015; Van Der Schoor et al., 2016). Currently, there are around 714 registered ECs in the Netherlands, with 131.000 people connected to them (Vega & Van Twillert, 2023; HIER, 2023).

The emergence and increase of ECs address that people are interested in communities and engagements to act upon environmental concerns (Gui & MacGill, 2018). This was also shown in a recent survey in the EU, which showed that 61 per cent of people would be likely to join an EC if one was set up locally. Although this is a high number, is the actual number of ECs relatively small (Guetlein & Schleich, 2023). This is also visible in the Netherlands, where the total share of renewables is relatively low and most of it is placed at sea and not in the built environment (Koirala et al., 2018). However, the growing interest in ECs can be seen as a response to deficiencies in the current energy market, which has not yet been adapted to the increase of renewables (Gui & MacGill, 2018). From this perspective, a widespread vision is that the role of users should change from passive consumption to active engagement (Koirala et al., 2018; Gui & MacGill, 2018). Besides technological possibilities, there are also social opportunities like citizen empowerment and engagement in the energy sector (Blasch et al., 2021).

Technological developments are often the focus of the energy transition, although as important is the social component mostly overlooked (Dóci et al., 2015; Caferra et al., 2023; Van Der Schoor et al., 2016). An EC focuses on the social and technological aspects, characterised by a high degree of community ownership, management, and benefits in projects (Soeiro & Dias, 2020; SmartEn, 2022). Another key opportunity with ECs is to encourage people to be involved and increase social acceptance of renewable energy (Walker et al., 2010; Guetlein & Schleich, 2023). This could lead to more people taking sustainable actions and being involved in energy production and consumption (Walker et al., 2010). An EC allows people to meet their neighbours and get accepted and integrated into the community and neighbourhood (Dóci et al., 2015). To achieve these benefits, ECs require collaboration between individual citizens, which makes trust in the collective action an essential component for success (Walker et al., 2010).

1.2. Problem description

The willingness to participate is needed for collaboration between citizens within an EC, while being influenced by community identity and trust (Soeiro & Dias, 2020; Koirala et al., 2018; Yildiz et al., 2015). The identity or culture of a community mostly focusses on the perception to collaborate (Schoorman et al., 2007), being a central driver for willingness to participate including local norms and motives (Koirala et al., 2018), which can lead to putting effort into projects together (Soeiro & Dias, 2020). Trust on the other hand, is recognised as being fundamental to strengthen and sustain an EC (Walker et al., 2010). Trust is seen as a requirement for information exchange and decision-making, having a role in the coordinating system of a community (De Vries et al., 2023). Trust is therefore seen as necessary when an activity requires collaboration and coordination among multiple and diverse actors (Walker et al., 2010; Voogd et al., 2022; De Vries et al., 2023; Gui & MacGill, 2018), creating social ties and cohesion (Yildiz et al., 2015). Additionally, being necessary for developing and maintaining good relationships (Simpson, 2007), leading to organisational effectiveness (Yildiz et al., 2015). A substantial mentioning is that trust and community identity also influence each other mutually (Soeiro & Dias, 2020; Koirala et al., 2018). As ECs become larger, heterogeneity increases, making them rely less on interpersonal similarities to work together and therefore trust is needed to be effective (Mayer et al., 1995; Yildiz et al., 2015). This prominent role described in literature, when looking at collaboration within ECs, makes it therefore also the focus of this research.

As described earlier, technological aspects are often the dominant focus of research in the energy transition, though the social component is also important (Dóci et al., 2015; Caferra et al., 2023; Van Der Schoor et al., 2016). Therefore, this thesis works on the social research gap within the energy transition by looking at the role of trust within ECs. The literature provides general assumptions on the role of trust for ECs. However, these empirical studies are limited (Yildiz et al., 2015) as well as specific findings on types of trust are missing. Additionally, ECs are a relatively new concept, resulting in multiple variations with a range of features and organisational structures an EC could consist of (Gui & MacGill, 2018; Soeiro & Dias, 2020; Blasch et al., 2021; Vega & Van Twillert, 2023). Assumptions on the general role of trust within the broad definition of an EC can, therefore, miss out on specific findings on types of trust or variations within ECs.

Although the importance of trust for collaboration within ECs is notable, the existing literature does not assign an exact contribution and development of trust within ECs (Walker et al., 2010). Therefore, this thesis will investigate the role of trust within ECs more in depth to contribute to this research gap.

1.3. Research objective and question

As mentioned above, the literature show general assumptions and findings on the development of trust within ECs. However, in these cases has trust been generalised into one concept, although it has multiple components which describe different forms of trust. In general, trust has been found to be essential for successful collaboration within ECs (Walker et al., 2010). Several trust relations can be identified, like trust between members, authorities, an EC itself and other parties. Although how these trust relationships actually unfold is barely researched, while subtypes of trust were not included (Yildiz et al., 2015). Literature focused on trust show the importance of differentiating between subtypes of trust when collaborating. An example of such a distinction is interpersonal, institutional or interorganisational trust, which will be elaborated on later. In order to research these subtypes of trust in the context of collaborating within an EC, has the following general research question been formulated:

GRQ: ***"How does trust develop within and between ECs collaborating on localised sustainable energy systems?"***

The investigation of the development of trust within different ECs leads to more understanding of the process and advantages of forms of trust within ECs (Yildiz et al., 2015). This could lead to recommendations regarding features an EC should consist of to be effective, additionally understanding which components of trust have a crucial role within collaboration (Yildiz et al., 2015). This information could be useful for spatial planners, policymakers and for the existing EC, providing information to sustain and improve the EC towards a localised sustainable energy system. Additionally, can the theoretical framework on the subtypes of trust as well as the typological framework for ECs, be used for further research.

1.4. Structure

The introduction covers the concept of EC by elaborating on its relevance through political interest, history, growth, technological and social background of ECs. The problem description defines the knowledge gap, summarised by the lack of in depth research on subtypes of trust while in addition, covering the differences in features an EC could consist of. Finally, the research objective and general research question describe the scientific and societal relevance. The second part of this thesis is the theoretical framework, giving a definition to ECs and elaborating on various features it can consist of. A definition for trust is given, explaining different subtypes it can consist of. The third part is about the operationalisation of the theoretical concepts, also defining sub-research questions to find answers to the general research question. Followed by the fourth part, the methods elaborate on how these questions are researched and how data is collected and analysed. The cases are introduced in the results chapter. The main part of the results is on the analysis of the subtypes of trust, which are in the end linked to features of the cases. The discussion looks at the sub questions and discusses the main findings and limitations. The conclusion provides an answer to the general research question.

2. Theoretical framework

There is no straightforward definition for ECs. Therefore, it is hard to assign a common role of trust within ECs although being a crucial component for an EC to be effective. In this theoretical framework, a general definition of an EC is assigned, while comparing various principles from literature. Within this definition there are still multiple features an EC can still differ in, which will be elaborated on as well. Resulting in a description of typologies ECs could be categorised in.

The second part of the theoretical framework is used to define trust. This is done by giving a general description, describing factors related to trust as well as different forms of trust. Three subtypes of trust will form a base for the framework which are explained using further distinctions as well. This gives an overview of the trust relationships that can be identified.

These two parts define the fundamental concepts for this research. They are later used in the methods to structure data collection and in the results to analyse the data.

2.1. Energy Communities

2.1.1. Definition energy communities

ECs are a relatively new concept, and their popularity increased over the last decade (Dóci et al., 2015; Van Der Schoor et al., 2016). Therefore, there is currently no straightforward definition for EC that includes all forms and provides a general basis (Walker et al., 2010). In general, an EC is a social and organisational structure that enables local collective citizen ownership and management of renewable energy (Bauwens et al., 2016; Gui & MacGill, 2018). Nevertheless, the organisation and functions can distinguish between ECs although sharing a common objective. These differences between ECs also result in different terms used in literature referring to ECs, for example integrated community energy systems, clean energy communities, renewable energy communities, energy cooperatives or community energy (Blasch et al., 2021). These different names show an overlap in objectives and follow the definition given above, nonetheless their specific focus on features or characteristics can differ considerably from each other (Gui & MacGill, 2018).

The objective and focus on an EC are commonly based on the role of the community and how the energy is managed (Gui & MacGill, 2018). Although this seems straightforward, there are multiple interpretations of what a community should consist of. Blasch et al. (2021) give two principles of a community in general. First, they should be open and participatory in their process, second they should seek local and collective outcomes. ECs being open and voluntary in its participation is also interpreted by Soeira & Dias (2020) being a key requirement. As well as the main objective providing environmental, economic and community benefits for members (Soeiro & Dias, 2020), which is similar to local collective outcomes, which is also described in other literature (Van Summeren et al., 2020). The common objective for ECs is to increase renewable energy and gain local sustainability goals, but most importantly to create a democratic self-sufficient community, increasing local cohesion and resources (Van Der Schoor et al., 2016; Van Summeren et al., 2020). Although engaging in economic activities, the objective is thus not making profit but providing community benefits (Caramizaru & Uihlein, 2020; Yildiz et al., 2015).

A third requirement is that the shareholders should be natural persons or local authorities located in the vicinity of the project (Soeiro & Dias, 2020). A community would thus be based on locality with a common local geographic location as well as collective beliefs, similar lifestyles and frequent interactions are essential. Using the concept of locality, ECs distinct themselves from society and the

centre of power (Wirth, 2014)(Van Summeren et al., 2020). Although this local component seems logical, it is complex to define the scale of what is local, to be applicable to all types of EC. To avoid this problem, it can be described as the proximity to members and projects within a specific geographical location.

Based upon these principles in literature, a description of EC can be made which is generally applicable. First, an EC should be open and voluntary for participation. Second, an EC should have collective objectives consisting of environmental, economic and community benefits while focussing on renewable energy generation and consumption. Third, the organisation, authorities, members and the projects should be in the proximity of a specific geographical location.

2.1.2. Features EC

An EC can differ greatly in how they look and function. The wide variation of features, described by activities and characteristics an EC can consist of, makes it thus complex to assign a single typology to ECs (Gui & MacGill, 2018; Soeiro & Dias, 2020; Blasch et al., 2021; Vega & Van Twillert, 2023). A difference in features within ECs can be identified regarding governance, ownership participation and technology (Hoffman & High-Pippert, 2010; Soeiro & Dias, 2020; Caferra et al., 2023; Koirala et al., 2016), as well as spatial characteristics like scale and locality can differ (Gui & MacGill, 2018; Koirala et al., 2016). These five components already give a few diverse options an EC can consist of and thus will be used to explain the differences between ECs within the general definition stated earlier.

Feature 1: Governance

The decision-making process within ECs is complex and involves multiple actors at several places and influenced by multiple institutional levels (Bauwens et al., 2016). Polycentric governance is widely used to explain the governance of an EC, especially when focussing on collaboration and trust within various types of ECs (Blasch et al., 2021). Different levels of decision-making are an essential component of an EC, for example self-organisation and participation (Bauwens et al., 2016).

A democratic decision-making structure is fundamental for an EC, where regular meetings are organised to approve important decisions by members (Van Der Schoor et al., 2016). Guetlein & Schleich (2023) determined that citizens dislike large commercial investors within decision-making and do not want voting based on capital shares. A common decision making model used, which is different to these enterprise models, is the one member one vote rule (Yildiz et al., 2015). Although this system seems difficult and time-consuming, members do not perceive it like that (Soeiro & Dias, 2020). Consequently, ECs need to be based on collective objectives characterised by voluntary membership and democratic decision-making and certainly not by commercial profit initiatives (Van Der Schoor et al., 2016; Walker et al., 2010; Soeiro & Dias, 2020).

Therefore, cooperatives are the most common organisational type and are seen as the preferred model for ECs (Caramizaru & Uihlein, 2020). Cooperatives provide a democratic basis benefiting members, are non-profitable, focus on collective outcomes as well as benefitting from a legal licensing (Van Der Schoor et al., 2016; Bauwens et al., 2016; Caramizaru & Uihlein, 2020). Other organisational models present in the Netherlands are community foundations or public and private partnerships. Community foundations similarly focus on local community development, not focussing on individuals, but even broader in the community including benefits for citizens which did not invest in the projects. Public or private partnerships focus on agreements ensuring energy or other benefits to the community, this allows the distribution of responsibilities and generating profits. The governance in these partnerships is often based around the value of the share an actor has (Caramizaru & Uihlein, 2020).

Feature 2: Ownership

The type of ownership is linked to the type of activities a member participates in as well as the organizational structure. Vega & Van Twillert (2023) define three types of ownership, full ownership means having individually complete control and rights over an asset like solar panels on a roof. Partial ownership describes gaining rights and interest via shares over an asset like a wind park. The last is financial ownership, which is about having financial interest without direct ownership over the asset. Partial and financial ownership can be best linked to co-ownership in case of the members of an EC. Bauwens et al. (2016) identified that ECs should be best owned by members and not commercial investors, resulting in earnings being divided pro rata of ownership or participation and not the amount of shares. This is in line with following co-ownership models like cooperative and community ownership, which will be used in this research (Koirala et al., 2016).

The traditional energy infrastructure is built upon transmission and distribution by state owned companies, while supply and production is available for private commercial parties (Akerboom & Van Tulder, 2019). Large offshore wind farms are owned by big commercial investors, although onshore wind farms have a momentum towards co-ownership by energy cooperatives, focussing on collectively investing in renewables (Akerboom & Van Tulder, 2019). Cooperative ownership is most common in the Netherlands, where assets are owned by the cooperative, which is controlled via a democratic structure where all members are integrated (HIER & Energie Samen, 2022). Community ownership is slightly different, while assets are owned by multiple stakeholders in a less structured governing entity (Koirala et al., 2016; Yildiz et al., 2015; Caramizaru & Uihlein, 2020). A shared ownership model with cooperative ownership as well as community ownership having shares is also possible, where the assets are thus partly owned by the cooperative and local actors with local partners having shares is also possible (HIER & Energie Samen, 2022).

Feature 3: Participation

There are different activities related to an EC, for example, on the supply side, purchasing collective solar or wind, demand side activities on energy conservation and trading, even so retrofitting of dwellings or awareness raising for EC or renewable energy are ways to participate (Koirala et al., 2018; Caramizaru & Uihlein, 2020). Raising awareness seems an odd activity, yet introducing social norms and peer behaviour are recognised as potential drivers for people to participate in ECs or invest in renewables (Caferra et al., 2023; Guetlein & Schleich, 2023; Blasch et al., 2021). An active role of members is fundamental for the democratic structure of an EC (Koirala et al., 2018; Van Der Schoor et al., 2016). Eventually, the member's role is dependent on other features of the EC, differing in what is expected and which rights they acquire.

Participating in an EC could demand some time and effort from its members (Van Der Schoor et al., 2016), while active roles for citizens in bottom-up activities are required (Koirala et al., 2018; Van Der Schoor et al., 2016). The goal of an EC is to inform citizens and stimulate them to be willing to invest time and effort in community objectives, creating technical experts should not be the goal (Hoffman & High-Pippert, 2010). Participating in an EC requires more than just selecting an energy provider or individually installing PV panels, but rather participating in the collective energy production and consumption (Van Der Schoor et al., 2016). Participation should be open and voluntary and thus potential members should be able to join based around non-discriminatory criteria (Caramizaru & Uihlein, 2020), acceptance and support are essential to successfully work towards community benefits (Koirala et al., 2018; SmartEn, 2022). Participation is sustained by committing to collective objectives, and placing community needs above personal needs (Hoffman & High-Pippert, 2010).

Governmental institutions like municipalities can also participate by supporting ECs with favourable regulation, providing space, financial support or trading energy (Guetlein & Schleich, 2023). Examples of Dutch policy instruments are SDE+, PCR, NEM and SCE, which support the functioning and financing of EC (Vega & Van Twillert, 2023). It is important to mention the dependency on these supporting policy instruments are essential for EC, while often access to financial capital is the challenge (SmartEn, 2022). Therefore, the activities and typology of an EC are often related to the applicability of the supporting policy instruments. Activities of ECs are therefore also lobbying to be included in these supporting policies, while often these are focussed on individuals and not heterogeneous communities (Dóci et al., 2015; Wirth, 2014). Other activities of the ECs itself are to organise collective buying of renewables, information markets and promoting insulation of houses (Van Der Schoor et al., 2016).

Feature 4: Technology

The type of technology also impacts the structure and management of an EC significantly. Technology is often about the actual generation of energy, but it is also about the transmission and distribution of energy to meet the demands of the user (Blasch et al., 2021). The focus of energy generation is mostly on wind and solar, although heat is getting more attention as well (Vega & Van Twillert, 2023). Other options are bioenergy or mini hydro, though it can also range to energy efficiency or conservation (Gui & MacGill, 2018; Caramizaru & Uihlein, 2020).

Technologies for the transmission and distribution of the energy is described by concepts like a virtual power plant (Gui & MacGill, 2018). Although within the concept of ECs, it is still more a vision than being realised, yet it does show potential. A virtual power plant is a software-based solution that combines different distributed energy sources into a coordinated entity, this allows other activities like energy trading and management. A virtual power plant thus focuses on generation, transmission and distribution, within this, energy storage via batteries or other storages like Electric vehicles are vital (Van Summeren et al., 2020).

Another concept used is peer to peer trading (Gui & MacGill, 2018), facilitating a direct exchange system for communities (Hahnel et al., 2020). This is based around supply and demand being more balanced, while prices when energy is scarce will rise and the other way around. This could lead to more investment in renewables and storage as well as lowering demand peaks and energy costs overall (Hahnel et al., 2020; Parag & Sovacool, 2016). Members of a peer-to-peer trading community can either maximize their financial benefits or be self-dependent in when to use energy (Hahnel et al., 2020; Ecker et al., 2017). Although within an EC, it is crucial that members deliver their stored energy to others when energy is scarce (Ecker et al., 2017).

In practice, the focus of ECs is mostly on renewable energy production (Koirala et al., 2016), where different technologies can influence the role of how a member participates. Transmission and distribution is currently rather niche, nonetheless mostly all concepts would require active participation from members (Van Summeren et al., 2020). Eventually the purpose of technology within ECs can be best described by a better coordination between energy production and storage, fulfilling the communities demand (Koirala et al., 2016).

Feature 5: Locality & scale

Spatial characteristics of an EC are mostly described by locality and scale. Locality for an EC is mostly about two components, whether the energy is locally produced and consumed. Determining locality is complex and has several definitions (Willcox, 2016), most simple explanation is whether something is close to the members of the EC. Therefore, the members have to live somewhat in proximity to each other to produce and consume locally. Locality is seen as a requirement for partnerships in energy

projects, while it is needed to focus on local needs, local sources and community benefits (Caramizaru & Uihlein, 2020).

The main focus of ECs is often on energy generation, despite that everyone also consumes energy. Local generation as well as local consumption is essential, to achieve this, local communities should be in the proximity of the energy projects (Caramizaru & Uihlein, 2020). Local consumption is needed, especially while the extensive increase of renewables in the current energy system could cause problems to the electricity grid. The current grid is made for a stable supply and not for a fluctuating supply by renewables (Dóci et al., 2015). Therefore, local consumption could be a solution to minimize large restructuring of the grid. Produced energy should be consumed within the community after being produced (Knirsch et al., 2019; SmartEn, 2022; Van Der Schoor et al., 2016; Koirala et al., 2016), flexibility would be needed to operate this new decentralised energy system (Blasch et al., 2021). A prominent role for ECs could be a solution to achieve this (Knirsch et al., 2019; Blasch et al., 2021; SmartEn, 2022).

The locality of an EC is also related to its scale, in which they can vary significantly, it can consist of a few local households in a building block or street to thousands of households and businesses scattered around a large area (Gui & MacGill, 2018; Koirala et al., 2016; Caramizaru & Uihlein, 2020). Because of this differences in scale, it can be discussed whether ECs could scale up to have a large share in the energy transition (Van Der Schoor et al., 2016), which asks for a large scale transformation of the system (Dóci et al., 2015). The general focus on technological developments (Dóci et al., 2015) impacts the scale of renewable energy projects. For example, the growing size of wind turbines and wind parks makes policy more complex, consequently complicating participation and local ownership, discouraging ECs in favour of big commercial actors (Bauwens et al., 2016; Wirth, 2014). Upscaling of ECs could be beneficial, while small-scale players are often more vulnerable to external impacts (Bauwens et al., 2016). Another benefit of upscaling for an EC, is that it would add more consumption sources and generation options, which increases the flexibility (Koirala et al., 2016). Upscaling is possible when financial and community benefits can be shown, as well as how to avoid failures (Blasch et al., 2021).

The network theory states that a small cohesive community in a dense network increases trust and cooperation, but controversially, high density and homogeneity can limit upscaling (Gui & MacGill, 2018). The heterogeneity of the members of a community is thus a fundamental aspect of scale, being measured in location, size, technology and motivations (Dóci et al., 2015). ECs are currently growing in size, this results in more complexity and heterogeneity (Yildiz et al., 2015), which makes it difficult to sustain the local component of an EC (HIER, 2023). There is no straightforward most-effective measure on how related members need to be with each other, they can be closely related or have varied socioeconomic backgrounds. They could even have different interests, as long as they share a common objective within the EC (Gui & MacGill, 2018).

2.1.3. Typologies EC

In order to categorise the variations in features within the definition of an EC, can typologies be used to structure the differences. There are several typological frameworks defined in literature, which are mostly single focused around technology or activities (Yildiz et al., 2015). Yildiz et al. (2015) themselves made a difference between production cooperatives, distribution cooperatives and trading cooperatives, which is solely focused on dominant activity of the EC. A more technological and proximity focus typology is described by Gui & MacGill (2018), stating typologies based upon the location with the connection to the grid and member relations. But these specific focuses make them less applicable, therefore a more wide focus typology is needed.

Vega & Van Twillert (2023) describe different typologies based around the location and functioning of ECs applicable to the Netherlands, which makes it useable to apply in this thesis. A difference is made between local energy cooperatives, production cooperatives and cooperatives of cooperatives. These three forms are all cooperatives, meaning that they are juridically registered, while working towards a collective objective (HIER & Energie Samen, 2022). A fourth typology can be added, called community initiatives, which follows a similar description but is not juridically registered (HIER, 2023). These four typologies are further elaborated on in the following part.

Type 1: Cooperatives of cooperatives

The first typology, cooperatives of cooperatives consist of alliances between ECs and operates as a knowledge centre to learn from each other (Vega & Van Twillert, 2023; HIER & Energie Samen, 2022). Thus the members are other local ECs with specific geographic locations, while this umbrella organisation can be organised in a larger area (Yildiz et al., 2015; HIER & Energie Samen, 2022). The scale of the collaboration between these individual cooperatives can vary from regional to national level (HIER, 2023). The cooperatives of cooperatives support the ECs with knowledge on marketing, communication and innovation as well as upscaling. They can also buy energy from the ECs and distribute it to the members or other partners, this is done without a profit making objective (HIER, 2023).

Type 2: Local energy cooperatives

The second typology is local energy cooperatives, which is the most common, consisting of households and businesses doing multiple activities and projects focussing on their local neighbourhood (Vega & Van Twillert, 2023; HIER & Energie Samen, 2022). This primary focus on the local energy demand of the community is the main requirement for this typology, striving towards collective environmental and community objectives. The geographical area can differ from neighbourhood to regional scale, thus a local description is necessary. The members of the EC are citizens and businesses (HIER & Energie Samen, 2022). Local energy cooperatives also work together with other ECs on larger projects within their proximity, which could result in fusing into one EC (HIER, 2023).

Type 3: Production cooperatives

Production cooperatives is the third typology, focussing on the development of one project or on multiple projects of the same type (Vega & Van Twillert, 2023; HIER & Energie Samen, 2022). The focus is solely on the production of energy, often via large solar roofs but also wind parks. Because the focus is not necessarily on local consumption, the spatial location is not dependent on proximity to members, having a neighbourhood to regional scale. The members are citizens and businesses as well, which collectively invest in renewable energy. Production cooperatives can also be related to local energy cooperatives, which want to separate their production from consumption and other activities (HIER & Energie Samen, 2022).

Type 4: Community initiatives

The last typology is community initiatives, describing a collective initiative by citizens to collaborate in the sustainability of their local energy production and consumption (HIER & Energie Samen, 2022). As described earlier, this is done without a juridically registered form like a cooperative, therefore they are less visible and smaller (HIER, 2023). The scale of the initiatives vary from street to neighbourhood level, but with a clear local community focus (HIER & Energie Samen, 2022). Activities these initiatives focus on are energy production as well as energy saving and distribution, this is done through collective purchasing, while awareness raising is a vital part (HIER & Energie Samen, 2022; HIER, 2023). A difference with the energy cooperatives is that the location of the energy projects is often on individual household level instead of a collective project for multiple citizens, although this division is

overlapping. The community initiatives are often the beginning of energy cooperatives, while already also receiving support from other ECs and institutions (HIER, 2023).

2.1.4. Features related to typologies

The typologies described can differentiate in their features but there is also overlap. In order to have a clear picture of their differences, a general overview is made in Table 1. This table includes the four typologies and the features governance, ownership, participation, technology and locality & scale. It is important to note that some deviation from these findings are still possible within the typologies, while it gives the most common feature per typology. The features that are coloured green in the table show overlapping features between typologies, resulting in some similarities despite their differences.

	Cooperatives of cooperatives	**Local energy cooperatives**	**Production cooperatives**	**Community initiatives**
Governance	Cooperative model (juridically registered), members are EC	Cooperative model (juridically registered), members are citizens and businesses	Cooperative model (juridically registered), members are citizens and businesses	Public or private partnerships (not juridically registered), members are citizens
Ownership	Cooperative ownership	Shared cooperative & community ownership	Shared cooperative & community ownership	Community ownership
Participation	Members can use knowledge and learn from each other	Members can do collective purchasing, energy distribution and raising awareness	Members can do collective purchasing	Members can do collective purchasing, energy distribution and raising awareness
Technology	Energy trading and management	Local renewable energy production and consumption	Renewable energy production	Local renewable energy production and consumption
Locality &	Not local related,	Member proximity focus	Local but no proximity focus,	Member proximity focus
Scale	National to provincial scale	Neighbourhood to regional scale	Neighbourhood to regional scale	street to neighbourhood scale

Table 1, general overview of typologies and their corresponding features, overlapping features are coloured green.

2.2. Trust

2.2.1. Definition of trust

Collaboration is a fundamental aspect of an EC, while it is mostly about working together to realize certain environmental and community goals. Mayer et al. (1995) state that collaboration is connected to people depending on others to achieve personal or organizational objectives. Depending on others to do what you expect, is significantly based on trust, which therefore is a key component of an EC. Trust can be defined by expecting certain competencies and goodwill from the trustee to perform, while the trustor can have negative consequences if agreements are not met (Voogd et al., 2022). This is further conceptualised by Hardin (2002), defining trust by a subject of trust (A), trusts the object (B), concerning matters (X), which is widely used (Voogd et al., 2022; Bauer, 2021; Simpson, 2007). The subject of trust can be described as the trustor, for example a member of the EC, which has a certain amount of trust in an object of trust. This object of trust can be another member but also an institution, where the concerning matters can be the functioning of them. The definition from Hardin (2002), thus provides a useful base for understanding trust in general, however can also be used to understand different subtypes of trust and factors influencing trust.

Although a simple conceptualisation is generally useable, it does not always bring the full picture. As the factors of specific context and time are also influential for a trust relationship (De Vries et al., 2023; Bauer, 2021). Trust can develop over time, for example by the outcome of trust in a trustee, resulting in their actions corresponding to what was expected (Bauer, 2021). The context is taken into account while looking into the community identity influencing the willingness to collaborate with each other (Soeiro & Dias, 2020).

2.2.2. Development of trust

Developing trust is not straightforward, while benefits from trust are often in a reciprocal relationship being a basis for trust (De Vries et al., 2023). This is for example applicable to cooperation, trust improves cooperation and cooperation improves trust (Bauer, 2021; Mayer et al., 1995; Walker et al., 2010; De Vries et al., 2023; Gui & MacGill, 2018). Also, information exchange and trust are in a complex relationship because trust can facilitate interaction as well as interaction is needed to build trust. Adding to that, a lack of trust can limit information exchange but the need for information exchange can be limited by too much trust (De Vries et al., 2023), making it a difficult balance to the right amount of trust. Eventually, the general vision is that successful actions and showing goodwill to participate, helps building trust (Schoorman et al., 2007; Luhman, 2000).

Risk is a fundamental factor for trust, as without risk trust would not be needed, it is only required if a failed outcome would have negative consequences (Luhman, 2000; Johnson-George & Swap, 1982). The willingness to take risks is thus a measurement of trust (Schoorman et al., 2007), the trustor can avoid risk by not participating although then also dismisses the associated benefits (Luhman, 2000). The risks may maybe even larger than the benefits, factors of trust like transparency can lower the perceived risk to make it acceptable (Luhman, 2000; Schoorman et al., 2007). Therefore, risk with its uncertainties can increase the need for trust (De Vries et al., 2023). EC are in favour of risk-reducing mechanisms, to reduce the financial risks making them manageable with the associated benefits (Bauwens et al., 2016).

2.2.3. Subtypes of trust

Trust is a complex concept, as described through reciprocal relationships, as well as being difficult to measure and interpret (Simpson, 2007). To better understand the concept of trust, it is useful to use subtypes of trust, which divides the concept of trust in smaller interpretable parts. The distinction between interpersonal and institutional trust is widely used as a basis (Voogd et al., 2022; De Vries et al., 2023) and, therefore used in this thesis as well. It can be described as trust among individuals or trust in institutions. Additionally there are several other forms of trust, interorganisational trust is used for trust between organisations (De Vries et al., 2023), which is also used in this thesis while there is contact between EC and authorities. These three subtypes of trust form the framework for trust in this thesis, which will be further elaborated on in the following parts.

Type 1: Interpersonal trust

Interpersonal trust is the trust between individuals that the other has the ability and intention to successfully cooperate (De Vries et al., 2019). Trust develops through expectations and interactions between partners about their collective intentions and actions (Leahy & Anderson, 2008; De Vries et al., 2019), which can be expressed in reliability, predictability and fairness (Zaheer et al., 1998). Interpersonal trust is seen as a basic necessity for cooperation requiring interdependency (Johnson-George & Swap, 1982; Simpson, 2007). As individuals collaborate is shared interpersonal trust often needed, which is described by mutual trust. Interpersonal trust is rather dynamic, being influenced and influencing the actions of the subject of trust (De Vries et al., 2019), while externalities can also influence the amount of trust (Simpson, 2007).

To understand interpersonal trust better, is a common division used between relational trust and rational trust (Voogd et al., 2022). Relational trust is based on shared identities, emotions and relations, which leads to collectiveness (Stern & Coleman, 2015; De Vries et al., 2019). Simpson (2007), extends this by stating the importance of the orientation of members, which can be described by the motive people have to participate (Guetlein & Schleich, 2023; Koirala et al., 2018). The motive to participate is therefore stated to influence relational trust when individuals collaborate (Soeiro & Dias, 2020; Koirala et al., 2018).

Rational trust develops on arguments and keeping promises (De Vries et al., 2023). As an actor can build trust by being rational in their reasoning, (Stern & Coleman, 2015; De Vries et al., 2019, which can be linked to having shared interests and justice beliefs (Leahy & Anderson, 2008). Rational trust focusses on the interactions between individuals, while showing commitment in a common objective can increase rational trust, especially when collective benefits are experienced. (Simpson, 2007).

Relational trust thus mostly explains the intention to cooperate aspect of interpersonal trust, which is built upon shared identity and collective motives to cooperate. Rational trust focusses on the ability to cooperate aspect of interpersonal trust, which develops through rational arguments and successful interactions. Together can relational trust and rational trust describe the interpersonal trust between individuals when collaborating.

Type 2: Institutional trust

Institutional trust is defined as trust in governments and organisations to be competent in their functioning (Guetlein & Schleich, 2023). Institutional trust often depends on long term unconscious expectations that institutions will function like expected (De Vries et al., 2019). Therefore, being considerably stable in comparison with interpersonal trust, even being considered as a stable factor for interpersonal and interorganisational trust to develop within (Zaheer et al., 1998). Institutional

trust has less fluctuating components, being based upon institutional performance and design (De Vries et al., 2019).

Institutional trust is often linked with social trust, which is about an individual's general tendency to trust others, therefore also wanting to cooperate without knowing the other well (Seifert, 2017; Leahy & Anderson, 2008; Stern & Coleman, 2015; De Vries et al., 2019). A well-functioning institution can provide the development of other forms of trust while creating a collective trust among people, resulting in people willing to collaborate (Seifert, 2017; De Vries et al., 2019). In the case of institutional trust can social trust be divided into competence trust and goodwill trust (Hickey et al., 2021). Competence trust develops through a subject of trust having various resources and good capabilities (Hickey et al., 2021). Competence trust is thus built through an institution is capable of functioning well and its procedures being effective (De Vries et al., 2023; De Vries et al., 2019; Leahy & Anderson, 2008). Goodwill trust is based on developing confidence and trust by acting fairly and improving reputation (Hickey et al., 2021). So, an institution needs to be transparent and follow procedures being agreed upon (De Vries et al., 2023).

So, competence trust and goodwill trust can explain how individuals build trust in institutions. Institutional trust itself can form a base for other forms of trust and collaboration.

Type 3: Interorganisational trust

Interorganisational trust is about the extent of trust between organisations (De Vries et al., 2023), more specifically, the members of an organisation having a collective trust relation to the other organisation (Zaheer et al., 1998). Interorganisational trust is a fundamental component for successful collaboration between two organisations, especially when there is interdependency between them (Hickey et al., 2021). The role of trust in interorganisational collaboration is related to reliability and capabilities (Leahy & Anderson, 2008; Hickey et al., 2021), resulting in possible lower costs for the organisations themselves (Zaheer et al., 1998). Different types of trust impact the development of interorganisational trust (Hickey et al., 2021), interpersonal and institutional trust have impact, while members of an organisation also have individual relations (Zaheer et al., 1998). In the end, collaboration is a vital outcome of interorganisational trust, as information exchange and risks are seen as fundamental factors in measuring trust.

2.2.4. Overview relations subtypes and factors of trust

Trust is a complex phenomenon, to understand it better a division can be made between subtypes. In this research, the three subtypes chosen are interpersonal, institutional and interorganisational trust. These subtypes on their own can be influenced by several other subtypes, factors and also by each other. This makes them on their own also complex, therefore, choices must be made on what impacts each subtype the most. An overview of the choices made for this research is shown in Figure 1, showing the relations between the subtypes and factors of trust with collaboration being the end destination.

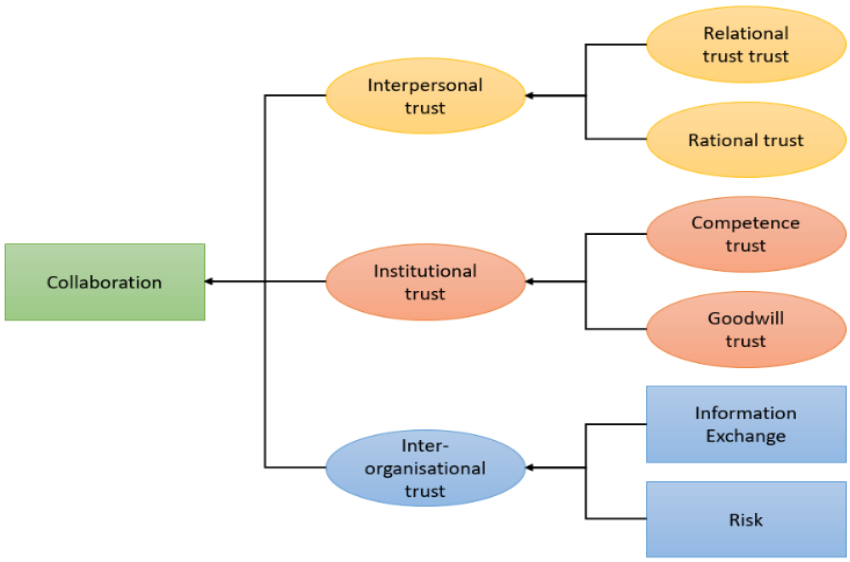

Figure 1, overview of subtypes of trust and their related components used in this research.

3.Operationalisation

The operationalisation of concepts described in the theoretical framework is done to structure them in order to use them as a base for the research questions. Therefore in this part shortly the two concepts EC and trust are summarized and explained how they are used in the sub-research questions.

3.1. Operationalisation of concepts

In the theoretical framework it has been defined what description an EC should follow to be included in this research. In short, the requirements that must be met are being open and voluntary in participation, having collective objectives consisting of environmental and community benefits, and having members in the proximity of the project locations. Within these requirements, an EC can differ in the following five characteristics: Governance, Participation, Ownership, Technology, and Locality & scale. Derived from literature, four typologies were described, namely cooperatives of cooperatives, local energy cooperatives, production cooperatives and community initiatives. These four typologies show overlap as well as distinctions in their features, therefore they can be compared to each other as well as comparing features. The theoretical framework already provides elaboration on these typologies and features upon their characteristics and making them measurable and applicable, therefore, there is no need to further operationalise them in this chapter.

The main focus is on the role and development of trust, which should not be generalised into one single concept. Trust is a complex phenomenon, being influenced by several factors. In order to make trust measurable and specific, is a distinction made by splitting it into three specific sub forms of trust, namely interpersonal trust, institutional trust and interorganisational trust. These sub forms of trust are also affected by certain factors and other types of trust, but are specific enough to be made measurable. The theoretical framework already elaborates on these three sub forms of trust, explaining the vital relations is useful for applicability and measurability. Investigating the relation between certain features and these three forms of trust provides answers to the general research question on the role and development of trust, which is shown in Figure 2.

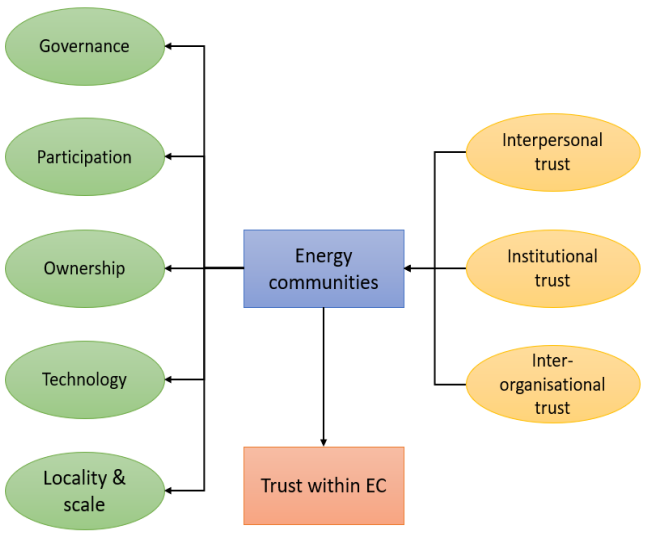

Figure 2, operationalisation of concepts used in this research

3.2. Research questions

The following general research question was found, as already was formulated in the introduction.

GRQ: ***"How does trust develop within and between ECs collaborating on localised sustainable energy systems"***

In order to answer this question are the following sub research questions made:

SRQ1: ***"How do different types of trust develop within ECs?"***

SRQ2: ***"How do different types of trust develop between ECs?"***

SRQ3: ***"How is trust development impacted by the different characteristics of ECs?"***

The first sub-question investigates the development and role of trust within an EC, by looking at collaboration between individuals within the ECs as well as the role of institutions on the functioning of the EC. The objective of this question is to find out what influences the amount of trust, as well as what the impact is of a certain amount of trust on collaboration within an EC. This sub questions thus mostly focusses on interpersonal trust and institutional trust.

The second sub-question is similar to the first one but especially focuses on the role of trust between ECs. Therefore, it looks at collaboration between ECs and other parties while investigating the development and role of interorganisational trust. Once again, the objective of the question is to find out what influences the amount of trust and what the impact of a certain amount of trust is on collaboration between ECs.

The third sub-question investigates the differences between ECs while comparing typologies on features and their impact on the development of trust. The objective of this question is to find out which features are most influential for building trust, and which type of trust is actually most important per typology.

The three sub-questions can be used to answer the general research question. They provide insight into the role of trust in ECs that depend on collaboration. This can give insight into which types of trust an EC should focus on or which features provide or actually need a certain type and amount of trust to be useful.

4. Methods

4.1. Approach

The general objective of this research was to investigate the development and role of trust within ECs. This was used to eventually look at the share ECs could have in the energy transition. As described earlier, there are several typologies and features an EC can consist of and thus also differences in trust. Based upon these typologies, cases were selected and elaborated on via desk research, which were used for the data collection. Data collection was done by doing interviews and literature research, this forms a triangulation of data methods, however also triangulation of data sources which differ from literature as well as several interviewees with their own perspective (Yin, 2009; Berg, 2009). This is done to increase the validity and completeness of the research (Bhandari, 2023). The theoretical framework and operationalisation of concepts provided a base for the data collection methods. In the end this research structure was used to answer the research questions, this is shown in Figure 3. In the following parts there will be elaborated on what data was collected using the methods described, as well as how this data was analysed and interpreted following certain criteria (Yin, 2009).

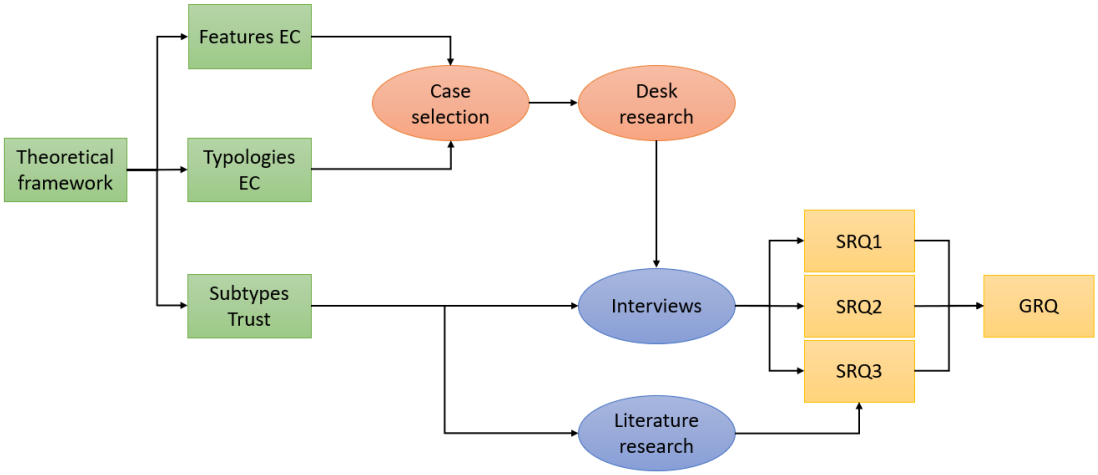

Figure 3, an overview of the data collection methods. Circles are data collection methods or actions, squares are concepts or outcomes of questions. The green squares represent the theoretical framework, the red circles are preparation activities for the data collection methods, the blue circles are the data collection methods, the yellow squares are the research questions.

4.2. Case study design

A case study was done, while being a way of putting theory into practice, also being a common practice within qualitative research. In this case, the typologies described earlier can be applied to cases in order to understand the role of trust within them. For this research, a multiple case embedded case study design was chosen, using the model from Yin (2009), to research the role of trust among the different typologies. Embedded case study designs look at the different units a case consists of, while the multiple cases are selected to investigate. The multiple case embedded case study design was chosen, because generally multiple case designs are seen as more robust and reliable (Yin, 2009). The four typologies represented four different cases, while the units studied are sub forms of trust, in order to compare findings the context of the cases needs to be similar. How this case study design looks like is shown in Figure 4, important to mention is that for the case of cooperatives of cooperatives the unit of interpersonal trust is missing while the members of this typology are other EC and not persons.

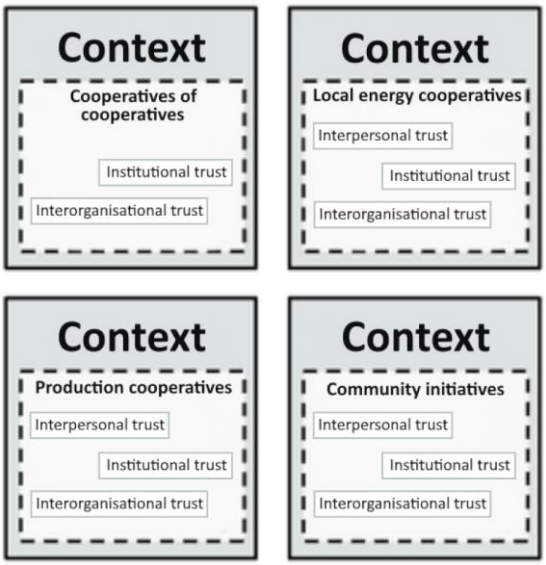

Figure 4, the four typologies used for a multiple case embedded case study design. Their context is similar, in order to compare, units researched within the typologies are the subtypes of trust applicable.

4.2.1. Case study selection

As Yin (2009) states, it is essential not to overestimate the amount of cases, while time and resources are scarce. Cooperatives of cooperatives were for that reason left out of this research, while also missing the unit of interpersonal trust as explained earlier and thus be limited in comparability with the other typologies. Also, Cooperatives of cooperatives have a provincial or national scale, which does not fit the description of a local EC. Thus three cases were selected, which are depicted by the typologies left, which are local energy cooperatives, production cooperatives and community initiatives.

Yin (2009) also states that the screening of potential case studies should not be too extensive and time consuming, it is essential to select them by certain criteria they qualify for. In this research there was chosen to focus on a similar context among the cases, which focuses on similar regions, policies and external factors. Also the EC should be there for already some time, so they have had several events. The most ECs can be found in the provinces of North- and South-Holland as well as in Gelderland. Especially in Holland there are significantly more production cooperatives, while Northern provinces like Groningen and Friesland show more local energy cooperatives (HIER & Energie Samen, 2022; Vega & Van Twillert, 2023). A more specific policy related context could even be made between Regional Energy Strategy (RES) regions (HIER & Energie Samen, 2022). In this research, it was chosen to select cases from the province of Gelderland and Overijssel, because of their supporting policy on ECs. Within these provinces were RES regions selected which also fulfilled chosen supporting parameters in their policy, in which ECs were contacted to participate, this can be found in Appendix 2. Multiple cases which fitted the definition set were contacted, from which eight were interested to participate. The cases selected will be introduced later.

4.3. Data collection

In this research, two data collection methods were used, which are linked to the cases selected. The first source was interviews being held, which were the primary data collection method for this research. As described, interviews are generally seen as the fundamental data source when researching human affairs or behavioural events (Yin, 2009). It is important to note, that in order to do the interviews a desk research of the cases was done to provide a base for the interview questions.

Other data sources like documentations, archival records and direct observations were used for the desk research, therefore triangulation of data sources is done (Yin, 2009; Berg, 2009). The second data collection method, which was more an addition to the interviews, was a literature research providing insights to compare to the findings of the interviews. The following parts will elaborate further on the three data collection methods in their order used.

4.3.1. Desk research

Earlier in this research, a long list of ECs in the Netherlands was made, providing an overview of around 200 ECs, shown in Appendix 1. The case study selection already described the focus on selecting ECs from the same region and context. There were several cases selected per typology which fitted the requirements to participate, from which four local energy cooperatives, two production cooperatives and two community initiatives agreed on participating. A desk research was done, looking at documentations, archival records and direct observations to elaborate on the cases. The cases were compared among the general definition from the theoretical framework as well as reviewed upon the features they consist of. Also key events were noted, from which a timeline was made. This background information as well as the timeline provided a base for the interviews, which can be found in the introduction of the cases and Appendix 5.

4.3.2. Interviews

The main data collection method for this research were interviews, providing the most data on trust. This research chose a semi structured interview, while it approaches the subject more from the interviewees perspective. Semi structured interviews consist of structured questions which are easily comparable and unstructured questions which investigate spontaneously initiated subjects (Berg, 2009).

A specific interview method was used in this research, which is called an innovation history method. This method is a process of preparing history, stimulating discussion, reflection and learning on the innovation defined (Douthwaite & Ashby, 2005). Innovation history analysis is therefore an useful method when focussing on key events in innovation processes (Klerkx et al., 2010; Spielman et al., 2009), while identifying factors that defined success or needed improvement (Douthwaite & Ashby, 2005). The innovation studied, which in this case was trust and collaboration, needed to be clearly understood as well as applicable to the case (Douthwaite & Ashby, 2005). A timeline constructed of key events and effects on trust and collaboration forms a base to analyse the innovation (Douthwaite & Ashby, 2005; Spielman et al., 2009).

A general questions sequence from Berg (2009), was used to make the interview guide. Starting with a general non-threatening question, called the throw away question used to draw a picture of the interviewee. Second, focussing more on fundamental questions on a single topic, followed by more sensitive questions on this topic, which are the essential questions. Last, validating the answers with questions worded differently, which is the extra questions. Probing questions were also used when needed to receive more complete stories. This sequence was repeated at step two to focus on a new single topic. This format provides a structure to introduce subjects, although the semi structured interview method shows that questions were not asked in order. For that reason, the questions could be used to actively react to the answers from the interviewee. As literature states, it is essential not to affect the answer possibilities of the interviewee, therefore question formulation is essential, avoiding double barrelled questions as well as too complicated or too long questions. This was important, while brief and concise questions have a higher chance of getting clear answers for analysis (Berg, 2009). It was also crucial to be specific on which type of trust a question is (Mayer et al., 1995), however also

not directly asking towards trust but using synonyms. The interview guide in Appendices 3 and 4 shows how the questions were formulated using these principles.

The interviews took around 1 to 1,5 hours, which is common for a semi-structured interview (Yin, 2009). They were prepared using the outcomes of the desk research on the eight case studies selected, already defining some key events and features. The interview tried to in-depth explore the perspectives, experiences and beliefs of the interviewees on the role of trust at critical moments in time. The interview were held among one or two members and employees of the ECs, in total 11 people were interviewed, shown in Table 2. The interviewees had sufficient knowledge on the whole EC because of the roles and functions they had, therefore bringing a lot of experiences and information to the interviews. The interview was recorded using Microsoft Teams to already make a transcript of what was said, this was later checked and improved on errors if needed. The interview was held at a neutral place, for example at home, in order to not limit the answers from the interviewee (Dóci et al., 2015).

Case	**Interviewees**
Heerde Energiek	Board member, Board member
Noaber Energie	Board member, member in a taskforce
Deventer Energie	Board member
Zutphen Energie	Board member, member in a taskforce
Wageningen op Zon	Board member
Duurzaam Kootwijkerbroek	Board member
Koninklijke buurt Bennekom	Initiator
Buurtbedrijf Zandweerd	Member in a taskforce

Table 2, overview of interviewees with their corresponding EC and function.

4.3.3. Literature research

Literature was used to find data on the development and influence of trust within ECs as well as on the relation between trust and collaboration. Literature was found and used in the whole process of writing the thesis. It provided a basis for the interview guide as well as for the results to be analysed, putting it into a larger perspective. This literature research was done using WUR library and Google Scholar as search engines, while using snowballing to find related literature. Primary and secondary sources are used.

4.4. Analysis method

After the data was collected, it needed to be analysed to be useful for answering the research questions. This was needed specially for the interviews in order to be used for analysis. Therefore, the desk research needed less elaborated analysis, because it was mainly used as preparation for the interview as well as the literature research which was used for further analysis of the findings from the interviews. When doing an embedded case study, it is needed to keep the results from the cases separated, while combining the results from all cases to a single outcome actually makes it a single case study (Yin, 2009). Therefore were the cases also analysed separately in this research, even though they could be in the same typology.

4.4.1. Desk research

The desk research gave a background to the cases which later was used for the interviews. Analysis of these cases was needed to find key events for the timeline as well as getting a clear understanding of the features the ECs consists of.

4.4.2. Interviews

The end result of the interviews was a transcript from the Microsoft Teams recordings. This was first checked on errors by listening to the recordings again and improving mistakes. Than in order to make the amount of data manageable and analysable, it was coded using Atlas software (Klerkx et al., 2010). The coding was done structured, by already defining some codes for the subtypes of trust and the parts they are divided in. After this the codes were compared and analysed, exploring relationships between the typologies and subtypes of trust (Kilelu et al., 2013). It is important to note that using Atlas is a tool to assist the analysis, but it was not the analysis itself (Yin, 2009).

The innovation history timeline approach used, showed tensions and processes of trust at various points in time among different actors (Kilelu et al., 2013). This was used to understand how the different forms of trust develop in ECs in relation to collaboration. In the end the findings per type of trust were compared among the cases, analysing the outcomes on what caused them. The types of trust were analysed within the context of collaboration, which was done to increase comparability. Lastly, the findings on trust were compared between the cases, in order to find differences in features.

4.4.3. Literature research

After findings from the interviews, comparable findings from the literature were collected in order to compare and analyse the results. This was done in order to find differences and similarities between earlier research.

4.5. Ethics and data management

A Microsoft Teams data channel was made in order to store and manage data. The data storage was used for the recordings of the interviews, the transcriptions of the interviews, the coded transcriptions, versions of the proposal and thesis as well as additional vital documents. This study database was created only accessible for this research, increasing reliability (Yin, 2009). Data management was done in Microsoft Word and the Atlas software. The data was only accessible for this research, when given permission accessible for my supervisor. The raw data, including recordings and transcriptions was stored until the thesis research finished.

The interviewees were held anonymous, while collecting data for the case and not individuals. The amount of anonymity protecting the interviewee was done according to their preferences. This included gaining informed consent, protecting them from harm, providing privacy (Yin, 2009). Also acknowledging that the interview was recorded and used for the research, while being informed about the method and goal of the research. As an interviewer it was essential to ask good questions as well as being a good listener, other fundamental aspects were flexibility, knowledge of the case and unbiased notions (Yin, 2009).

5. Results

In this chapter, the analysis of the interviews is described. First the cases need to be introduced, which is done using the desk research. After these case introductions are the interviews analysed according to interpersonal, institutional and interorganisational trust. In the end a summarized comparison between each case is given and a general view on trust when combining the three types of trust.

5.1. Case introductions

In this research, eight cases were used for analysis on the role of trust within and between ECs collaborating. Figure 5 shows the location of each case, showing the province, RES region and municipality they are connected to. The case selection process focussed on including as comparable as possible policy conditions for the cases. The province of Gelderland and Overijssel both show considerable effort for involvement and collaboration with ECs, which is also the case for the selected regional energy strategies. The most influence on EC is generally the policy of the municipality, where minor differences between each other can be registered. Governmental conditions are thus not completely the same, although this is also interesting while differences can be related to existing trust relations and collaboration with the linked ECs.

Before interviewing the ECs, a desk research was done, in order set a background for the interviews. The desk research consisted of a timeline on key events for the EC and a summary of the features they consist of described in the theoretical framework. These two parts were used to make an introduction to each case in the following part. Each case is introduced using five aspects, namely the establishment, current scale, objective, governance, activities and known collaborations. The timeline of each case can be found in Appendix 5.

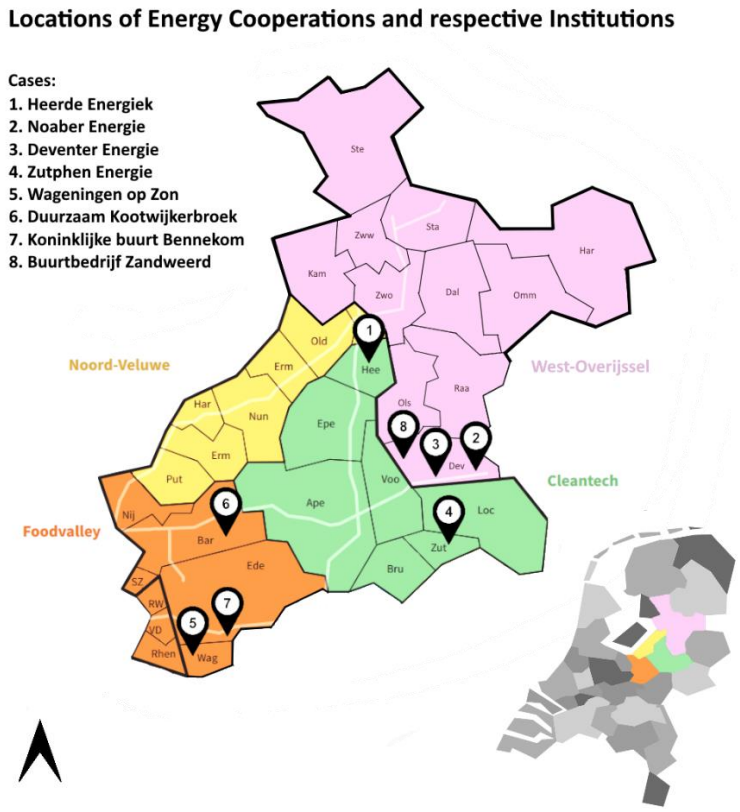

Figure 5, Locations of ECs within their province and RES regions.

5.1.1. Local Energy Cooperatives

As described earlier, are local energy cooperatives the most common type of ECs in the Netherlands. The focus of these cooperatives is on local renewable energy production as well as demand reduction, which is done through several activities. Most local energy cooperatives have a similar governance and ownership structure, but can differ in their participation, technology, locality and scale. The characteristics of each case are described by the five aspects mentioned above. Four cases for local energy cooperatives were researched.

Case 1: Heerde Energiek

Heerde Energiek is a cooperative established in 2017, since it has grown to more than 200 members. The objective of the EC is a sustainable future for Heerde and its inhabitants, focussing on renewable energy production and demand reduction. Through the GMM can members decide upon the activities and direction of the EC, which in essence have no target of profits for the cooperative itself (Heerde Energiek, 2023). Heerde Energiek provides knowledge to inhabitants and businesses on the energy transition as well as initiating renewable energy projects themselves. They have mostly focussed on solar roofs, called Heerde op Rozen, where members received financial benefits after a small investment (Nieuwsblad schaapskooi, 2024). Heerde Energiek also has an energy coach project, giving insights on insulation and energy provision to inhabitants, which is a project in collaboration with the municipality. The EC also did renewable energy projects outside of their municipal area, in collaboration with neighbouring ECs (Heerde Energiek, 2023).

Case 2: Noaber Energie

Noaber Energie is a cooperative located in Bathmen and was established in 2017, currently having around 125 members. Their objective is fastening the transition towards a sustainable Bathmen for inhabitants and farmers. Member can vote on the GMM, giving direction and permission to several activities of the EC (Coöperatieve Vereniging Noaber-Energie U.A., z.d.). Noaber energy has an energy coach project in collaboration with the municipality and also several renewable energy production projects (Noaber Energie, z.d.). They worked on a solar park, solar roofs and biogas, mostly in collaboration with farmers but also providing financial benefits for inhabitants after small investments. Noaber Energie mostly focusses on developments within Bathmen, although they also participate in a nearby wind park project with neighbouring ECs (Coöperatieve Vereniging Noaber-Energie U.A., z.d.).

Case 3: Deventer Energie

Deventer Energie is a cooperative established in 2012, currently having around 400 members and 100 customers. Customers are connected to the corresponding green energy supplier and have invested in energy projects, both members and customers can vote on the GMM. Deventer Energie strives towards a sustainable localised energy system, while doing projects on renewable energy production and demand reduction. They work on solar roofs and insulation programs, also have an energy coach project in collaboration with the municipality and participate in a wind park project with neighbouring ECs (ZutphenEnergie, z.d.). Their scale is municipality wide, as having projects not only in Deventer itself.

Case 4: Zutphen Energie

Zutphen Energie is a cooperative established in 2012, they have grown to around 1400 customers and 300 members. Their objective is a sustainable energy system for the local community, members and customers can vote on the GMM in order to give direction to activities to achieve this. Zutphen Energie has a specific focus on involving and communicating to the local community, especially the opening of their own store made them more attainable for local inhabitants. Zutphen Energie works and

participates on several solar and wind projects energy projects, collaborating with other ECs on some of them (ZutphenEnergie, z.d.). The municipality is a consistent partner for the EC, even signing a collaboration agreement, having several activities together like energy coaches or a smart energy hub project (Gemeente Zuthpen, 2023). Zutphen Energie mostly focusses on local projects, but are currently also participating in larger projects municipality wide.

5.1.2. Production Cooperatives

Production cooperatives have a focus on a specific type of renewable energy production, which can be a single project but also multiple of this same type. Most production cooperatives in the Netherlands focus on solar roofs, specifically doing no additional sustainability projects. Production cooperatives are often similar in terms of governance, ownership, participation and technology, but can differ in their locality and scale. The characteristics of, the two production cooperatives researched, are described using the same aspects as earlier.

Case 5: Wageningen op Zon

Wageningen op Zon is a cooperative established in 2014, currently having around 100 members. The members can vote on the GMM on directions or investments the board wants to discuss. They do not express a specific objective, although they do promote renewable energy production. Wageningen op Zon is maintaining one solar roof, members were initially able to invest in the solar roof and receive financial benefits. The EC has no intention of initiating or participating in new projects. Wageningen op Zon does collaborate with Marin, which is the business that provided the roof. Marin themselves also has 3 production cooperatives on the same roof, which collectively with Wageningen op Zon discuss what is needed for the future (Wageningen op zon, z.d.). The scale of Wageningen op Zon is neighbourhood level, while in order to participate a certain postal code is required.

Case 6: Duurzaam Kootwijkerbroek

Duurzaam Kootwijkerbroek is a cooperative established in 2019, currently consisting of more than 150 members. Their objective is to provide the possibility for all inhabitants to be able to invest in solar panels. To achieve this has Duurzaam Kootwijkerbroek initiated multiple solar roofs as well as participating in a solar park. The EC is not doing other sustainable activities, as wanting to focus only on solar energy production. Members have voting rights at the GMM on the projects they also have invested in and additional to the general directions of the EC. Duurzaam Kootwijkerbroek has a good relation with the municipality, communicating and discussing sustainable development within the municipal area (Duurzaam Kootwijkerbroek, z.d.). Although Kootwijkerbroek being a small village, is the EC able to operate on a municipal scale, searching for suitable solar projects to participate in.

5.1.3. Community Initiatives

Community initiatives are contrasting with the other two typologies as not being a cooperative. They can be a foundation, although most of them are actually not registered at all. The focus of these ECs can be on renewable energy production as well as energy saving or other sustainability activities. Community initiatives are often part of a larger overarching organization, which supports them. Community initiatives can differ significantly, especially in terms of governance, ownership, participation and technology. However these EC commonly have a small scale and specific local neighbourhood and community focus.

Case 7: Koninklijke buurt Bennekom

Koninklijke buurt Bennekom is an initiative which started in 2022, the EC is not officially registered but two initiators can be indicated. Currently the EC still consists of only these two inhabitants, but their

initiative is noted and involves other inhabitants of the neighbourhood as well (Mosch & Maat, 2024). Their ambition is creating a sustainable energy neighbourhood through collective solutions and collaboration (Woodley, 2024; RVO, 2024). The activities focus on informing and discussing inhabitants on the insulation and energy production possibilities for the neighbourhood. Koninklijke buurt Wageningen is supervised by a local energy cooperative in the municipality, but the EC also collaborates with the municipality or other organisations as well. Their ambition is to find more participants and possibly expand their sustainable movement all over Bennekom, although current focus is on their neighbourhood (Mosch & Maat, 2024).

Case 8: Buurtbedrijf Zandweerd

Buurtbedrijf Zandweerd is a foundation found in 2020, which has around 10 inhabitants actively participating. The objective of the EC is to create a local community which collectively works towards a sustainable neighbourhood. The foundation has a board which organises the activities the EC does, which are around three task forces, namely a handyman service, a sustainability team and a meeting centre. The sustainability team is most representable to the tasks of an EC, focussing on raising awareness and involvement in the neighbourhood as well as investigating collective energy production possibilities. Buurtbedrijf Zandweerd is part of the local energy cooperative Deventer Energie, which supports them. The foundation has good contact with the municipality, originally also being a consultation group for them in a heating network project for the neighbourhood (Buurtbedrijf Zandweerd, z.d.). Buurtbedrijf Zandweerd has a specific intention to only be active within the neighbourhood, working towards an independent sustainable neighbourhood (Overbeek, 2024).

5.2. Analysis of interviews

The cases described in the part above were used for interviews, these were conducted with one or two acquaintances of the EC as described earlier. In the following parts are the three types of trust analysed according to these experiences and information provided by the interviews.

5.2.1. Interpersonal trust

As described in the theoretical framework, is interpersonal trust about individuals having the right abilities and intentions to collaborate. The terms ability and intention appear to be straightforward, but are actually somewhat extensive in the case of collaboration. Therefore this analysis uses the concept of rational trust describing ability, and relational trust describing intention. Rational trust describes individuals trusting each other due to experiencing collective benefits. These collective benefits are built upon having substantive arguments and keeping promises, which requires a certain ability from the individuals to do. Relational trust describes individuals trusting each other due to experiencing collective identities and visions, while sharing intentions could lead to this feeling of collectiveness.

In the interviews, it became clear that different levels of collaboration can be recognized within ECs, ranging from passive to increasingly more active participation. Higher levels of collaboration should require an increasing extent of trust, while workload and knowledge needed also increases. From the interviews three levels of participation can be identified, which will be analysed according to both rational and relational trust.

Level 1: Financing through sleeping membership

The first level of participation is sleeping or passive membership, which is generally perceived as something negative, as a lack of engagement while still receiving benefits seems unfair to others. However from all interviews came out that this is only partly true for ECs, because passive membership

does bring financial contributions to the EC and does require trust. It is good to mention that especially local energy cooperatives and production cooperatives have a significant amount of passive members. Even though, the ECs rest upon members who actively participate in activities, are passive members not described as a loss, because the financial contributions are also a necessity to do these activities.

It can be said, that funding the ECs through contribution or investing in collective energy projects does require rational trust from members in the EC, while they risk losses. People fund the EC, expecting that the EC has the ability to do something beneficial with their financial contributions, which is probably related to the objective the EC addresses. On the other side, do ECs also need rational trust in the promises of the members to consistently finance their activities, as the interviews stressed the importance of these contributions. Inferring from this can positive experiences towards collective benefits result in more rational trust between members and the EC. Almost all ECs expressed in the interviews that the projects they did, especially the solar roofs and collective purchasing, were well received among inhabitants and members. As a result, this could signify adequate rational trust between members and the EC themselves, contributing to their financial participation.

Whether, passive members act out of financial motives or out of idealism, is a logical question when discussing relational trust among this group. When a passive member only pays a contribution fee to the EC than they do not receive any direct financial gains, this seems as an act out of idealism. However the discussion arises when passive members invest in collective energy projects, which does gives them financial benefits. This could affect relational trust with members who act out of idealism or active participants in these projects, which then would do more work for the financial benefits of sleeping members. The following is stated by a board member of Duurzaam Kootwijkerbroek about the intention of sleeping members, *"it is not needed to participate solely out of idealism, while the business case is well put together and is really profitable for them"* (Interview Duurzaam Kootwijkerbroek). He later explained, that the first question people ask is often about the payback period before investing, which was also mentioned by other ECs as well (Interviews Duurzaam Kootwijkerbroek, Wageningen op Zon, member of Noaber Energie). Furthermore, the board member of Wageningen op Zon also expresses having an extra fee for members which are not connected to a green energy supplier. They need this fee to avoid free riders and because the ECs also receive funds from the green energy supplier per member connected (Wageningen op Zon). From these insights, a more financially focused motive for sleeping members could be suggested, which could affect interpersonal trust among members. Although the ECs which elaborated on this topic expressed, that intentions are often a combination of receiving profit as well as contributing to sustainability. The balance between the two intentions can be different per member, but it does bring some kind of collective identity and vision, which is necessary for relational trust. The EC, which had collective energy projects, also stated that even the first ones were filled up quickly. This can be linked to relational trust, because there had yet not been successful projects before. However it is still difficult to assign the extent and impact of relational trust among sleeping members because there is often not that much close contact.

When combining the findings from rational and relational trust, it can be said that interpersonal trust is also for sleeping members a fundamental aspect. Becoming a member of an EC, thus financially collaborating, does require a certain extent of collectiveness and trust in the benefits it brings. Interpersonal trust is therefore especially noticeable between the passive member and the EC and less assignable among members themselves.

Level 2: Steering through GMM

Further participation from members are activities which are not connected to financial contributions, but ask for time and capacity from the participant. Attending a general members meeting gives an opportunity for members to give direction to the EC. This is a fundamental task, especially for cooperatives, while their main characteristic is being steered by their members. Interpersonal trust is noticeable through interdependency between the board and the members at GMM. As actions of the board must be approved by its members, whereas members are dependent on the board providing the right information.

Providing the right information requires a certain knowledge and ability from the board members, thus requiring rational trust. However, the right abilities from members is also needed to be able to discus and check the direction and information the board provides. The board member of Noaber Energie jokingly described their GMM as, *"the tamed sheep assembly"*, while nobody questioned the board (Interview Noaber Energie). He explained it by stating that the board was precise on details, which ensured trust from members that it was the right direction. It can be said that this does show a certain extent of rational trust from their members in the board, but alternatively less rational trust from the board in their members to have enough knowledge to discuss. A contrasting example is given by the board member of Wageningen op Zon stating, *"people are not afraid of giving their opinion, while also having the knowledge to do so"* (Interview Wageningen op Zon). This example shows a clear rational trust from the board in their members, while adding to the knowledge of the board. It can be said that substantive discussions at GMM show mutual rational trust between member and the board but also among members themselves, while showing each other knowledge and abilities.

Approving a certain direction during the GMM can be linked to a collective vision, as multiple interviews stated were built around substantive arguments, increasing rational trust. Multiple ECs express that they have never experienced a blockade from the members on a certain topic, showing that members share intentions and visions on the EC. However, wind parks are a clear exception for the collective spirit, creating a division among members. The topic makes people leave the EC or not wanting to participate too much, while getting pressure from others. This can heavily affect the relational trust among members, while having opposing visions. Although eventually these wind projects are done by the ECs, which can decrease relational trust even further among opposing members, resulting in less participation.

It can be concluded that the GMM, although only being a few times per year, is a key activity to increase both rational and relational trust. However, several ECs do state that whether members give their opinion or not during GMM, is derived from the nature of the local community (Interviews Deventer Energie, Zutphen Energie, Wageningen op Zon, Heerde Energiek). This would make it harder to increase the abilities among members, although GMM could be seen as an event to make members interested to learn as well. In the end are GMM experienced as positive events by the ECs, showing ability and sharing visions, as also creating collective benefits and identities. This shows that GMM are good for interpersonal trust between the board and its members as well as among members.

Level 3: Strengthening through volunteering

Being a volunteer within an EC is possible through joining task forces or even becoming board member. As described by the ECs, are volunteers the driving factor for the well-functioning of the EC. The volunteers put in the effort to participate in activities without individual benefits, but striving towards collective benefits for the whole EC. The interdependency among members is an essential aspect for the EC, while the EC cannot function without people volunteering. Although ability and capability among members is vital, describe all ECs that actually finding members willing to volunteer is the

largest challenge. Volunteering is in this case linked to doing it out of interest or goodwill, which is more linked to relational trust.

Constantly looking for ways to make members more active in participation, was described by all local energy cooperatives. Several activation strategies were mentioned during interviews, which mostly focused on collectiveness. For example did the board member of Zutphen Energie describe it as, *"what can you do for the cooperative and what can we do for you"* (Interview Zutphen Energie). Although you of course cannot force them, can the intention and feeling of collectiveness make members wanting to do more, while not wanting to be a free rider. The board, which has a challenge finding volunteers for themselves, have a large task in building relations with members and organising activities and task forces according to their interests. As the board member of Deventer Energie describes, *"the problem of scarce volunteers is not solved through money, but requires a lot of work and time from the cooperative to organise"* (Interview Deventer Energie). Building relational trust through shared intentions starts with finding members who share enthusiasm or interest, which can be used to create willingness to participate. Building relations can be done through activities and events, which makes members meet each other and can create relational trust between them. Zutphen Energie even has its own store, which serves as a meeting place for members, which proved to be an accelerator for collaboration (Interview Zutphen Energie).

The situation for community initiatives is slightly different, while not having actual members. Therefore the focus is on finding inhabitants who even want to be involved at all, which for example includes getting their house analysed on energy improvements. The first step for community initiatives is therefore to create a collective identity of doing something collectively for the energy transition. Relational trust is also essential in this case, while a shared vision is needed to collectively work towards a sustainable neighbourhood. For a collective solution are inhabitants depended on each other's choices. Creating enthusiasm and interest could increase relational trust among them and create collectiveness, where collaboration could be built upon. However to organise this, do community initiatives also need volunteers, which again proves to be a challenge.

For all ECs applies that it is needed to build upon local social structures and identities to create relational trust and public support, while the focus of ECs should be on the local community. The board member of Noaber Energie told, *"passive members do express gratitude and trust towards participating members, as they should! Considering all the effort we put in"* (Interview Noaber Energie). The gratitude from other members can be assigned as an essential part when forming a collective force with all members striving towards the same shared vision. From these insights can be concluded that relational trust is necessary for participation between active and passive members. This can be in the form of constructed relationships between members or showing shared visions and gratitude from passive to active members.

The ability and knowledge the EC has, based on its participants, can be increased through training or hiring professionals. Professionals can increase abilities and decrease workload, but the ECs often still rely heavily on their volunteers. Ability is needed within the EC, as they make promises to do certain activities, which is with money from members. But the fact that people are investing gives some identification that rational trust is sufficient. Knowledge and ability can help the EC a lot, as expressed by Heerde Energiek and Zutphen Energie. They had luck with specialists joining the EC, which really helped them in becoming more professional and creating several opportunities for activities to participate in (Interviews Heerde Energiek and Zutphen Energie). The board member of Wageningen op Zon also stated that he wanted to join the board, after realising the knowledge and substantiated structure the EC had (Interview Wageningen op Zon). This shows that rational trust could actually lead

towards increasing peoples willingness to participate and could also prove to be an building stone for relational trust in this case.

For increasing the willingness to participate, which is an ongoing task for EC, interpersonal trust proves to be needed. Where relational trust is especially necessary to sustain the feeling of collectiveness within the whole EC. Rational trust could form a structure for the EC, which could be beneficial for relational trust. Interpersonal trust between active and passive members thus proves to be an essential part for ECs.

5.2.2. Institutional trust

As the theoretical framework mentions, is institutional trust based on trust in governments and authorities to act fairly and competent in the way that is expected from them. The concept of goodwill trust elaborates on the aspect of acting fairly and transparent, focussing on communication and involvement. The competence of the authorities is described by competence trust, which states the capabilities and resources as well as looking at procedures being followed. The second part of the definition for institutional trust, is what is expected from the authorities by the ECs, which plays both for goodwill trust and competence trust an fundamental role. This expectation can be influenced by past experiences and current relations, but also by goodwill and competence trust themselves.

The role of the ECs as well as what role the authorities take, can differ from more distant support towards close collaboration. Important to note is that these findings on institutional trust are from the perspective of ECs, looking at the extent of goodwill trust and competence trust needed for different roles in collaboration with the authorities. The authorities discussed are the central government, the province and the municipality. From the interviews, two roles in collaboration are found, which will be analysed according to goodwill trust and competence trust.

Role 1: Supported by policy and subsidy

The most common interaction with the authorities for ECs is by receiving support from policy or subsidy. The ECs are dependent on the financial contributions of the authorities, in order to make their activities possible. The policy from the central government impacts the business case for renewable energy projects, while the profits are mostly based around a discount on national energy taxation. Subsidies on the investment costs are provided by regulations from the national government or provinces. Municipalities finance the small scale activities, for example informing evenings or specific sustainability activities. Several ECs also mentioned that municipalities stood guarantee for a loan, which gives financial benefits to the EC. As the interviews describe are national and provincial policy hardly influenced by the relationship with them. The municipality stands closer to the ECs, thus interaction and relation building is perceived necessary with them in order to receive financial support.

These examples, of ways the authorities financially support the ECs, seem obtainable and straightforward. However from the interviews can be concluded that this is currently not the case, because of policy becoming more strict and complex. This mostly regards the national policy and subsidies, where slowly subsidies are getting lower. Around ten years back, it was easier to create a business case for a profitable collective solar project. Current business cases are often not feasible, as financially supporting policy is too tight, resulting several ECs waiting with initiating new collective solar projects (Interviews Deventer Energie, Heerde Energiek, Noaber Energie, Wageningen op Zon). As the board member of Noaber Energie explains, *“current policy is not using reasonable and fair investments costs, making profit margins too narrow at these uncertain times”* (Interview Noaber Energie). The policy changes also impact ongoing projects, which were initially started under different terms, putting pressure on the profitability (Deventer Energie, Noaber Energie, Wageningen op Zon).

It can be said that this changing policy towards limited funding is not favourable for goodwill trust from ECs in the national government. As policy is changing, do near all ECs also describe it as not giving clear direction in the energy transition. Also stating that the political agenda is sometimes too much influenced by upcoming elections, which is often not in favour of the energy transition. The lack of direction and consistent subsidy makes long term projects difficult (interviews Deventer Energie and Zutphen Energie), which can be linked to the transparency of the national government. From these insights can be said that ECs experience an unclear direction for policy and lack of financial support, related to a lack of fairness and transparency, stating a low goodwill trust in the authorities. The low goodwill trust is a problem, as ECs could become hesitant in starting projects and activities because of uncertain future support.

The capabilities of the authorities are in this case expressed through financial resources. Provinces do show strength in terms of financial resources, as they are capable of providing sufficient subsidies for larger renewable energy projects. However, the changing policy form national and provincial government towards limited subsidy, could suggest that the financial resources are decreasing. This suggestion could decrease the competence trust in the authorities, impacting the activities of ECs. Although an initiator from Koninklijke buurt Bennekom also states this should not be the case, *"as long as there is money to take steps, we should grab this momentum to get things done"* (Interview Koninklijke buurt Bennekom). The municipalities show capabilities in financing from what is expected from them by the ECs, as near all interviews describe, receiving financial support for hiring professionals or organising small scale events. Some ECs described that the municipality is willing to do the financing, due to having successful experiences with the EC in the past, which can be seen as mutual trust from the municipality in the EC. However, the financial support has limits, while funding a cooperative to much is called governmental aid and is forbidden in the Netherlands. From these insights can be concluded that although the financial resources are decreasing, competence trust in the authorities is sufficient. Additionally, trust from the authorities is needed in the EC to finance them.

The extent of institutional trust proved to be higher in the past, where ECs started a lot of projects with financial support from the authorities. The competence trust can be described as sufficient to rely on, but the goodwill trust is currently lacking compared to the past. This is also visible by several ECs describing how they would like to get financially independent from the authorities (Zutphen Energie, Buurtbedrijf Zandweerd, Deventer Energie, Duurzaam Kootwijkerbroek). However all ECs are still mostly dependent on the financing and thus the policy direction of the authorities. Therefore, does institutional trust also decide the activities ECs are initiating and sustaining.

Role 2: Involvement by collaboration

A closer relation between authorities can be found when ECs are involved to participate or collaborate in collective projects. If successful, can these experiences increase institutional trust and also trust from the authority in the EC, creating a better atmosphere to initiate activities. Most solar roofs ask for a traditional supporting role from the government, while larger wind parks require closer collaboration due to their impact. Looking at energy saving, are energy coaches projects a clear example of collaboration, energy coaches assist people in making their homes more sustainable by giving information or assisting in purchasing. The closest collaboration possible, thus requiring most trust, is being each other's partner in a project, although this role is still scarce.

An interesting insight is that several ECs are actually initiated by their municipality, but are not always receiving the support and involvement they would expect from them (Interviews Heerde Energiek, Deventer Energie, Buurtbedrijf Zandweerd). The lack of involvement seems unfair to the ECs, according to the terms they started on, which affects goodwill trust. Near all ECs expressed having a difficult time

to get involved by the municipality, the board member of Noaber Energie states, *"it would be nice if they also would come to us sometimes instead of us always struggling to be involved"* (Interview Noaber Energie). This shows the relation between the municipality and the EC, which could affect institutional trust in terms of fairness and involvement. The interviews state that building and maintaining relationships with the municipality is a crucial task, while most of the times being dependent on them in terms of involvement. Additionally, councillors or civil servants change periodically, which proves to be a challenge when maintaining the relation with the municipality, sometimes a switch makes them start all over again. It can be said that the instability in their relation can harm the institutional trust, while expectations can differ when a councillor or civil servant changes. Although, it is good to mention that near all ECs did experience involvement or collaboration from the municipality. Examples are several ECs participating in heating network (Interviews Buurtbedrijf Zandweerd, koninklijke buurt Bennekom, Zutphen Energie), participating in regional energy strategy (interview Heerde Energiek) or even lining up expectations and visions together (Interview Duurzaam Kootwijkerbroek). It can be said that good communication from the municipality in their expectations and role of participation for ECs is essential for goodwill trust. As the combination of fair and transparent communication and good experiences increase institutional trust.

For good collaboration a certain competence is required from both the municipality and the EC in order to create a dependency to work together. The competence does not necessarily have to be focussed on financial resources, while political strength in terms of pushing through developments is also a capability, this strength is mostly visible for the national government and provinces. The capabilities can also be based around workforce and knowledge, which can be a problem for smaller authorities. As the board member of Heerde describes, *"small municipalities have the same objectives and tasks to do as larger municipalities. This becomes a challenge while having less knowledge, resources and people within the organisation"* (Interview Heerde Energiek). Although it would seem as a limitation, do several ECs in this situation describe it as an opportunity to collaborate, while ECs have the local knowledge themselves (Interviews Heerde Energiek, Zutphen Energie). Especially, in energy coach projects do ECs show their capability of reaching the local community better than the municipality, while getting less suspicion from inhabitants (Interview Noaber Energie, Buurtbedrijf Zandweerd, Deventer Energie). Therefore the question arises, whether you want the authorities to have high capabilities and have a powerful partner or you want less competence and create a certain dependency from them on the EC. It can be said that a combination of both is the best, where the authority has high competence to do successful projects together but the EC have specific competences which makes them valuable. These conditions could increase the extent of involvement and collaboration for ECs in collective projects or policy making with the authorities. However this is not an easy task, as the board member of Deventer Energie described, *"the ambitions of the authorities can go beyond the competence of the EC, the municipality makes clear that when not delivering to the standards that they will go to other commercial parties to collaborate with"* (Interview Deventer Energie). The no clear need for the competence of the EC has its impacts on collaboration, while the board member of Deventer Energie describes it more as just getting along with each other (Interview Deventer Energie). Although most ECs do describe having enough knowledge and capabilities for their activities, do municipalities not always see this. From these findings on competence trust it can be concluded that it plays a large role for collaboration between the authorities and ECs, but the influence is also heavily dependent on the role the ECs have.

This is also the point where goodwill trust and competence trust come together in these cases, as the role of ECs influences institutional trust heavily, thus collaboration as well. However, the ECs are still very dependent on the municipality to settle the role for them in the energy transition. As competence trust shows the need for recognizing each other capabilities and goodwill trust stresses the importance

of good communication, these two factors can steer expectations as well as increasing collaboration. It is unclear what the most beneficial role is for ECs, whether it is a more participating role most EC have or an equal partnership which only Zutphen Energie strives towards. As both roles can mean that the municipality recognizes the EC as a valuable partner and asks for involvement themselves, which is an objective the ECs strive towards requiring mutual institutional trust.

5.2.3. Interorganisational trust

As mentioned in the theoretical framework is interorganisational trust mostly about dependencies on each other, where the collaboration can be rated on reliability and capabilities. This is also used for this analysis, where first collaborations are analysed where the EC is dependent on another organisation for resources. The second part is about collaboration based on interdependency, which is mostly when collaborating with other ECs.

Relation 1: Collaboration based on dependency

Collaboration based on dependency is mostly applicable at solar roofs, while the ECs need the resource of a roof for these projects. Therefore are they dependent on the participation of an business or farmer, although the reliability of these parties is not always sufficient. Some ECs mention having experiences with organisation pulling out of the collaboration while suddenly wanting to individually use their roof (Interview Noaber Energie, Heerde Energie, Duurzaam Kootwijkerbroek). This can impact the interorganisational trust of ECs, while their effort does not results in being able to collaborate. Zutphen Energie shows an example where capabilities and resources have a critical role for interorganisational trust. As Zutphen Energie had enough financial resources but the other ECs had problems with financing in their collaborative wind energy organisation. This eventually lead to them breaking up, where Zutphen Energie took over the shares from the other ECs (Interview Zutphen Energie). This shows the dependency on each other in terms of financing, where certain capabilities are needed to successfully collaborate and interorganisational trust can be formed.

A different situation can be seen when large commercial parties are dependent on ECs to participate, while they need to fulfil local ownership requirements from policies. The capabilities of these organisations are strong and a large energy project could provide a lot of benefits, but ECs must be careful with the reliability of these commercial parties. Some interviews state having their own conditions to participate, to protect themselves from being abused. As the board member of Noaber Energie states, *"it must be transparent from the beginning, a substantial part must be in favour of the local community and it should be democratically correct"* (Interview Noaber Energie). Despite of the carefulness, do ECs express wanting to participate in these projects, in order to support the energy transition in a local manner (Interviews Noaber Energie, Duurzaam Kootwijkerbroek, Heerde Energiek). This shows that although interorganisational trust can be low due to unreliability, are ECs still willing to participate.

These findings on interorganisational trust show the role of dependency within collaboration with other parties. It can be said that especially reliability is an essential factor for interorganisational trust, while most commercial organisations have strong capabilities. The ECs show by having their own conditions to participate that interorganisational trust is not high, although they are still willing to collaborate.

Relation 2: Collaboration based on interdependency

Collaboration based on interdependency is mostly noticeable among ECs themselves or other sustainability organisations. This can be in the form of organising events together, information exchange or collective projects.

Information exchange is a common interorganisational activity, which requires interorganisational trust to be useful. Community initiatives are often part of another local energy cooperative, which supports them with knowledge and resources (Interviews Koninklijke buurt Bennekom, Buurtbedrijf Zandweerd). The energy cooperatives also have contact between each other, which can be through direct contact between each other or through their overarching cooperatives of cooperatives. Both ways provide the possibility for information exchange and discussing interesting developments, resulting in ECs learning from each other. As the board member of Duurzaam Kootwijkerbroek describes, *"EC do not get into each other's way, they are no rivals. So you cannot get any damage when helping someone, so it is always something good to do"* (Interview Duurzaam Kootwijkerbroek). This statement shows that EC can collaborate with each other, without the other being unfair to get more out of the collaboration. Near all interviews stated that everyone wants to help each other if needed, the selection upon who to collaborate with is than mainly based on capabilities to help each other. Where some ECs mention that mostly neighbouring or ECs with a similar size are can best help each other (Heerde Energiek, Noaber Energie, Wageningen op Zon, Zutphen Energie). From these insights, it is possible to state that interorganisational trust between ECs is very high, while both benefitting and having no rivalry.

Collective projects form another collaboration between ECs, which is mostly seen at large scale projects which require higher costs. An example is Deventer Energie and Noaber Energie working together on a wind energy project. They both show dependency on each other, which is for both focused on capabilities. As the board member of Deventer Energie stresses the collective financial power, does the board member of Noaber Energie express their dependency on the knowledge of the larger ECs like Deventer Energie (Interviews Deventer Energie, Noaber Energie). When experiencing successful moments in the collaboration, interorganisational increases even further, while reliability and capabilities prove as a pilar for collaboration. These insights also suggest that interorganisational trust between ECs in collective projects can be based on different dependencies, as long as having the capabilities to help each other.

Collaboration based on interdependency thus already is based upon a high interorganisational trust, which is because of the nature of most ECs wanting to help each other. Therefore the focus is mostly on the capabilities to help each other, which are often sufficient enough to support collaboration.

5.2.4. Comparison subtypes of trust per case

In the theoretical framework are different features described which could characterise typologies of ECs. The features are governance, ownership, participation, technology and locality & scale. As Table 1 from the theoretical framework shows is there overlap between typologies, which were during the desk research on the cases confirmed. However, in the details there are some minor differences between cases within the same typology. The following analysis is generalized on the subtypes of trust and each typology, although differences in features are also taken into account. Table 3 shows findings from the interviews on sources and outcomes of different types of trust, which are used to analyse the typologies, features and type of trust.

	Interpersonal trust	Institutional trust	Interorganisational trust
Heerde Energiek	No problems with people not participating, several specialists increasing ability and knowledge, consensus among members, successful solar projects.	Initiated by municipality, good contact with province and municipality, municipality needs EC while lacking ability, collective energy coach project	Collective projects with neighbouring EC, support from umbrella cooperative, organising sustainability events with other charities and organisations, project developers dependent on EC
Noaber Energie	Discussion financial or sustainable intention members, sufficient knowledge and ability, searching for active participants, successful solar projects	Expressing insecure times of policy changes, content with municipality but not always involved, financing and professionals supplied by municipality	Dependent on capabilities of other EC in wind project, support from umbrella cooperative, information exchange with other EC on development and questions
Deventer Energie	Searching for more participation and financing from members, collective vision within board, wind project brings segregation between members,	Initiated by municipality, struggle for support and involvement from municipality, dividing policy changes, financing and professionals supplied by municipality, collective energy coach project	Collective wind project with other EC increasing capabilities and resources, lack of workforce limiting exchange with other EC, established sustainability centre with other charities and organisations
Zutphen Energie	Several specialists increasing ability and knowledge, active participants but still looking for more, financing from members as customers, own store increasing contact and publicity	Support from province and municipality, agreement with municipality on structural funding and collaboration, good relation due to successful experiences, EC having more capabilities than municipality, collective pioneering projects with municipality	Initiating overarching organisation to form collective force with other EC, originally collective wind projects with other EC, information exchange at umbrella cooperative events
Wageningen op Zon	Financial benefits for members, knowledge within board, funding by members, foremost passive members, collective vision	Bureaucratic relation with municipality, not a corresponding policy strategy from municipality	support from umbrella cooperative, collaboration with business renting solar roof, information exchange with other EC
Duurzaam Kootwijkerbroek	Discussion financial or sustainable intention members, struggle for new board members or active participants, sufficient knowledge but scarce workforce, collective vision, funding by members	Trust in new policy developments, conflict between municipality and province, transparent mutual collaboration with municipality, funding from municipality	support from umbrella cooperative, information exchange and supporting with other EC, dependency on businesses willing to rent their roof for solar projects
Koninklijke buurt Bennekom	Searching for participants, individualist intensions from inhabitants, pleased response from members,	Trust in current policy momentum, vision on role of municipality,	Support, information and data provision from overarching cooperative, information exchange at umbrella cooperative events, collaboration with other sustainability organisation
Buurtbedrijf Zandweerd	Organising events to create community feeling, trying to get inhabitants involved	Initiated by municipality, content with relation municipality, experienced bad communication from municipality, EC is valued by the municipality, local scale knowledge lacking at authorities	Support, information and data provision from overarching cooperative, established sustainability centre with other organisations

Table 3, findings from each case summarized according to the sub types of trust.

When looking at interpersonal trust, thus also rational and relational trust, is the need for activation of members at all ECs visible. Within local energy cooperatives can a discussion be formed around having the same intentions, as it is difficult to find volunteers but sleeping members are increasing. Production cooperatives only focus on energy production projects based on financial profits, which could already tilt a collective intention towards financial benefits. This is visible as the members vote against doing other sustainable activities at GMM, however this also results in that they struggle to find board members. Community initiatives represent the other side of intentions, as no clear financial profits play a role yet, so intentions of members could be tilted towards sustainable idealism. It can be expected that members with a more idealism focus are more likely to volunteer, as receiving no direct benefits from it. Especially, local energy cooperatives and community initiatives show strategies in activation and involvement of members through relation building, while increasing relational trust to increase willingness to participate. Rational trust based on knowledge, is sufficient for all ECs, as described having specialists or trainings within the EC. The findings show that the amount of activities an EC executes is dependent on interpersonal trust and especially relational trust. The amount of activities is also visible per typology, as local energy cooperatives have most possibilities for participation and thus also relying on interpersonal trust.

Institutional trust shows clear differences between typologies. The local energy cooperatives have the closest collaboration with the municipality, which are therefore most reliant on institutional trust. The cases show that gaining trust from the authorities is critical as well, while trying to be involved. This can be done through showing capabilities and having successful experiences, while being involved often increases institutional trust for ECs. Production cooperatives show that they not necessarily need a lot of institutional trust, while not striving towards a lot collective projects with the municipality. Community initiatives also show no close collaborations requiring institutional trust, which can be linked to their size and impact. However, all typologies are affected by policy changes, which can limit them in their activities. Receiving no clear direction and lesser support from the government is a worry for all ECs, creating hesitance to initiate new activities and projects. This decrease in institutional trust results in several ECs in different typologies wanting financial independence from the government.

Interorganisational trust shows no clear differences between local energy cooperatives and production cooperatives. Both can be part of the same cooperative of cooperatives, thus also have information exchange with each other. Community initiatives are often part of Local energy cooperatives, thus are supported by them. As described earlier do energy cooperatives not have rivalry towards each other, even having the intention to help each other well. This shows high interorganisational trust among ECs themselves. The cooperatives also collaborate with commercial parties despite showing signs of low interorganisational trust in them, due to unreliability and unfairness.

The differences between cases within typologies are mostly linked to their size and amount of activities. Differences in size are noticeable in the extent of collaboration with the authorities, as larger ECs have more capabilities, thus being more interesting for the authorities to be involved. The amount of activities an EC is able to do, is much influenced by interpersonal trust, as the volunteers form the workforce of the EC. Growing in size to increase impact while also maintaining interpersonal trust to have enough volunteers is a challenge for ECs, but it is needed to maintain their position in the energy transition.

6. Discussion

This chapter will focus on discussing the results and the research itself. The first part will interpret the results against what was already found in literature, this shows how findings answer the sub questions as well as what it can add to ongoing debates. The second part will focus on the limitations of the research, looking at the theoretical framework, operationalisation, methodology and other practical limitations. Additionally, discussing the consequences of these limitations on the results.

6.1. Contribution of the results

The first sub question analyses two subtypes of trust, looking at interpersonal and institutional trust within ECs. As the first sub question is formulated, *"How do different types of trust develop within ECs?"*. The results show the roles of collaboration and participation, elaborating on different levels of involvement. Interpersonal trust is used for the participation of the members of the EC, institutional trust for collaboration and involvement of the EC by the government. The amount of involvement is related to the amount of interpersonal trust needed, but it can be questioned what the ideal level of involvement is. Therefore, it is interesting to compare the findings on trust to the ladder of citizen engagement from Arnstein.

The ladder of citizen engagement from Arnstein is still widely used as a core approach for participation (Collins & Ison, 2009). The ladder consists of eight steps with increasing degrees of citizen power, from manipulation towards citizen control. The approach shows a power struggle between citizens trying to move up and controlling organisations limiting this (Arnstein, 1969). Applying this approach to ECs can give different outcomes per level of participation. In general, ECs are fully controlled by citizens, while power is delegated to citizens in workforces and citizens decide upon the direction of the organisation. However, members could also have more tokenism like participation, where they are informed and asked for the GMM to verify the direction set by the board. Most members are within the tokenism step, although contrasting to the power relation from Arnstein do the boards from ECs want to get their members towards citizen power participation.

Discussions and reviews on the ladder also focus on this aspect as well, discussing if everything lower than citizen control is not desirable. The ladder leaves out that participants could be content with their level of engagement or not wanting to be involved at all (Collins & Ison, 2009; Tritter & McCallum, 2006). This research contributes to this as well, showing that most members do not want to necessarily participate more. The interviews show that building relational trust can increase the willingness to participate, focussing on collective intentions and finding interests of the members. This shows the importance of interpersonal trust in changing the intention of members into active participation, which is described by Arnstein and the ECs as desirable. The positive effect of interpersonal trust on participation is also mentioned in literature, as being a way to express support (Walker et al., 2010; Guetlein & Schleich, 2023). Voogd et al. (2022) stated, should trust get more attention in the process of participation, this research specifies this to the importance of relational trust.

An interesting addition to this, is the motives members have to participate, discussing the financial and idealism side. Literature describes that environmental concerns are the most occurring stimulus, while financial motives would play no important role in participating in an EC (Guetlein & Schleich, 2023; Soeiro & Dias, 2020; Koirala et al., 2018). However, the findings from the interviews in this research show a balance between environmental and financial motives, whereas financial motives are mostly described as dominant. These motives can impact the feeling of collectiveness, thus relational trust and eventually participation as well. The exact role of the intentions members have on interpersonal

trust is still complex, which literature also mentions (Guetlein & Schleich, 2023; Soeiro & Dias, 2020). Although this research does give different insights, this is still complex to assign. Further research on the role of intentions on relational trust and the willingness to participate would be needed. A larger group of members could provide answers on the role of motives on collectiveness and relational trust. The levels of participation constructed in this research could provide a structure, as the findings show that different activities require varying amounts of interpersonal trust.

Institutional trust was also part of answering the first sub research question. Literature describes the role of institutional trust in creating an environment where people have collective trust and are willing to collaborate (Seifert, 2017; De Vries et al., 2019). The interviews showed the same finding, specifically when the institution had the role of financing and policy making. However, the interviews also show the importance of mutual trust between institutions and ECs when collaborating, which is not mentioned in literature. Mutual trust is mostly described in literature for interpersonal trust, but not for institutional trust. This makes it an interesting finding, while it changes the dynamics of institutional trust substantially. Originally, institutional trust was more one sided, as an EC needed institutional trust in order to do their activities, but not having clear relations with the institutions. Mutual institutional trust shows that the relation between them is needed in order to collaborate, adding the component of relation building to institutional trust.

The mutual institutional trust is specifically visible with municipalities, as the interviews show that they collaborate closest with ECs in collective projects. This can be linked to the localisation of the energy transition as well as the decentralization of the political system. Goodwill trust and competence trust, which are used to describe institutional trust, do give some insight on mutual institutional trust. As the interviews described that the municipality had to recognize their ability to help in the energy transition, which creates mutual institutional trust. The cases do show differences in power dynamics, where some ECs can be desperate to be involved, whereas other ECs explain that the municipality have themselves the urge to collaborate because of the ability of the EC. Further research can prove additional changes in dynamics of institutional trust when in closer collaboration and contact with each other.

The second sub question focusses on interorganisational trust, as it is formulated “How do different types of trust develop between ECs?”. An interesting finding from the interviews, is the fact that there is no rivalry between the ECs. Which is seen as a beneficial component when collaborating, because it creates an environment to help each other without risks. This is currently applicable, while each EC has their own local region they operate in. The interorganisational trust between ECs makes it possible to exchange information and receive help if needed. A trust relationship based around not being rivals undermines the factors of fairness, while there is no profit in not being fair. It is interesting to follow developments on increasing scale and overlapping regions of ECs, as accompanied by becoming energy distributors of energy could change the no rivalry relationship between ECs. Although, currently there is no risk in information exchange for ECs, as interorganisational is only based around the expectation that the other would help as well if they could.

The third research question analyses the role of typologies of ECs on subtypes of trust. The third question is formulated, *“How is trust development impacted by the different characteristics of ECs?”*, showing interest in the differences between typologies. As described in the theoretical framework are there currently several definitions for ECs and thus also multiple typological frameworks. The typological framework used, was chosen because it represented best the features that this research wanted to analyse. Although, in theory boundaries between typologies seemed clear, there were in practice noticeable differences between cases within a single typology. This makes it in the end still difficult to assign certain outcomes to specific typologies or features.

The undecided role of the ECs in the energy transition can be seen as a cause for not having distinct typologies yet. As was found in the interviews, ECs are still evolving and growing a lot, which makes differences within typologies larger. These different evolvements of ECs can be assigned to the uncertain future as well as local conditions. Although, the results try to link roles and developments of subtypes of trust to typologies, is this tricky because of the differences within. A clear example is the scale and size of local energy cooperatives, whereas Zutphen Energie works on municipal level and has 1700 citizens involved, while Noaber Energie works town wide and has 125 members. But there are also difference within production cooperatives, while Wageningen op Zon has one project and no intention of growing, while Duurzaam Kootwijkerbroek has multiple and want to increase its impact. These differences per case have influence on all three types of trust, which shows the complexity of assigning ECs to a single typology.

This research does contribute to the discussion on assigning typologies for ECs. As the results confirm the importance of the activities and collaboration the ECs do, which was besides scale the main focus of the typologies used from Vega & Van Twillert (2023). However, when analysing trust, there are also several externalities having impact independent of the features from the EC. For example, did the nature of the local community play a fundamental role for interpersonal trust, the authorities themselves for institutional trust and the dependency relation for interorganisational trust. The variation of features within typologies and these externalities show once again the complexity of the role and development of trust.

6.2. Limitations of the research

When looking at limitations of this research, it is first good to see if fundamental aspects of the theoretical framework are processed well in the methodology. When looking at institutional trust, it was tried to set similar institutional conditions for the cases, which was done by looking at provincial and RES region policy. The results eventually showed the impact of municipalities on institutional trust, which in practice differed a lot per case, which made it more difficult to generalize conclusions per typology. However, cases within the same typology also showed different experiences and institutional trust in the province they were located in.

The differences between cases on institutional trust, can be explained by the type of collaboration and interaction the ECs have with the municipality. For example, Deventer Energie and Zutphen Energie are both large local energy cooperatives in terms of size and scale, but Deventer Energie has much less institutional trust and less collaboration with the municipality while Zutphen Energie has a lot. These two cases did have similar features within the same typology, but the amount of institutional trust is hard to link. This research did have three cases within the same municipality, namely Deventer Energie, Noaber energie and Buurtbedrijf Zandweerd, but it was difficult to assign clear conclusions on the features as well. Further research into these three cases, doing multiple interviews per case, could prove impacts of certain features as institutional conditions would be completely the same.

Another fundamental aspect mentioned in the theoretical framework, is the impact of subtypes of trust on each other. As Seifert (2017) states, that interpersonal trust can lead to institutional trust and the other way around as well. However, the findings of this research cannot conclude things on this relation between subtypes of trust. This can be related to not researching all subtypes of trust per activity within a single case, but analysing different activities per sub type of trust. Another use of the timeline is possible, to link the relation between subtypes of trust and key events. As for this research the timeline was used to introduce cases and activities, which was useful when looking at separate relations between subtypes of trust and collaboration. Making a timeline with trust as its main

component, thus seeing differences in the extent of trust in time, could prove to be useful when analysing the relation between subtypes of trust.

Another limitation is the moment that this research was executed, while right after the data collection, a large policy change was announced which could largely impact the role of energy cooperatives. As this policy makes it possible for energy cooperatives to sell energy to their members, which was before not possible for small distributors. This could change a lot for the activities and the role of the ECs, also impacting the three subtypes of trust. As the board member of Kootwijkerbroek stated right before, “it improves the possibilities for the ECs, giving them a better more crucial position in the energy transition” (Interview Duurzaam Kootwijkerbroek). As was shown in this research, there was already a wish to become more independent, while becoming an energy supplier was mentioned to become financially independent. This policy change probably does increase institutional trust, as it gives more possibilities and power to ECs.

7. Conclusion

In this conclusion, the research will be summarized briefly and provide an answer to the main research question. Starting with looking at the original aim of the thesis in comparison to the results of the research. The general research question is formulated as, *"How does trust develop within and between ECs collaborating on localised sustainable energy systems?"*. As the general aim of this thesis was to explore the social component of the energy transition, which is represented by ECs. The typology framework from Vega & Van Twillert (2023) was used, but also an additional typology was added, as the three typologies researched are local energy cooperatives, production cooperatives and community initiatives. These typologies were described using the features governance, ownership, participation, technology and locality & scale. The main focus was on analysing the following subtypes of trust, interpersonal trust, institutional trust and interorganisational trust. Interviews were conducted with 8 cases, providing insights into the role of these subtypes of trust and the relation to collaboration and participation.

The sub questions focussed on the subtypes of trust, as the first question looked at interpersonal and institutional trust. Interpersonal trust was analysed upon activities among members within the ECs, which differentiated per level of involvement. This showed the importance of different participation possibilities, although a lack of workforce was stressed as a challenge, as being linked to relational trust. This lack of relational trust, thus limited willingness to participate, also showed negative impacts on collaboration with the authorities and other ECs. Relational trust, which is part of interpersonal trust showed to be most influential for increasing willingness to participate. As for institutional trust, interestingly gaining trust from authorities can be seen as an essential development to increase collaboration. As institutional trust itself also substantially impacts ECs individually, while they rely on support from the authorities in order to initiate activities themselves. However, the uncertain role of ECs in policy decreased goodwill trust in the authorities, which lead to ECs being hesitant in starting new activities. Interorganisational trust between ECs showed to be rather well, while ECs are capable and willing to help each other. Good experiences proved to be influential for all three types of trust, but this initially requires enough trust to actually start a collaboration first. This research, showed the importance of developing trust within and between ECs in the energy transition. The three types of trust showed that they were essential for participation, collaboration and information exchange, which are needed to successfully cooperate within and between ECs.

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9. Appendices

Appendix 1. Long list EC

Cooperative of cooperatives	Production cooperatives / Local energy cooperatives
Energie Samen (National umbrella organisation for EC)	
Samen Om (78 EC)	2030.nu, Alkmaar Energie, Almeerse Wind, Almelo Energie, Altena Energie, Amsterdam Energie, BECO, BENG!, Betuwewind, Boeskoolstroom, Brummen Energie, Buurtstroom Energie-U, DaalmeerZon, De Groene Reus, De Nieuwe Molenaars, De ZonneRoos, Deelstroom Delft, DUEC, Duurzaam Roerdalen, Duurzaam Sittard, Duurzaam West Betuwe, EC Meierijstad, EC Vlieland, eCoBuren, Eemnes Energie, EigenWijkse Energie, Endura, Energie Collectief Loon op Zand, Energie Coöperatie Epe, Energiecoöperatie Parkstad, Energie Cooperatie Teylingen, Energie Cooperatie Vorden, Energie Dongen, Energie Gilze Rijen, Energie Reeshof, Energie van Hengelo, Energiek Halderberge, Energiek Schiedam, Enschede Energie, Goed Veur Mekare, Greuner, Groen Waterland, Haagse Stroom, Heerde Energiek, Hellendoorn op Rozen, Heuvelrug Energie, Hillezon, HilverZon, HoekscheWaardDuurzaam, Hof van Twente op Rozen, Katwijkse Energie Coöperatie, Kennmerwind, Leimuiden Duurzaam, Leudal Energie, Loenen Energie, MeerDelen, Nieuwe Lansinger Stroom, Opgewekt Rijssen, Peel Energie, Reindonk Energie, Rijn en IJsel Energie, Tegenstroom, TexelEnergie, ValleiEnergie, ValleiZon, Voorne-Putten Energie, Voorthuizen Duurzaam, Vrijstad Energie, Wageningen op Zon, Wattnu, Weert Energie, WeSpark, Wijdemeren, Woerden Energie, Zeeuwind, Zon op Alphen, Zon op Woudenberg, Zutphen Energie
Energie van Utrecht (25 EC)	Energie coöperatie Bunnik, EigenWijkse EC, Rijne Energie, 2030.nu, Veenwind, De Windvogel, Opgewekt Houten, Zon op Woudenberg, Woerden Energie, Duurzaam Eiland, Veemarkt Samen, EC Rhenen, EC De Knotwilg, Eemnes Energie, Duurzame EC Zeist, Lek en IJsel Stroom, Energie-U, Zon op Heuvelrug, Buurtstroom Energie-U, Heuvelrug Energie, Windkracht Eemland, Energie-N, Zon op De Ronde Venen, BENG!, BaarnDuurzaam
Green Choice (>120 EC)	Zonneweide Glimmen, Waddenstroom, Zevenster, Duurzaam Koudum, De Eendracht, De Toekomst, Buurtmolen Tzum, Buurtmolen Herbaijum, West-Friesland, Het Breedschap, Ecostroom, Zuiderlicht, Bergen Energie, EC Watt Nu, CALorie, Graft-de Rijp, Haarlem Noorderlicht, Kennemer kracht, DE Ramplaan, EC Kweekzon, Spaarnezaam, HET Coöperatie, NHEC, Opgewekt in Purmerend, Energiek Velsen, ZEK, EC klokhuis, Heiloo Energie, Zon Kleine Veld, EC Nieuw Oranjepoort, Emmeloord Opgewekt, Dalfsen Stroomt, Tuindorp Hengelo, Hof van Twente, Steenwijk Energie, Vinkenbuurt Stroomt, IJhorst Energie, Duurzaam Zalk, Energiek Zwartewaterland, Blauwvinger Energie, EC Molenlanden, Groene Hart Energie, EC Bodegraven-Reeuwijk, Deelstroom Delft, Drechtse Energie, KBenergie, Waardstroom, EnergieC Midden-Delfland, Gebiedscoöperatie Nieuwkoop, Coöperatie Pijnacker Nootdorp, EC De Groene Stroom, Blijstroom, REC, Schiedamse Energie Collectief, ZonKracht Capelle, Haarse Zon, Opgewekt Houten, E-lekstroom, Energie-U, Heuvelrug Energie, Zon op De Ronde Venen, DeA, Energierijck Berg en Dal, Coöperatie Bommelerwaar, eCoburen, Elburg, Energie Samen Rivierenland, Powered by Hattem, Lochem Energie, Novio Stroom, Nunspeet Energie, Rijn en IJsel Energie, Veluwe Energie, Energierijk Voorst, Bergen op Zon, Best Energie, Bres, EC Princenstroom, Energypoort Peelland, Duurzaam Drimmelen, Kempen Energie, Welschap UA, EC energietransitie Maashees, Energiecoöperatie Oss, Zon op Macharen, Duurzaam Overloon, Duurzaam Riel Goirle,

	Dommel Stroom, ZummerePower, Energiefabriek 013, EC Anneville, EC Langstraatzon, Beekse Energiecooperatie, Joris Wekt Op, Reindonk Energie, Energietransitie Maashees, EMEC, Duurzaam Roerdalen, Samenstroom
Separately mentioned	GReK (GroningerEnergieKoepel), Drentse Kei, Us Kooperaasje, NLD, Milieufederatie Gronigen, Milieufederatie Drenthe, Milieufederatie Fryslan, Doarpswurk, VerenigingGroningerDorpen, BOKD, Energiewerkplaats, Zeeuwind, Coöperatie Deltawind

Appendix 2. Case selection procedure

The first step of the case selection procedure was looking at policies from provinces and RES regions being similar in supporting ECs. This is needed to set similar conditions for the cases to be able to compare them. In the table below, different scores or characteristics are shown, upon the policy were checked to be used, the green policies were similar enough to select cases from.

	Provincie Gelderland	**Provincie Gelderland**	**Regio West-Overijssel**	**Regio Arnhem Nijmegen**	**Regio Clean tech (Stedendriehoek)**	**Regio Food Valley**	**Regio Fruitdelta Rivierenland**	**Regio Noord-Veluwe**	**Regio Achterhoek**
How many times mentioned in document	14	>19	>50	2	19	26	8	40	9
Mentioning collaboration with EC	yes	yes	yes	yes	yes	yes	yes	yes	yes
Elaboration on EC collaboration	no	yes	yes	no	yes	yes	no	no	no
Mentioning Local Ownership	yes	yes	yes	yes	yes	yes	yes	yes	yes
Mentioning specific EC	no	no	yes	no	no	no	yes	yes	no
Reference	https://media.gelderland.nl/Klimaatplan_jan2022_c4132d730e.pdf	https://energievanoverijssel.nl/wp-content/uploads/2024/06/PPE-2024-digitoegankelijk-v-def-mei-2024.pdf	https://www.reswestoverijssel.nl/over+de+res/res1-0/documenten+res1-0/handlerdownloadfiles.ashx?idnv=1953654	https://www.groenemetropoolregio.nl/media/ogylo0xo/regionale-agenda-2023-2024.pdf	https://regiostedendriehoek.nl/wp-content/uploads/2023/06/Definitieve-1.0.pdf	https://www.regiofoodvalley.nl/fileadmin/energietransitie/Jul_2021/Formele_versie_rapport_RES_1.0_2021_volledig-print.pdf	https://www.resrivierenland.nl/wp-content/uploads/RES-1.0-Rivierenland-6-april-2021.pdf	https://energiestrategienv.nl/uploads/637546799608339084_RES-01%20Noord%20Veluwe%20-%20Bestuurlijk%20document.klein.pdf	https://www.resachterhoek.nl/verzamelpagina+gepubliceerde+publiekelijke+documenen/HandlerDownloadFiles.ashx?idnv=2114748

Within the cases were several cases in the different typologies sought. After a list was made, were the cases ranked upon following the criteria set for ECs in the theoretical framework. The cases which went through the selection procedure were contacted and possibly used for the research. The list with the cases applicable to the selection criteria is shown in the table below.

RES Regio	Local energy cooperatives	Production cooperatives	Community initiatives
Regio Clean tech & Regio West Overijssel	DeA	Buurtstroom DeA	Buurtbedrijf Zandweerd
	Loenen energie	O.G.G. Oxe geeft gas	
	Deventer energie	Collectieve opwekinstallatie Zonnedael	
	Vereniging Noaber energie	Zon op K&N	
	Brummen energie		
	Energiecooperatie Epe		
	Lochem energie		
	Energierijk Voorst		
	Zutphen energie		
	Heerde energiek		
Regio Food valley	ValleiEnergie	Dakenstroom	Koningklijke buurt bennenkom
	Warmtenet Oost-Wageningen	Zon op Nijkerk	Wageningse Benedenbuurt
	Vereniging voorthuizen duurzaam	Cocon wonen energie	
	Energie Rhenen	Uitonsdak (II)	
		GW Zonnestroom	
		Zonneenergiecentrale keltenwoud	
		Wageningen op zon	
		Duurzaam Kootwijkerbroek	
Regio Noord-Veluwe	Powered by hattum	Woonwijk de zeven heuvelen	
	Noord-Veluwe/Oldebroek	Veluwe energie	
	Nunspeet energie		
	Endura		
	Nieuwe energie		

Appendix 3. Interview guide used (Dutch)

i. Checklist of important questions

Topic	Subtopic	Questions	Check
Interpersonal trust	General	6. Denkt u dat andere leden de juiste intentie hebben om samen te werken?	
		6c. In hoeverre hebben leden de juiste vaardigheden om samen te werken?	
	Relational trust	3c. Heeft u het gevoel dat andere leden hetzelfde denken en willen binnen “EC”?	
	Rational trust	4c. In hoeverre vind u dat andere leden voldoende helpen voor “EC” om doelen te behalen?	
		4d. Houden zij volgens u zich aan afspraken die gemaakt zijn?	
	Risk	5a. Loopt u risico door wat andere doen binnen “EC”?	
		5. Bent u onderling afhankelijk van andere binnen “EC”?	
Institutional trust	General	8. Wat merkt u vanuit dit beleid met betrekking tot “EC”?	
		6a. In hoeverre spelen verschillen in normen en waarden tussen leden een rol in discussies of bij samenwerking?	
	Social trust	2. Werkt u makkelijk samen met mensen die u niet of niet zo goed kent?	
	Goodwill trust	8a. Word er vanuit “EC” zorgen gemaakt om het beleid vanuit de overheid?	
	Competence trust	9c. In hoeverre wordt er vanuit de overheid transparant gewerkt naar “EC” toe?	
		9. Vind u dat er vanuit de overheid genoeg kennis is over “EC” en de energietransitie?	
Interorganisational trust	General	11. Wat vinden de meeste leden van het samenwerken met andere organisaties?	
	Information exchange	12a. In hoeverre word er informatie uitgewisseld met andere energie coöperaties of duurzaamheidsorganisaties?	
	Risk	13a. In hoeverre zijn zij afhankelijk van samenwerken met jullie?	
		13b. Zit er een risico aan samenwerken met andere energie coöperaties of duurzaamheidsorganisaties?	
Other		Als u naar de tijdlijn kijkt, ontbreekt er dan nog iets belangrijks volgens u?	
		1a. Wat is de rol of welke activiteiten hebben leden binnen “EC”?	
		Wat is de huidige schaal van “EC” en zijn er ambities om dit te vergroten?	

ii. General interview guide

Over mezelf

- Studeer en woon in Wageningen
- Master Urban Environmental Management
- Planologie, ruimtelijke ordening
- Energietransitie interesse

Opname

a. Vind u het goed als ik dit gesprek opneem en gebruik voor mijn onderzoek (formulier)
b. Dataverwerking is anoniem
c. Het draait om uw meningen en ervaringen

Aandachtspunten

- Niet direct vragen naar vertrouwen
- Niet vermelden dat onderzoek over vertrouwen is

Achtergrond

a. Kunt u zich kort voorstellen?
b. Sinds wanneer en hoe bent u betrokken bij "EC"?

Interpersonal trust

1. Met wie werkt u samen binnen "EC"?
    a. Wat is de rol of welke activiteiten hebben leden binnen "EC"?
2. Werkt u makkelijk samen met mensen die u niet of niet zo goed kent?

U geeft aan samen te werken met … binnen "EC,

3. Hoe verloopt deze samenwerking volgens u?
    a. Zijn er veel discussies of onenigheid over inhoudelijke onderwerpen?
    b. Trekken jullie veel samen op?
    c. Heeft u het gevoel dat andere leden hetzelfde denken en willen binnen "EC"?
    d. Komt dit ook overeen met de doelen beschreven door "EC"?
    e. Kunt u zich een bepaald moment herinneren dat dit niet zo was en er spanning ontstond tussen leden?

4. Hoe verdelen jullie het werk?
    a. Wat zijn populaire of minder populaire taken?
    b. Heeft u het gevoel dat taken samen opgepakt worden?
    c. In hoeverre vind u dat andere leden voldoende helpen voor "EC" om doelen te behalen?
    d. Houden zij volgens u zich aan afspraken die gemaakt zijn?
    e. Kunt u een voorbeeld geven van een actie van een ander lid waardoor gemeenschappelijke doelen behaald werden?
    f. Kunt u zich een moment herinneren dat een lid zich niet aan de afspraken hield of niet voldoende deed voor "EC"?

5. Bent u onderling afhankelijk van andere binnen "EC"?

a. Loopt u risico door wat andere doen binnen “EC”?
b. Kunt u zich een gebeurtenis herinneren waaruit dit bleek?

6. Denkt u dat andere leden de juiste intentie hebben om samen te werken?
    a. In hoeverre spelen verschillen in normen en waarden tussen leden een rol in discussies of bij samenwerking?
    b. Kunt u een voorbeeld geven waaruit dit blijkt?
    c. In hoeverre hebben leden de juiste vaardigheden om samen te werken?
    d. Dus over het algemeen ervaart u de samenwerking met andere leden als …?

Institutional trust

7. Met welke overheidsinstanties werken jullie veel samen?
    a. Kunt u voorbeelden noemen van samenwerking met de overheid?

In het beleid van de provincie en regio word een belangrijke rol gegeven aan EC in de energietransitie…

8. Wat merkt u vanuit dit beleid met betrekking tot “EC”?
    a. Word er vanuit “EC” zorgen gemaakt om het beleid vanuit de overheid?
    b. Kunt u hier een voorbeeld van noemen toen dit ervaren werd?
    c. Wat voor invloed had deze gebeurtenis op de relatie van leden met de overheid?
    d. Wat voor invloed heeft dit op de activiteiten die “EC” uitvoert?

9. Vind u dat er vanuit de overheid genoeg kennis is over “EC” en de energietransitie?
    a. In hoeverre is er contact vanuit de overheid over hun activiteiten die betrekking op jullie hebben?
    b. Komt beleid van de overheid overeen met wat afgesproken is?
    c. In hoeverre wordt er vanuit de overheid transparant gewerkt naar “EC” toe?
    d. Zijn er voorbeelden van momenten dat er onenigheid was met de overheid en “EC”?
    e. Welk effect had dit op de activiteiten van “EC”?

Interorganisational trust

10. Met welke mensen en partijen werkt u samen buiten “EC”?

U geeft aan dat er partijen zijn waarmee word samengewerkt…

11. Wat vinden de meeste leden van het samenwerken met andere organisaties?
    a. Waaruit kunt u dit opmaken?

12. Hoe word een samenwerking met een andere “EC” gekenmerkt
    a. In hoeverre word er informatie uitgewisseld met andere energie coöperaties of duurzaamheidsorganisaties?
    b. Kunt u een voorbeeld geven van een relatie met een andere coöperatie waarbij informatie uitgewisseld werd?
    c. Hoe word het samen optrekken met deze EC ervaren?

13. Zijn er organisaties waar jullie afhankelijk van zijn?
    a. In hoeverre zijn zij afhankelijk van samenwerken met jullie?

b. Zit er een risico aan samenwerken met andere energie coöperaties of duurzaamheidsorganisaties?
c. Kunt u een gebeurtenis herinneren waaruit dit bleek?

14. Kunt u een moment benoemen waarbij de samenwerking met een andere organisatie minder goed verliep?
    a. Hoe kwam dit?
    b. Heeft dit effect gehad op andere samenwerkingen?
    c. Was het uitzondering of regelmaat?
    d. Hoe speelde deze gebeurtenis onder de leden van “EC”?

Missing information features

1. Wie is eigenaar van de projecten van “EC”?
2. Zijn er beperkingen wanneer iemand lid mag worden van “EC”?
3. Wat is de huidige schaal van “EC” en zijn er ambities om dit te vergroten?

Verbreding

4. Welke belangrijke gebeurtenissen kunt u zich herinneren naast …? Wat gebeurde met betrekking tot samenwerking?
5. Kunt u zich een gebeurtenis herinneren waar iets mis ging en hoe werd hiermee om gegaan?
6. Als u naar de tijdlijn kijkt, ontbreekt er dan nog iets belangrijks volgens u?

Afsluiting

- Ik check heel even kort of ik nog een bepaald belangrijk punt gemist heb
- Ik wil u heel erg bedanken voor het interview

Appendix 4. Interview guide translated (English)

iii. Checklist of important questions

Important questions are marked yellow in this version.

iv. General interview guide

About Myself

- Study and live in Wageningen
- Master Urban Environmental Management
- Specialization in Spatial Planning
- Interest in the Energy Transition

Recording

a. Is it okay if I record this conversation and use it for my research? (consent form)
b. Data processing is anonymous.
c. It revolves around your opinions and experiences.

Points of Attention

- Do not directly ask about trust.
- Do not mention that the research is about trust.

Background

d. Can you briefly introduce yourself?
e. Since when and how have you been involved with "EC"?

Interpersonal Trust

1. With whom do you collaborate within "EC"?
    a. What is the role or what activities do members have within "EC"?
2. Do you easily collaborate with people you do not know or do not know well?

You mentioned collaborating with ... within "EC."

3. How do you perceive this collaboration?
    a. Are there many discussions or disagreements about substantive issues?
    b. Do you often work closely together?
    c. Do you feel that other members think and want the same things within "EC"?
    d. Does this align with the goals described by "EC"?
    e. Can you recall a specific moment when this was not the case and tension arose among members?
4. How do you divide the work?
    a. What are popular or less popular tasks?
    b. Do you feel that tasks are tackled together?

c. To what extent do you think other members sufficiently help “EC” achieve its goals?

d. Do they follow the agreements made, in your opinion?

e. Can you give an example of an action by another member that helped achieve common goals?

f. Can you recall a moment when a member did not adhere to agreements or did not do enough for “EC”?

5. Are you interdependent on others within “EC”?

    a. Do you take risks based on what others do within “EC”?

    b. Can you recall an incident that demonstrated this?

6. Do you think other members have the right intentions to collaborate?

    a. To what extent do differences in norms and values among members play a role in discussions or collaboration?

    b. Can you give an example that illustrates this?

    c. To what extent do members have the right skills to collaborate?

    d. So generally, do you experience collaboration with other members as ...?

Institutional Trust

7. Which government agencies do you collaborate with frequently?
    a. Can you give examples of collaboration with the government?

The policy of the province and region assigns an important role to EC in the energy transition...

8. What do you notice from this policy concerning “EC”?

    a. Are there concerns within “EC” regarding government policy?

    b. Can you provide an example when this was experienced?

    c. What impact did this incident have on the relationship between members and the government?

    d. What effect does this have on the activities that “EC” carries out?

9. Do you think there is enough knowledge about “EC” and the energy transition within the government?

    a. To what extent is there contact from the government about their activities that concern you?

    b. Does government policy align with what was agreed upon?

    c. To what extent does the government work transparently towards “EC”?

    d. Are there examples of moments when there was disagreement with the government and “EC”?

    e. What effect did this have on the activities of “EC”?

Interorganisational Trust

10. With whom and which parties do you collaborate outside of “EC”?

You mentioned that there are parties you collaborate with...

11. What do most members think about collaborating with other organizations?
    a. How can you tell this?
12. How is a collaboration with another “EC” characterized?
    a. To what extent is information exchanged with other energy cooperatives or sustainability organizations?
    b. Can you provide an example of a relationship with another cooperative where information was exchanged?
    c. How is the joint effort with this EC experienced?
13. Are there organizations you are dependent on?
    a. To what extent are they dependent on collaborating with you?
    b. Is there a risk in collaborating with other energy cooperatives or sustainability organizations?
    c. Can you recall an incident that demonstrated this?
14. Can you name a moment when collaboration with another organization did not go well?
    a. What caused this?
    b. Did this affect other collaborations?
    c. Was it an exception or a regular occurrence?
    d. How did this incident play out among the members of “EC”?

Missing Information Features

1. Who owns the projects of “EC”?
2. Are there restrictions on who can become a member of “EC”?
3. What is the current scale of “EC” and are there ambitions to expand it?

Broadening

4. What significant events can you recall besides ...? What happened regarding collaboration?
5. Can you recall an incident where something went wrong and how was it handled?
6. When you look at the timeline, do you think anything important is missing?

Conclusion

- I will briefly check if I missed any important points.
- I want to thank you very much for the interview

Appendix 5. Case timelines

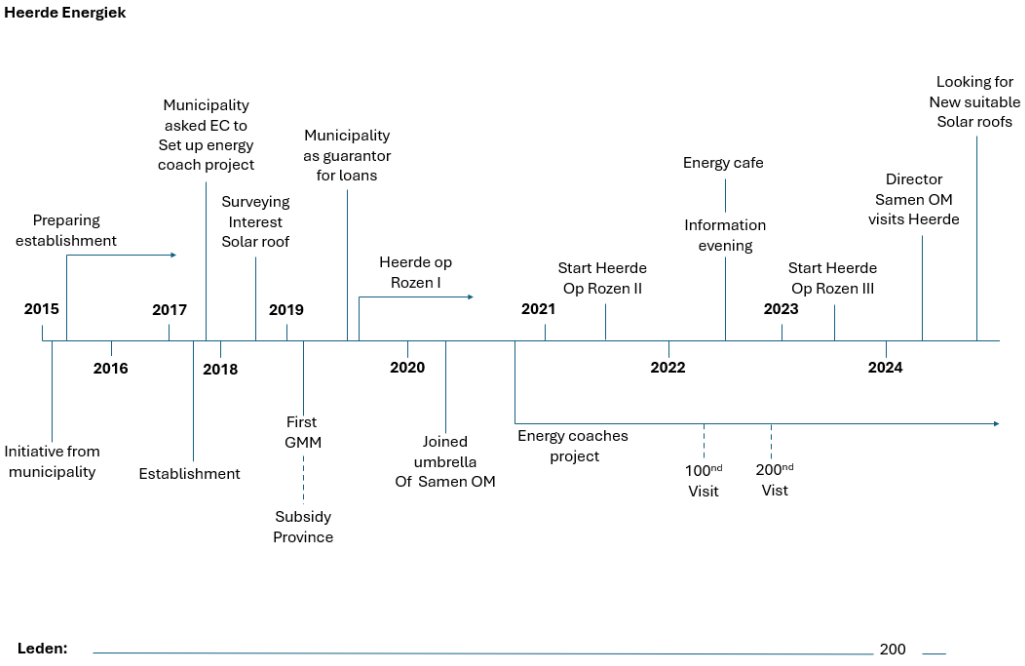

Figure 6, timeline Heerde Energiek (Heerde energiek, 2023; Nieuwsblad schaapskooi, 2024; Heerde Energiek, z.d.).

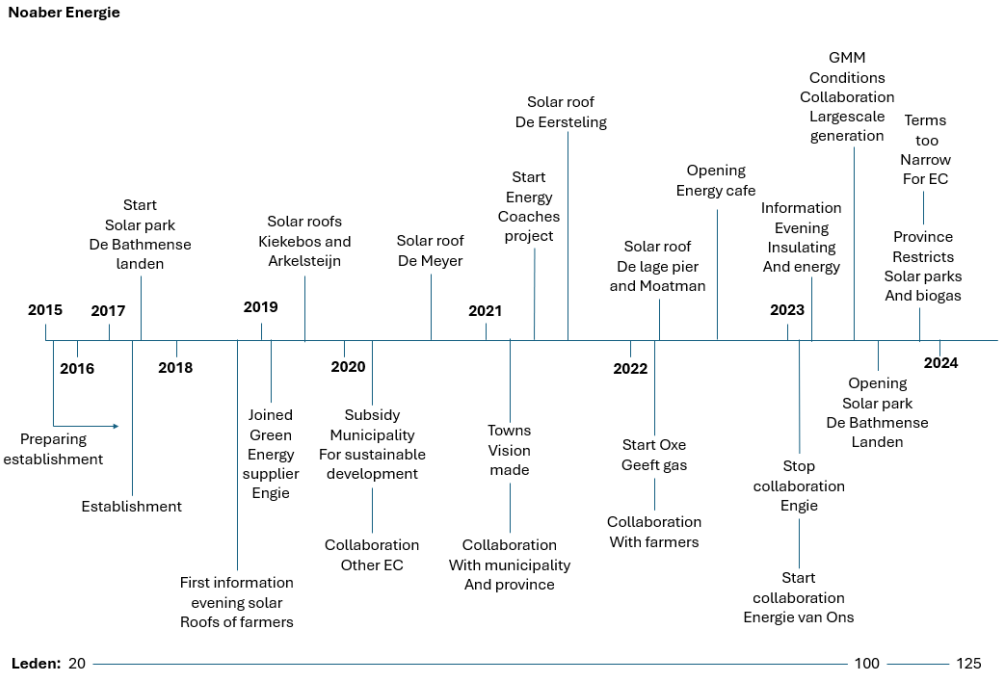

Figure 7, timeline Noaber Energie (Coöperatieve Vereniging Noaber-Energie U.A., z.d.; Everaardt, 2023; Noaber Energie, z.d.).

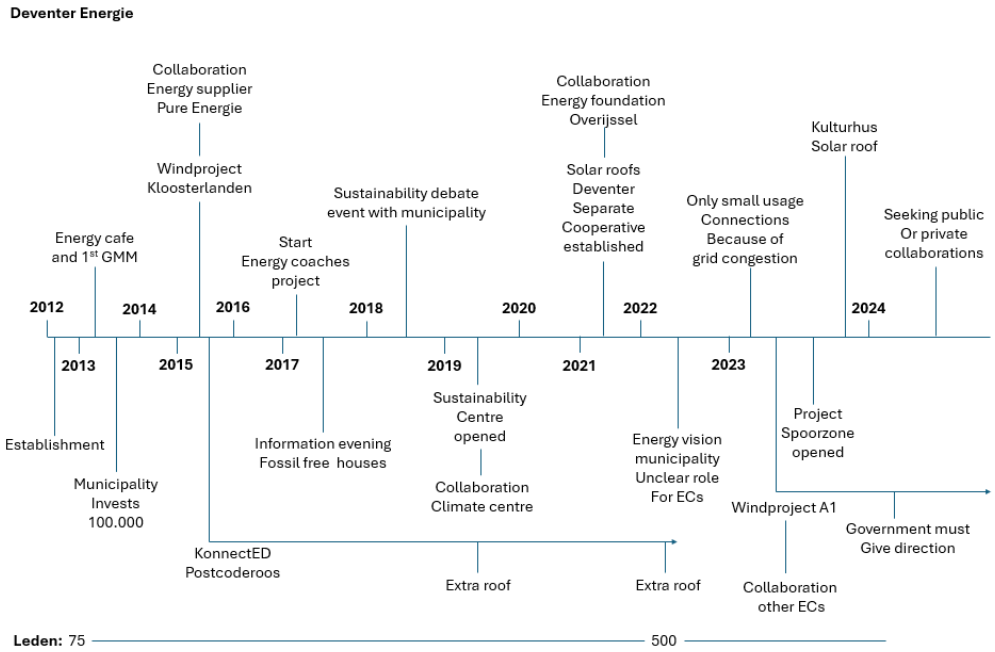

Figure 8, timeline Deventer Energie (Deventer Energie coöperatie, z.d.; Gemeenteraad Deventer, 2024; Energiefonds Overijssel, 2023; Deventer Energie coöperatie, z.d.-b; Salland Solar, 2012).

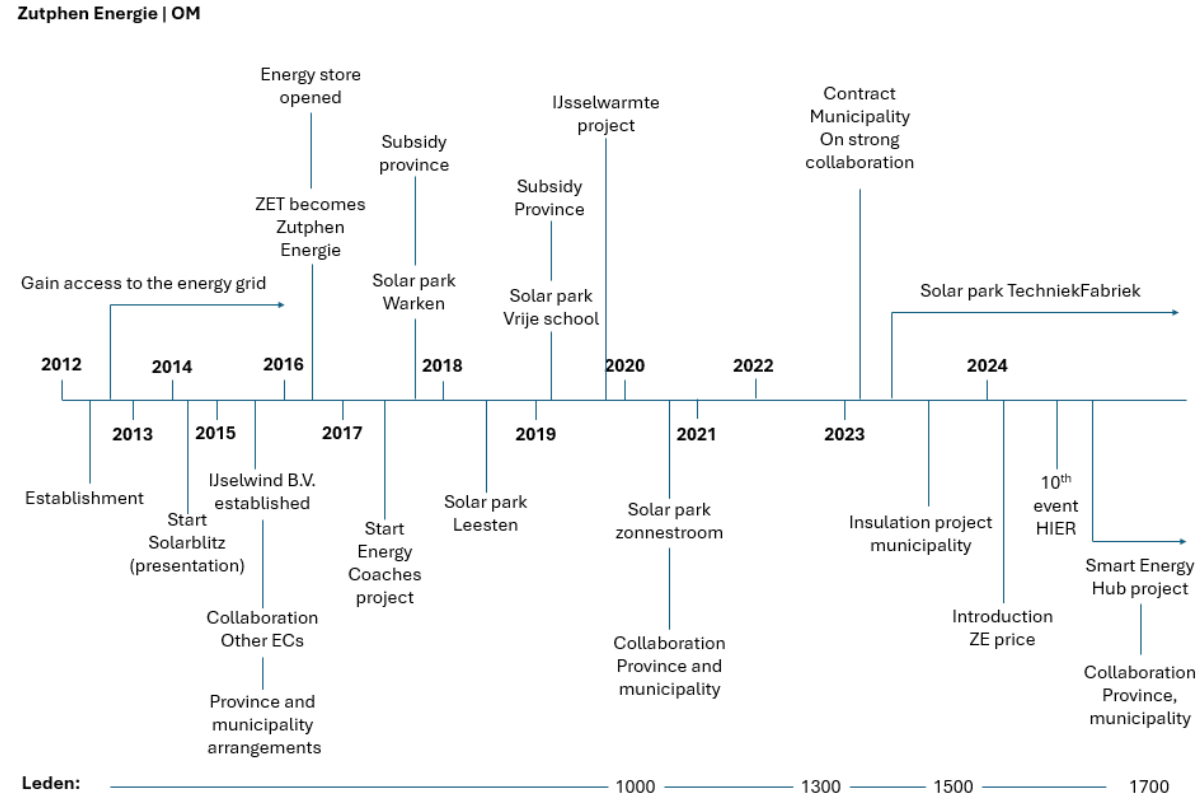

Figure 9, timeline Zutphen Energie (ZutphenEnergie, z.d.; HIER, 2020; Gemeente Zuthpen, 2023; ZutphenEnergie, z.d.-a).

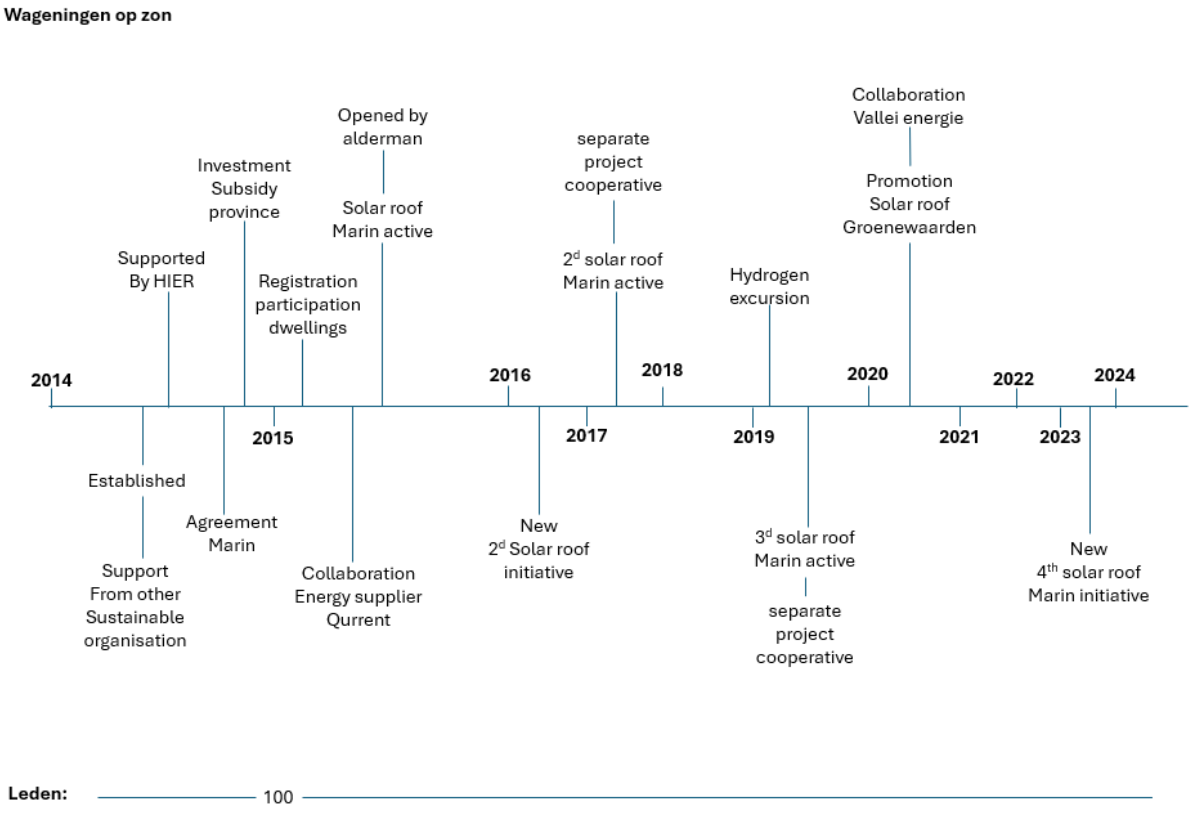

Figure 10, timeline Wageningen op Zon (Wageningen op zon, z.d.; Mokoginta, 2016)

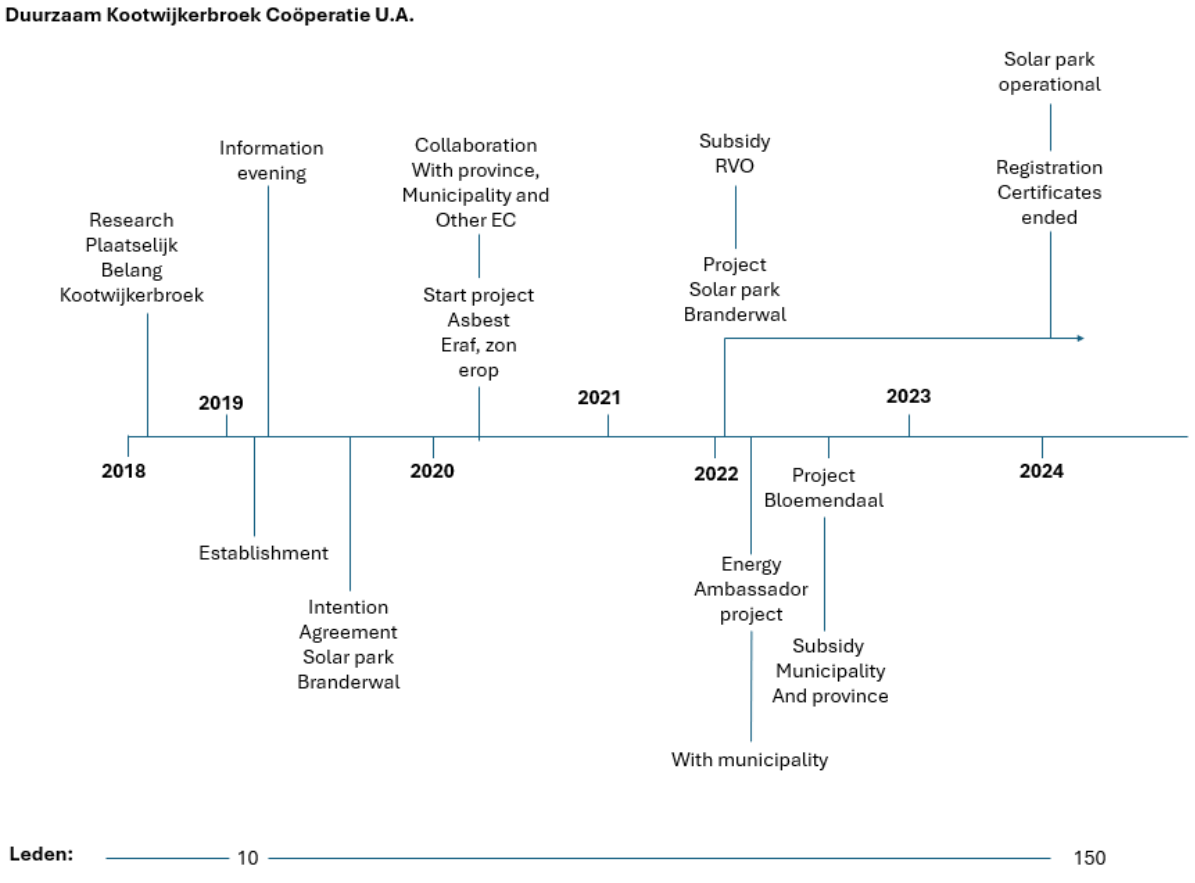

Figure 11, timeline Duurzaam Kootwijkerbroek (Duurzaam Kootwijkerbroek, z.d.; Zonnepark Branderwal, 2023)

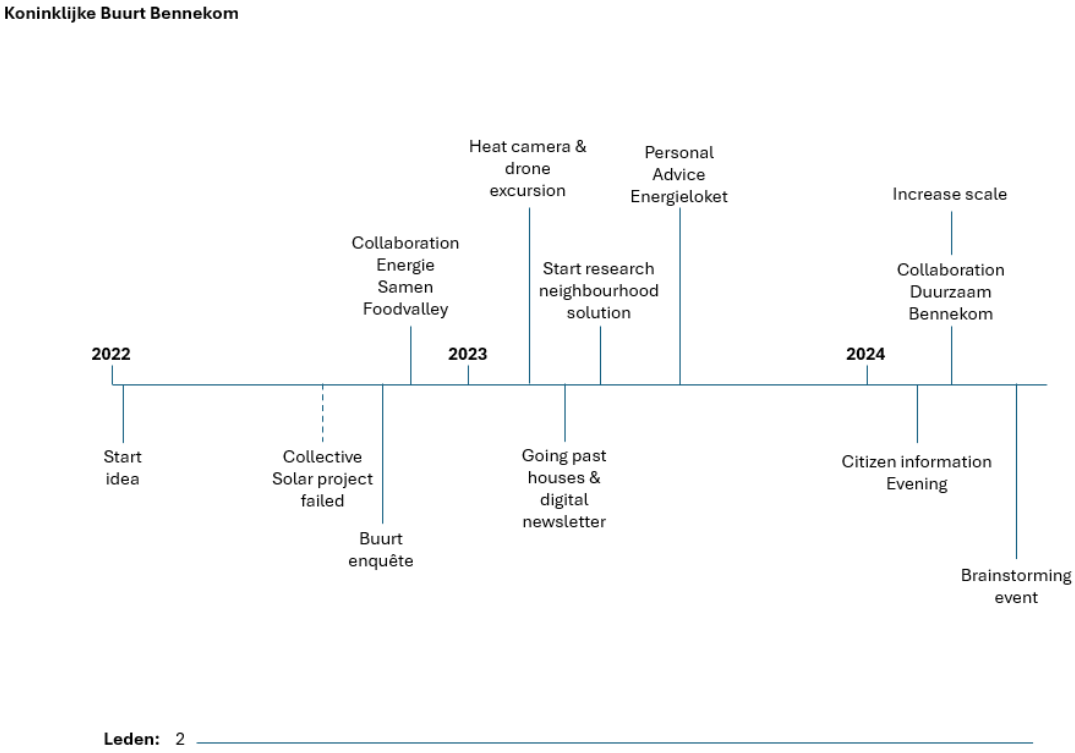

Figure 12, time Koninklijke buurt Bennekom (Mosch & Maat, 2024; Woodley, 2024; RVO, 2024).

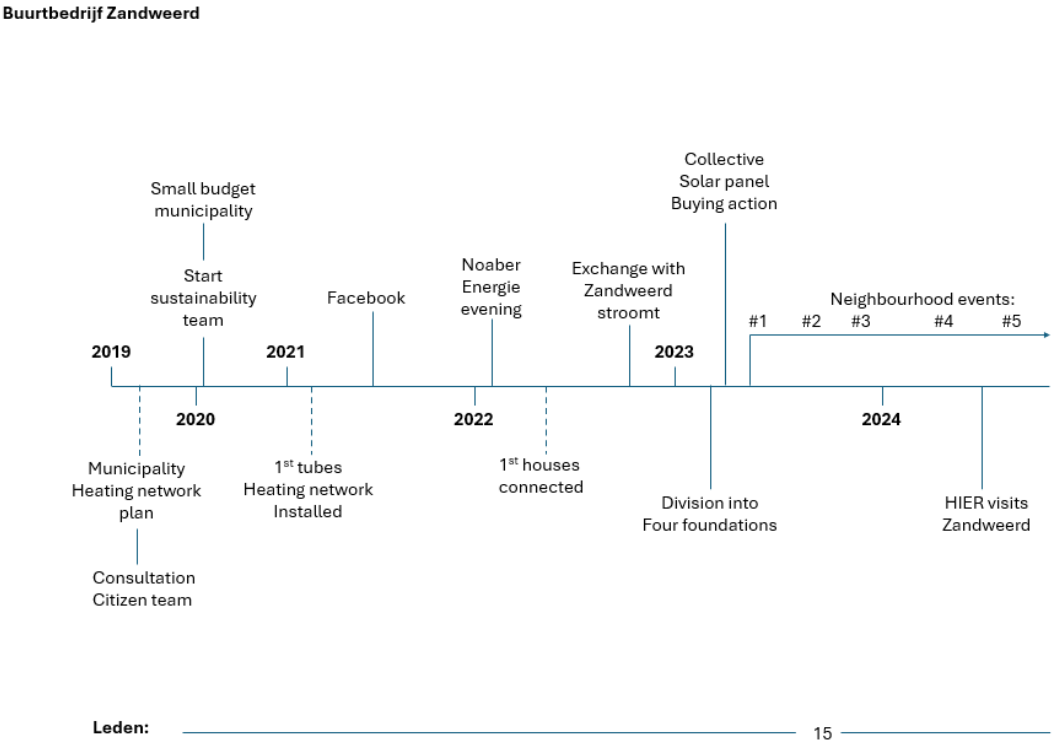

Figure 13, timeline Buurtbedrijf Zandweerd (Buurtbedrijf Zandweerd, z.d.; Overbeek, 2024; Duurzaamheidsteam Zandweerd, z.d.)