University of Twente

Master's in Environmental and Energy Management Thesis

Renewable Energy Communities as a tool for the Democratization of the Local Energy Transition in the Province of Fryslân, the Netherlands

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Abstract

The Paris agreement makes an urgent call to limit the temperature increase of the earth below 1.5-2°C respecting pre-industrial levels, combat climate change and pursue a sustainable low carbon future. Much importance has been given to the energy transition in the Netherlands. The National Climate Agreement, which was proposed as a follow up of the Paris Agreement, aims to reduce greenhouse gas emissions 49% by 2030 compared to levels in 1990 and achieve as other European countries, climate neutrality by 2050.

The energy transition is the pathway to achieve these goals at European level, and therefore, the European Union has highlighted the importance of Renewable Energy Communities (RECs), as they mean a tool to advance the energy transition through the democratization of the energy sector.

The Clean Energy for all Europeans Package (CEP) establishes the Renewable Energy Directive (RED) as the framework through which RECs are defined, framed, and receive a legal character at the European level.

Citizens are considered drivers of the energy transition; therefore, the research objective comprises the assessment of democratic qualities in RECs and their contribution to the democratization of the local energy transition by carrying an in-depth study of three energy cooperatives in the province of Fryslân: Duurzaam Akkrum Nes, Grieneko and Wijnjewoude Energie Neutraal. The research uses the definition given by the RED, the principles of the International Cooperative Alliance and three main democratic qualities: *participation, acceptance* and *right of members*, which are based on an in-depth literature review, to assess democracy in RECs. In this research data was collected from documents and through interviews. The data was codified and analysed to investigate the contribution of RECs to the energy transition. The research concludes that although RECs present democratic qualities in their establishment and operation phases, different degrees of democracy prevail on each of the energy cooperatives. RECs contribute as well to the democratization of the local energy transition, however there are certain barriers and drivers that need to be considered, if the local energy transition is to be advanced.

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List of Abbreviations and Acronyms

CEP	Clean Energy for all Europeans Package
DAN	Duurzaam Akkrum Nes
EU	European Union
IRENA	International Renewable Energy Agency
NECPs	National energy and climate plans
NIMBY	Not in my backyard
REC	Renewable Energy Community/ Cooperative
RED	Renewable Energy Directive
UNFCCC	United Nations Framework Convention on Climate Change
WEN	Wijnjewoude Energie Neutraal

Acknowledgement

"Worthy are you Lord to receive glory and honour and power, all my crowns are laid before you" Revelation 4:10

My deepest thanks and love are for my parents who have unconditionally supported me in everything I´ve done, this achievement is also yours. To my girlfriend, my closest person and strong pillar who was always there for me and encouraged me during the whole process, and to my friends for all the good moments and laughs we had during this corona year, thank you, it wouldn't have been as good as it was without you. Special thanks are for my supervisors Dr. Gül Özerol and Dr. Frans Coenen, thank you for wisely guiding me along the process and always putting me back on track.

1. Introduction

1.1. Background

The Paris agreement makes an urgent call to limit the temperature increase of the earth below 1.5-2°C respecting pre-industrial levels, combat climate change and pursue a sustainable low carbon future (Foran, 2016). Every country has to do its part according to the principles of sustainable development and inter-generational equity. As the international community strives to achieve its goals, the *energy transition*, which is defined as "a pathway towards transformation of the global energy sector from fossil-based to zero-carbon by the second half of the century" (IRENA, 2021), pushes forward in regions and local communities through different initiatives.

At the European level, the renewable energy directive (RED) acts as a commitment of the European Union (EU) with the Paris Agreement and the 21st conference of the Parties to the United Nations Framework Convention on Climate Change (UNFCCC). The RED supports the EU energy policy and the EU 2030 energy and climate framework, which includes the binding target of cutting emissions by at least 40% below 1990 levels by 2030 (European Parliament, 2018). In the Clean Energy for all Europeans Package (CEP), the EU recognizes that renewable energy communities (RECs) are a way to reconnect to citizens and include the social dimension in the energy transition (Cobutt, 2021), namely democratizing it. The RED states that "the participation of local citizens and local authorities in renewable energy projects through RECs has resulted in substantial added value in terms of local acceptance of renewable energy […] which results in greater participation by citizens in the energy transition". Following from this statement, the local involvement is crucial to the context of increasing renewable energy capacity because through the provided framework, citizen ownership and acceptance of renewable energy is encouraged (European Parliament, 2018).

Much importance has been given to the energy transition in the Netherlands. The National Climate Agreement, which was proposed as a follow up of the Paris Agreement, aims to reduce greenhouse gas emissions 49% by 2030 compared to levels in 1990 and achieve as

other European countries, climate neutrality by 2050. This transition is considered primarily a social transition which will affect society daily; how we live and move and our consumption patterns (The Government of the Netherlands, 2019). Furthermore, the National Energy and Climate Plans (NECPs) were introduced as regulations for every EU member state, agreed as part of the CEP. Each member state should, accordingly to the NECPs, submit a progress report every two years on the achievements of the established targets regarding energy efficiency, renewables, greenhouse gas emissions reductions, interconnections and research and innovation (European Commission, n.d.).

Both, the Climate Agreement and the NECPs address five dimensions: decarbonization, energy efficiency, energy security, internal energy market and, research and innovation (Ministry of Economic Affairs and Climate Policy, 2019). These dimensions show the relevance of local energy initiatives for the national policy as they act as decarbonization initiatives, where renewable energy and energy efficiency projects take place. The decentralized energy that these initiatives generate also add in strengthening national energy security due to more energy being produced by renewable sources. This in time pushes forward research and innovation as the internal energy market strives to adapt and be flexible to the new sources of energy.

Local initiatives towards energy transition are given different names in the scholarly community, such as “grassroots innovations” (Seyfang and Smith, 2007), “local energy initiatives" (LEI’s) (Hoppe et al. 2015) or “local low carbon energy initiatives” (LLCEI’s) (Warbroek and Hoppe, 2017), which have similar characteristics and purposes, including permanent or at least long-term organizations, such as cooperatives. The term cooperative is relevant for this research because it promotes the autonomous and voluntarily association of people aiming to meet common economic, social, sustainability and cultural goals through a democratically owned and controlled people-centred enterprise (ICA, 2017a, 2017b). Principles from cooperatives are voluntary and open membership; democratic member control; economic participation through direct ownership; autonomy and independence: education, training, and information; cooperation among cooperatives: and concern for the community (REScoop, 2021). These principles frame the concept of

"democratic qualities" within cooperatives. For this thesis purposes, the cooperative definition (ICA, 2017a, 2017b), and the term given by the RED, *Renewable Energy Community* (REC) will be used to refer to all such initiatives. The RED defines REC as a legal entity, which "is based on open and voluntary participation, is autonomous, and is effectively controlled by shareholders or members that are located in the proximity of the renewable energy projects that are owned and developed by that legal entity". The shareholders of such initiatives can be natural persons, SMEs, local authorities and even municipalities, with the primary purpose of providing environmental, economic and community benefits to its shareholders, members, or local areas, rather than just financial profits (European Parliament, 2018; Roberts, 2020).

1.2. Problem Statement

RECs are not new in the Netherlands. According to Agterbosch (2006), 25 Dutch wind cooperatives were founded during a relatively short period, from 1986 to 1992. Although some of them have disbanded or merged, the main drivers for the uprise of this first wave of energy cooperatives came as a result of the antinuclear and pro-environmental movements from those decades. These cooperatives mainly relied on wind energy and were found in rural areas, mostly near the shores. These wind cooperatives belong to the first type of energy cooperatives; however, a second type of REC has been more recently coming up to stage in the past few years (Oteman et al., 2014). The second type of RECs refer to "community initiatives for decentralized renewable energy [...] aimed to promote energy savings, private renewable energy production, facilitate cooperative energy production and/or supply renewable energy to their members." (Oteman et al., 2014). Local renewable energy companies are found in cities and rural areas alike and they often have a city or municipal identity, which is reflected in their names.

The number of this new type of energy initiatives reached 246 in 2015 and 498 in 2018. Currently there are 623 energy cooperatives in the Netherlands with an estimated 97,000 participants. As of 2020 only in the province of Fryslân there are 73 energy cooperatives, positioning Fryslân as the province from Netherlands with more energy cooperatives established (Lokale Energie Monitor, 2020). These data show that in the last few years

there has been a rapid increase in the number of energy cooperatives. However, the number of cooperatives has started to stabilize, focusing now on the quality of cooperatives which translates to the further development towards dynamic and effective cooperatives with more of their own projects, members, and participants (Koops-Tippersma, 2021). This implies that RECs have arrived at the stage where the quality of the cooperatives is more relevant to the energy transition than the growth in numbers of these cooperatives in the Netherlands. Shared spatial identities, understanding of the livelihood and landscape can help create the social context where new technologies and projects, such as the ones needed to increase quality of the cooperatives, are easier to be accepted, and energy consumption transforms itself into production of renewable energy (Calvert, 2016; Späth and Rohracher, 2010). This relates to the concept of energy democracy, in which everybody should be guaranteed access to sufficient and affordable energy; fossil fuels should be left in the ground and renewable energy should ultimately reach 100% of the energy share; new forms of collective private ownership such as cooperatives should emerge to socialize and democratize the production means; and lastly the transition should ensure unionized and fairly paid jobs in the renewable energy sector (Energy Democracy, n. d.).

The field of knowledge regarding the establishment of RECs is not new. Many scholars have researched several aspects of RECs, such as success factors, motivations for the creation of a REC, acceptance of RECs, member and community interaction and participation (Wüste and Schmuck, 2012; Otema et al., 2014; Arentsen and Bellekom, 2014; Yildiz, 2014; Hoppe et al., 2015; Yildiz et al., 2015; Warbroek and Hoppe, 2017; Warbroek et al., 2019; Doci, 2021). However, evidence regarding forms, practices, and outcomes of energy democracy outside the German context is currently limited (Van Veelen, 2018). Therefore, the concept of energy democracy as well as the principles of the ICA play an important role determining the democratic qualities of RECs in Fryslân, and how these RECs help democratize the energy transition locally.

1.3. Research Objective

The research objective is formulated based on the knowledge gap identified from the review of the literature. As mentioned above, several studies have been developed on the

establishment and operation of RECs, whereas the influence of democratic qualities within this kind of cooperatives has received little attention. Thereby, the research objective of the thesis is to assess the democratic qualities in RECs and the contribution of RECs to the democratization of the energy transition locally, by carrying out an in-depth study of RECs in the province of Fryslân, the Netherlands.

1.4. Research Questions

To achieve the research objective of the thesis, the following main research question was formulated:

> How do RECs contribute to the democratization of the energy transition in local communities?

The following sub-questions are formulated to answer the main research question, emphasizing the empirical focus of the research carried out in Fryslân, the Netherlands:

1. To what extent is the establishment and operation of RECs democratic?
2. How do the democratic qualities influence RECs in Fryslân?
3. How do RECs in Fryslân compare to each other in terms of democratic qualities?

1.5. Thesis Outline

The thesis consists of 5 chapters. **The first chapter** introduces the topic. By discussing the empirical background of RECs, the problem statement, the main objectives, and the research questions, the frame of the thesis is established. **The second chapter** establishes the research design, which includes the research methodology, research framework, research strategy and the data analysis method. **Chapter three** presents the theoretical framework based on a comprehensive literature review. **The fourth chapter** presents the findings of the interviews and develops a comparative analysis based on the REC cases of the three villages, as well as an analysis of the contribution of RECs towards the democratization of the energy transition locally. Finally, **Chapter five** draws on conclusions and recommendations.

2. Research Design

In this chapter the methodology of the thesis is presented through the research framework, research strategy, research cases, research boundary, and the data sources and data collection methods. Finally, the data analysis of the thesis is explained in section 2.3, which includes the analytical framework, an explanation of the interview design, validation of data analysis and an ethical statement.

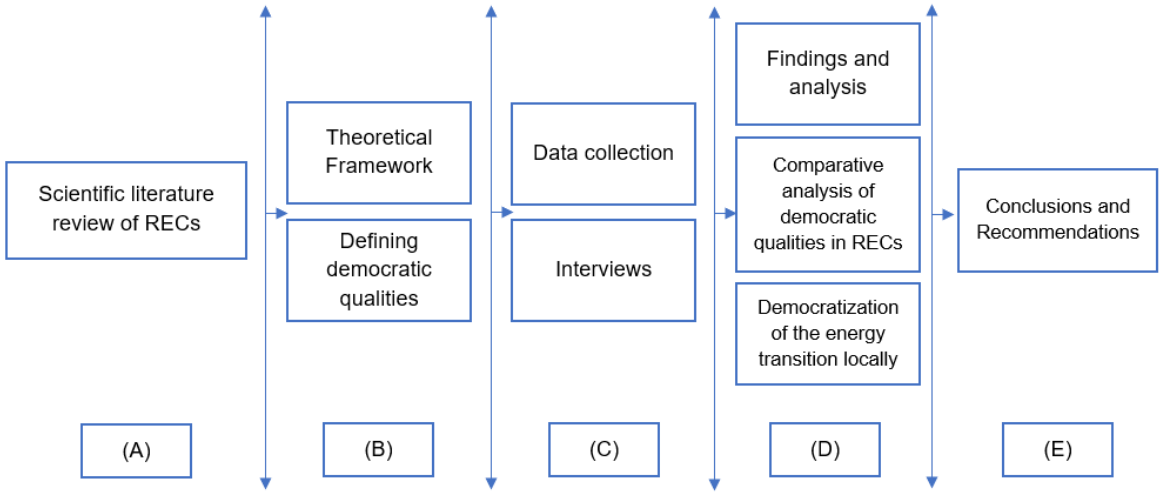
2.1. Research Framework

According to (Verschuren and Doorewaard, 2010) constructing the research framework for a research project consists of determining the research objective, which for this research comprises in improving the understanding on democratic qualities in RECs by carrying out an in-depth study of RECs in the province of Fryslân, the Netherlands. The research object of the thesis embodies the assessment of principles and criteria on democratic qualities within the establishment and operation of RECs, namely *participation, acceptance,* and *rights of members* (See section 3.5).

A descriptive research perspective will be used for the first research sub-question, aiming to systematically review literature of RECs, so to define the democratic qualities needed to assess democracy in the establishment and operation of RECs. The second sub-question establishes an explanatory research perspective where the defined qualities are applied to each REC and afterwards analyzed. Additionally, the third question follows in line with the explanatory perspective of the second sub-question into a comparative approach between the research cases, to identify differences and/or similarities vis à vis democratic qualities in the establishment and operation of RECs in Fryslân. Finally, an explanatory approach is used to analyse the contribution of RECs towards the democratization of the energy transition locally.

A schematic representation of the thesis´s research framework is shown below.

Figure 1. *Schematic presentation of the Research Framework*



The schematic presentation is explained through the following steps:

A. Carrying out a literature review on the establishment and operation of RECs to define criteria and find out democratic qualities.
B. Establishing a theoretical framework based on a scientific literature review on the definitions of RECs, success factors and motivations of RECs, energy democracy, the principles of the ICA, *IAD framework*, and *the triangle of social acceptance of renewable energy innovation* to define democratic qualities in the establishment and operation of RECs.
C. Data collection was carried out through interviews with members of the chosen RECs and examinations of documents and cooperative webpages.
D. Coding and analyzing the findings regarding democratic qualities within RECs. A comparison of the research cases in terms of democracy in their establishment and operation and finally an analysis of the results in relation to the democratization of the energy transition locally.
E. Conclusions and recommendations to RECs and concerned stakeholders.

2.2. Research Strategy

The research strategy for the thesis is a case study approach of three RECs in the province of Fryslân, which focuses on an in-depth research apropos democratic qualities developed from the literature review. The nature of the research is empirical, meaning that through combining the literature review with the interviews, it aims to collect data to assess how democratic are the RECs. This then, leads to an analysis of the cases to assess the contribution of these RECs towards the democratization of the energy transition. The cases upon which the research was based are the following energy cooperatives: Wijnjewoude Energie Neutraal (WEN) located in Wijnjewoude, Grieneko located in Baard and Duurzaam Akkrum Nes (DAN) located in Akkrum.

The following paragraphs will further develop the cases, the research boundary, the methods for data generation, validity, and data analysis.

2.2.1 Case Selection

As mentioned previously, the RECs selected as research cases for the thesis are situated in their respective villages in the province of Fryslân in the Netherlands. The thesis focuses on three RECs: WEN, Grieneko and DAN. The three villages with their respective RECs have been selected as research cases since they represent RECs, with different energy initiatives in Fryslân, and they all have established legal frameworks as cooperatives under *Ús Koöperaasje* (umbrella organization) and its daughter organization *Energie Van Ons*. According to the Lokal Energie Monitor (2020) *Energie Van Ons* has 100 cooperative members and 60 of them are in Fryslân. Additionally, one of the main reasons for choosing these three RECs is their longevity, this means that these RECs have been operating for several years and thereby there is more information to be obtained. The reason for choosing the geographical location of Fryslân is that the province is characterized by a strong regional culture and identity, including their native language, which strengthens the Frisian identity, and in time strengthens self-organization (ICA, 2017) and collective action by local communities (Warbroek et al. 2019). Fryslân is also one of the frontrunner regions vis à vis numbers of RECs.

2.2.2 Research Boundaries

This thesis is limited to three RECs for the purpose of completing the research within the specific timeframe (April-August 2021). Including more cases in the research would provide a better sample to represent all RECs, however this was not possible due to the time constraints. There is vast scientific and gray literature regarding RECs. Many aspects, motivations and factors have been studied from energy initiatives, and many concepts have been drafted forward in terms of energy democracy, however as vast as it is, this research is not able to focus on the whole field of knowledge regarding RECs and the energy transition, therefore the research was limited to the narrowing of three main criteria "participation", "acceptance" and "rights of members".

Further on, democracy in RECs is a dynamic topic, meaning that knowledge in this field is varied (Van Veelen and Van der Horst, 2018) and can change rapidly. In this regard this research is bound to data and information published up to August 2021. The Clean Energy Package of the EU has recognized the role of RECs on the energy transition (Cobutt, 2021), therefore adding knowledge to this field is crucial. However, it is important to note that from the total number of energy cooperatives located in Fryslân, only three RECs were studied for this research. In that case the research cannot ensure statistical generalization, but instead focuses on analytical generalization, as further explained in the conclusions chapter.

2.2.3 Data Sources and Data Collection Methods

The data collection methods that are used to answer the research questions involve scientific articles and policy documents (gray literature) and interviews. The databases of scientific articles consulted during this research were *Scopus, ScienceDirect, Google Scholar* and *ResearchGate*. The keywords use in the search engines of these databases varied from: *Renewable* AND *Energy* AND *Communities; grassroots* AND *innovation; NIMBY; energy* AND *democracy; social* AND *acceptance; participation; members* AND *rights; energy* AND *cooperatives; local* AND *energy* AND *initiatives; community* AND *involvement*. Lastly the period of the publications reviewed ranges between 1982 and 2021. Data sources and data collection methods for each research sub-question is shown in Table 1, and the interview design is explained below.

Table 1. Data s*ources and data collection methods*

Research Sub Question	**Data Required to Answer the Question**	**Sources of Data**	**Accessing Data**
To what extent is the establishment and operation of RECs democratic?	In-depth literature review from scientific articles and grey literature.	**Secondary Data:** official documents, reports, and scientific publications.	Desktop research in Scopus and in official websites.
How do the democratic qualities influence RECs in Fryslân?	- Findings of the literature review. - Theoretical framework on democratic qualities. - Findings from the interviews.	**Secondary Data:** official documents, reports, and scientific publications. **Primary Data:** Data from interviews, organizations, and cooperatives.	Desktop research in Scopus and in official websites. Communications through email. Interviews through Microsoft Teams.
How do the RECs in Fryslân compare to each other in terms of democratic qualities?	- Findings from interviews. - Theoretical framework on democratic qualities.	**Primary Data:** Data from interviews.	Comparative analysis of democratic qualities according to ICA principles.

The interview design consists of individual, semi-structured interviews lasting between 45 and 60 minutes. The respondents were selected, since they were well acquainted of the processes within each of the RECs and they gave relevant, up to date, information regarding each cooperative. The interviews aimed to obtain coherent data on democratic qualities (participation, acceptance and right of members) within the cooperatives, and to assess if these cooperatives are democratic and if they contribute to the democratization of the energy transition locally in the province of Fryslân, the Netherlands. The interview questions and the consent form can be found in the Appendix A and B. The organizations and positions of the interviewees are shown in the table below.

Table 2. Overview of *interviewees*

Interviewee	Organization	Position
1	Municipality Leeuwarden & DAN	Energy Coordinator Municipality of Leeuwarden & Member of Cooperative
2	DAN	Board of Cooperative
3	DAN	Board of Cooperative
4	Grieneko	Board of Cooperative
5	Grieneko	Cooperative Advisor & Member of Cooperative
6	Grieneko	Mobility Advisor & Member of Cooperative
7	WEN	Program Manager
8	University of Utrecht	Master student Cultural Anthropology; Sustainable Citizenship
9	Municipality Board of Opsterland	Representative of the Local Council

Due to the COVID-19 restrictions, the interviews took place online using Microsoft Teams. All interviews were recorded to ensure a most effective transcription and data collection. Priorly to this, the researcher asked permission of the respondent to record the interview. A series of questions regarding democratic qualities within the establishment and operation of RECs were posed during the interviews. Prior to the interviews, the researcher established communications with the respondents, through phone, email, or video call, to explain what the research was about and what was to be discussed during the interviews. Finally, an informed consent form was priorly sent to the respondents to be signed. Once the form was signed the interview was allowed to begin on the due date.

After the last question was answered during the interview, the interview could be officially concluded if the respondents did not want to add something else. The respondents were asked by the researcher if there were any questions left from their side and if so, the proper feedback was given. Also, the researcher asked the respondents if there were any suggestions of any other interviewee to take part on the research.

After each interview, the researcher transcribed the recordings. If they so desired, the respondents were entitled to receive a copy of the transcript, and make comments or further corrections of the information, as well as to keep certain information to themselves if that were the case. The researcher made sure that the consent forms were signed and followed

the preference of the respondents on how to be cited in the thesis. Finally, once the thesis was finished, a copy of the thesis was sent to respondents for them to see the results, conclusions, and recommendations of the research. All information gathered from the interviews was kept safe on the student´s email university cloud, and for data protection purposes the information is to be deleted after the publication of the thesis.

2.3. Data Analysis

2.3.1. Analytical Framework

The analytical framework is based on a literature review of scientific publications and official documents, and the data collected with interviews. The thesis is based on a qualitative analysis to answer the main research question by answering the sub-questions. This is further explained in the following steps:

Step 1. Conducting a scientific literature review on energy democracy and democratic qualities of RECs gives answer to the first sub-question.

Step 2. A qualitative analysis of the identified democratic qualities was carried out regarding RECs in Fryslân, through the findings of the conducted interviews that were transcribed with the Amberscript software, and the data codified with the Atlas.ti 9 software. The coding used in this research is the following: *participation; right; member; acceptance; trust; government; decision; decision making; rights of members; benefit; support; sceptical; democratic qualities; democracy; quality; Energie van Ons; energy transition; accept; create; age; and gender*. This process answers the second sub-question.

Step 3. According to the findings and the qualitative analysis previously done, a comparative analysis is conducted to understand how RECs in Fryslân compare to each other in terms of democratic qualities and their contribution to the local energy transition in Fryslân. This will give answer to the third sub-question and subsequently the main research question.

2.3.2. Validation and Data Analysis

Data was collected from two main sources: the literature review and the interviews conducted on respondents from the three different cooperatives in Fryslân and outsiders who are acquainted with these RECs and the energy transition. In the literature review,

scholars studied several aspects of RECs in different regions of Europe and in the Netherlands, showing valuable data for this research. The case study results, based on the data collected from different respondents, confirm the data shown by scholars in the literature review and adds valuable knowledge to field of RECs and the energy transition. The data obtained is valid for the research because through a triangulation of information, it is possible to testify that the data collected from respondents is not biased. As mentioned before, the respondents come from three different villages and different backgrounds and therefore are not directly related, however their answers and the data collected regarding the democratic qualities of participation, acceptance and rights of members within RECs are similar, i.e. the one-member one-vote principle, unactive membership, strong leadership needed, the share of decision making sits and important positions within cooperatives being dominated by old white men, etc. This information, obtained by the interviews is presented in chapter 4, using the theoretical framework developed in chapter 3.

2.4. Ethical Statement

In this Master Thesis the use of information regarding the interviewed respondents and the communications was obtained according to ethical and integrity principles. This means that no respondents were forced to act against their will and decided to conduct the interviews voluntarily. These respondents were priorly informed that they could leave or stop the process of the interview in any given moment if they so desired. Additionally, the respondents signed up a form of consent before any interview, in which it was explained that the information given was only to be used for the research purposes and if they so desire their participation would also be anonymous. The interview recordings, transcripts and documents were kept in the U-Twente students email cloud to be always protected, also preventing unauthorized parties from accessing it.

3. Theoretical Framework

This chapter establishes the theoretical framework of the research, focusing on the democratic qualities to assess the creation and operation of RECs as well as the democratization of the energy transition. Participation, acceptance, and rights of members are key concepts in this chapter.

3.1. Definitions of RECs

Consensus about the proper name and definition of RECs was seldom among the scholarly community until it gained European recognition in 2016 within the EU CEP. The importance of RECs to the CEP relates to the way they reorganize economic and political life, enabling citizens to gain autonomous income, self-esteem, social security, and to work for a more equal distribution of power in our societies (Cobutt, 2021; Krieger, Kropp and Kulke, 2017, 1). Along the years many terms and definitions of RECs have been used accordingly to the focus and purpose of each research, for example: Warbroek and Hoppe (2017) define LLCEI's as "the bottom-up initiating and managing of a project or series of projects involving the generation, stimulation and/or facilitation of low-carbon energy and/or energy efficiency by citizens/actors from civil society on a local scale."

The definition of grassroots innovations given by Seyfang and Smith (2007) is "networks of activists and organizations generating novel bottom–up solutions for sustainable development; solutions that respond to the local situation and the interests and values of the communities involved". This definition might not completely fulfil the purposes of this thesis to establish its research ground, however it is important to mention it, as it encompasses the wider scope of bottom-up initiatives apropos sustainable development.

As a matter of comparison, grassroots innovations focus on all kinds of community-level, bottom-up initiatives, such as furniture recycling enterprises, gardening cooperatives, low impact housing development, community composting schemes, etc. The LLCEI's on the other hand, focus purely on the energy efficiency and energy generation initiatives.

Furthermore Hoppe et al. (2015) conceptualize the term Local Energy Initiatives (LEIs) upon what other scholars have written. For instance, they mention the definition given by Boon and Dieperink (2014) for Local Renewable Energy Organizations as a definition that assimilates the concept that they are trying to establish. However, they appeal to the social part of LEIs arguing for a closer approach to a grassroots innovation's definition. They mention that restricting LEIs to organizations decreases in value the structural character of LEIs as grassroots networks of local actors. This leads them to the adherence of the LEIs concept to the definition given by Middlemiss and Parrish (2010); grassroots initiatives in low carbon energy transition that are typically locally based, non-commercial, small-sized, and rely on the engagement and actions of highly motivated people with limited power and limited resources.

Yildiz (2014) adds to the concept definition of RECs arguing that energy cooperatives are associations of citizen participation with a common goal, where members have the decision power to choose their board management and board directors, irrespective of the share in the cooperative, also having proportional participation from the benefits of the cooperative activity. These cooperatives also support the motion of every member being entitled to a single vote, reducing thus the influence of single actor over the whole REC.

Yildiz et al. (2015) state that cooperatives are social and economic organizations whose initiators are individuals living in social and geographical proximity; whose cooperative model is based on member goals and values over profit maximization. This includes in-company democracy, social responsibility, and communal self-help. All of this democratized the energy sector by creating an institutional basis for citizen participation.

Lastly, Interreg Europe (2018. pp.2) summarizes the concept of REC as "a term that covers a host of different projects. At its most basic, renewable energy communities involve generation of energy from renewable resources and technologies, which are partly or wholly owned by local communities. The definition is flexible, recognizing that different legal and economic models abound, and that depending on the local context, numerous

actors may be involved, including citizens, local businesses, charities and the public sector.".

3.2. Factors and Motivations that affect RECs

According to Warbroek et al. (2019), the success factors that influence the establishment and operation of RECs are embodied in three categories:

(i) factors related to the RECs themselves (i.e. related to (intra-) organizational issues);
(ii) factors related to interaction with the local community; and
(iii) factors related to the governance setting and linkages with government.

This categorization supports the foundations of community involvement and democracy being a major factor to the success of RECs. Two of these categories relate directly to democratic qualities ergo "(i) factors related to the RECs themselves (i.e. related to (intra-) organizational issues) and (ii) factors related to interaction with the local community". Warbroek et al. (2019) also stress the idea that the degree of social participation in the REC is crucial for its acceptance.

Furthermore, RECs can have *several motivations*, ranging from providing a better environmental and sustainable future to creating local economic savings and revenues from energy savings and joint projects (Oteman et al., 2014). Arentsen and Bellekom (2014: pp. 2) add to this argument saying that *important factors for the creation of a REC* include "energy prices, environmental awareness, independence of large companies and exporting countries, possible local sources, such benefits as a green image and social cohesion, and dissatisfaction with inconsistent energy policies and incompetent governments".

Wüste and Schmuck (2012) identify *preconditions and drivers for the successful establishment of RECs*. They argue that initiators, peaceful coexistence, common activities of the local inhabitants, impetus from villagers themselves, active search for alternatives to fossil fuels and nuclear energy are the main conditions for the successful establishment of the REC. They mention that *the main motives for RECs* are as follows: (i) ecological

motives: sensible use of natural resources of the planet and contribution to climate change (ii) economic motives: strengthening added value in the region, saving costs for heating and earning money; and (iii) social motives: where respondents saw the programme as a "community project" to "make the village life more attractive, create energy supply independence, and a self-realization feeling.

Warbroek and Hoppe (2017) studied *the modes of governing and policy of local and regional governments supporting Local Low Carbon Energy Initiatives* in the Netherlands, focusing on the provinces of Overijssel and Fryslân. Their research shows that sub-national governments, and institutional frameworks and policies play a prominent role in the development of RECs through institutional adaptation and policy innovation.

Dóci (2021) examined *the factors that influence renewable energy communities' formation and organization* from the institutional and social context. However, Dóci (2021) remarks that although the importance of energy initiatives in the sustainability transition is increasingly acknowledged, little is known about their formation and operation. For example, there is no clarity on how they engaged their members to work collectively on a voluntary basis towards a common goal. Several studies have examined these types of grassroots communities, however, research on collective action that such communities succeed to realize remains scarce.

Warbroek et al. (2019) address *the social, organizational and governance factors that explain success with LLCEIs* in Fryslân, the Netherlands. The authors scrutinize fifteen claims that explain success, which include factors such as community involvement, access to funds, availability of time, project champion, alignment with characteristics of the local community, size of the founding and steering group, human capital, board diversity, visibility of the LLCEI, interaction between the LLCEI and the local community etc. Among these, interaction between the LLCEI and the local community as well as community involvement are important conceptual factors to this research. As explained in the paper, bonding or social capital plays an important role in the development of the REC because it is based on the capability of mobilizing resources through social networks based

in social norms and in different levels of trust, intimacy, and reciprocity. Moreover, community involvement, namely ensuring that the interests of the community are heeded steers acceptance to the REC projects.

Yildiz et al. (2015) find that participation, conflict, and trust are important factors to analyse within RECs. Their empirical data gathered from Germany demonstrates that active participation, democracy, and the desire to influence the local energy policy are motivations for individuals to join the ranks of RECs. Nevertheless, it is important to not forget that conflict and trust are important aspects within the dynamics of member groups. Other motivations mentioned in the study are the following: democracy in the organizational and social issues, one-person-one-vote, and the opportunity to participate with small investments.

These studies add valuable knowledge to the field of RECs, they show motivations and success factors of RECs, in which it is possible to include democratic processes and participation of the local community. However, they do not explain, empirically, how democratic are RECs during these processes, thereby in section 3.5. a framework based on democratic quality is presented.

3.3. Energy Democracy and the Energy Transition

Theories of democracy are deep grounded in political science where the procedures and mechanisms are associated with decision making (Van Veelen & Van der Horst, 2018). The idea of democracy has tended to evolve according to each field of knowledge, such as food democracy, innovation democracy and water democracy (Van Veelen & Van der Horst, 2018). The origin of the concept "energy democracy" comes from the climate justice movement in Germany, same as the community-owned energy cooperatives model, who has its origins in Denmark and Germany (Angel [b], 2016) and later spread across Europe. In 2012 at the Lausitz Climate Camp, the German climate justice movement marked a crucial point in the evolution of this concept by proposing a first definition: "Energy democracy means that everybody is ensured access to sufficient energy. Energy production must thereby neither pollute the environment nor harm people. More concretely, this means

that fossil fuel resources must be left in the ground, the means of production need to be socialized and democratized, and that we must rethink our overall attitude towards energy consumption" (Angel, 2016; Energy Democracy, n.d.). In a short period of time the energy democracy concept shifted from an abstract idea to real world processes and practices across different energy systems, communities, cities and societies with the sole purpose of pursuing a collectively owned energy sector rooted in social justice (universal access, fair prices and secure jobs), sustainability (transition from high to low carbon energy sources) and democratic control (Angel, 2016; Angel [c], 2016).

Nonetheless, the notion broadened as the realm of knowledge in energy democracy progressed. Van Veelen & Van der Horst (2018) review and conceptualize energy democracy upon earlier studies. For instance, questions arise on who owns and controls energy, and how? And where and for whom energy is produced and consumed? These questions can be answered through a central concept to energy democracy: Participation, in other words, participatory energy systems, where energy generation and distribution are control by the collective in the local geographical community with the function of transforming the current political and energy systems (Van Veelen, 2018). Based on the review of literature, Van Veelen & Van der Horst (2018 pp.8) came to the next central conclusion regarding energy democracy: The economy, society and energy system should become more inclusive, equitable and low carbon; political power and decision making should originate in the local level; and greater citizen involvement and ownership should be achieved through cooperation and local self-organization. Deepening on the concept of social inclusion, which is central to energy democracy, consumers need to be placed at the centre of a renewed EU energy system, as this will allow them to take their own decisions on how to produce, store, sell or share their own energy. Moreover, more control and access for consumers will translate into better quality of life and better finances. This democratization of energy will alleviate energy poverty and protect vulnerable citizens (Lutsch, 2017).

Although the literature shows how energy democracy should function in theory, the reality might differ from it. It is often assumed that RECs promote energy democracy and more

democratic processes within the organization. However, Van Veelen (2018) shows that active participation is seldom, and instead members are generally willing to leave the decision-making process in hands of the board members, albeit this does not improve democracy in RECs or a democratization of the energy transition. Thereby, having a strong community leadership is essential to successfully manage RECs.

Several RECs have acted towards a more participatory approach within their operations. Such actions include adding quotas to the board to represent age or geographical distribution of the community or enhancing diversity through the inclusion of women and young members into the board. Still, it is not guaranteed that distribution of power will take place when underrepresented groups of the cooperative or community are included, due to competition processes in decision making (Van Veelen, 2018). Therefore, direct participation of members through the "one person – one vote" principle should be the basis to increase democracy in RECs, because the shareholder becomes user of the services being invested in, and the renewable energy project is not seen any more as a financial investment but as a benefit for the community (Vansintjan, 2015).

3.4. Principles Governing Cooperatives

Although energy democracy and the democratic qualities in RECs are related, it is important to differentiate them. On the one hand, the democratic qualities based on the principles of the International Cooperative Alliance are relevant to assess democracy within cooperatives and RECs (ICA, 2017a, 2017b). On the other hand, energy democracy focuses on the bottom-up approach of citizen participation, social inclusion, and ownership of the energy sector for its transition to renewables, namely the democratization of the energy transition.

The ICA establishes seven principles to assess democracy within cooperatives. Thus, when applying these principles to the RECs, in this research, it is possible to assess the democratic qualities of such initiatives. The principles are the following (ICA, 2017; REScoop, 2021):

1. Voluntary and Open Membership: Voluntary and open organizations to all persons who are willing to become a member regardless of gender, race, social status, political or religious beliefs.
2. Democratic Member Control: Democratic organizations controlled by the members, who are active in participation and decision making, ruled by the one-member one vote principle.
3. Member Economic Participation: Members contribute equitably to the capital of the cooperative. Members usually receive little compensation as the benefits or surpluses are used to further develop the cooperative and support other activities.
4. Autonomy and Independence: Autonomous, self-help organizations controlled by their members. Any agreements with governments and organizations to raise capital, they do so in terms that it ensures democratic control by the members, maintaining the autonomy of the cooperative.
5. Education, Training, and Information: Cooperatives provide education and training to their members to improve the development of the cooperative. They provide information to the public about the nature and benefits of the cooperative.
6. Cooperation among Cooperatives: Working together with other cooperatives on the local, national, regional or international structures, strengthens the cooperative movement.
7. Concern for the Community: Cooperatives work towards sustainable development through policies approved by their members.

3.5. Democratic Qualities in RECs

As presented in the previous sections, a literature review has been conducted on democracy in RECs to establish a theoretical framework that can be used in answering the main research question and sub questions of the thesis. Based on the literature review, the most relevant concepts to the broad idea of democracy in the establishment and operation of RECs are identified as follows: (i) citizen participation in RECs, (ii) community acceptance of RECs and (iii) rights of members in RECs.

3.5.1. Citizen Participation in RECs

In this research participation is analysed based on the definition of RECs given by the EU RED, the energy democracy concept presented in section 3.3. and the cooperative principles of the ICA presented in section 3.4., therefore, criteria such as voluntary participation regardless of gender, race, social status, political and religious inclinations; democratic membership control in decision making, information, and autonomy are important to understand the quality of the cooperative. Further on, the energy democracy concept is the basis to assess participation and bottom-up approaches for the democratization of the energy transition as it advocates for the inclusion and ownership of citizens of the energy sector.

Additionally, The *Institutional Analysis and Development* (IAD) framework of Elinor Ostrom presents an important approach to understand that *governance* plays an important role in relation to the democratization of the energy transition through RECs, because it establishes the repertoire of rules, norms and strategies that influence behaviour within policy interaction. *Self-governance* is also relevant for this research since it states the basis for democracy within a delimited community; "The capacity of communities to organize themselves so they can actively *participate* in all (or at least the most important) decision processes relating to their own governance" (McGinnis. 2011). To understand these terms in the research context, it is important to highlight that there is a difference between a renewable energy community and a territorial community, which on this research refers to renewable energy cooperatives with a democratic structure and to the Frisian local communities, who are represented in the Parliament by the representatives elected by the people every four years (Tweede Kamer | Der Staten-Generaal, n.d.)

3.5.2. Community Acceptance of RECs

Acceptance is the willingness from a user or stakeholder to adopt a given system or technology (Adell et al. 2014). According to Wüstenhagen et al. (2007), social acceptance is not a new concept for the energy sector, and on the contrary, it is constantly used in the policy literature and often overlooked by people who assume that a strong general popularity of a new energy technology should be a strong precursor for acceptance to a

specific project. Therefore, attention should be put to NIMBYism if community acceptance is to be understood towards the renewable energy projects of RECs. Hubbard (2005) defines NIMBY ('Not in my backyard') as "locally organized campaigns opposing a locally unwanted land use, whether an industrial installation, human service facility or new housing.". In the context of renewable energy projects, Schwenkenbecher (2017, pp. 3) exemplifies a more ad hoc case of NIMBYism of renewable energy facilities: "NIMBY is someone who leads or participates in campaigns aimed at preventing particular infrastructure construction projects in their vicinity, including renewable energy projects. The immediate and central aim of NIMBY campaigns is to prevent that such projects go ahead.".

NIMBYism plays a crucial role when implementing local renewable energy projects, such as wind farms or solar farms, because generally a community will accept renewable energy projects as long as the environmental impact of such projects is not close to their residence (Wüstenhagen et al., 2017), since the burden of such facilities relies not on the broader society but in the close vicinity (Schwenkenbecher, 2017). In other words, the resource extraction from renewables and their impact is visible to the community, different to the resource extraction from fossil fuels, that happens far away from their residences and below the earth´s surface (Sieferle, 1982). In addition, when siting decisions must be taken at the local level to establish a project, the community might oppose the project for several reasons, such as: "Who is the investor? Is it an outsider? Is the initiator an actor from within the community? Is the community invited to participate in the project? Does the local community have significant influence in the process? Is specific local, tacit knowledge used or is the community only expected to say ''yes''? If locals can be involved in either the process or the investment, does this apply to all or not? Moreover, who decides about that?" (Wüstenhagen et al., 2007. pp. 4).

Figure 2. The triangle of social acceptance of renewable energy innovation

Source: Wüstenhagen et al. (2007)

The triangle of social acceptance of renewable energy innovation by Wüstenhagen et al. (2007) presents a relevant approach to social acceptance in RECs. There are three levels of social acceptance: socio-political acceptance, community acceptance and market acceptance. However, the only relevant type of acceptance for this thesis is the *Community Acceptance*, which refers "to the specific acceptance of siting decisions and renewable energy projects by local stakeholders, particularly residents and local authorities". The result of not taking on account the broader community for such decisions and projects is NIMBYism. This is the reason of why the EU has given much attention to RECs, because through participation of local citizens and authorities in renewable energy projects through RECs, acceptance and local investment of renewable energy is increased (European Parliament, 2018), lessening NIMBYism.

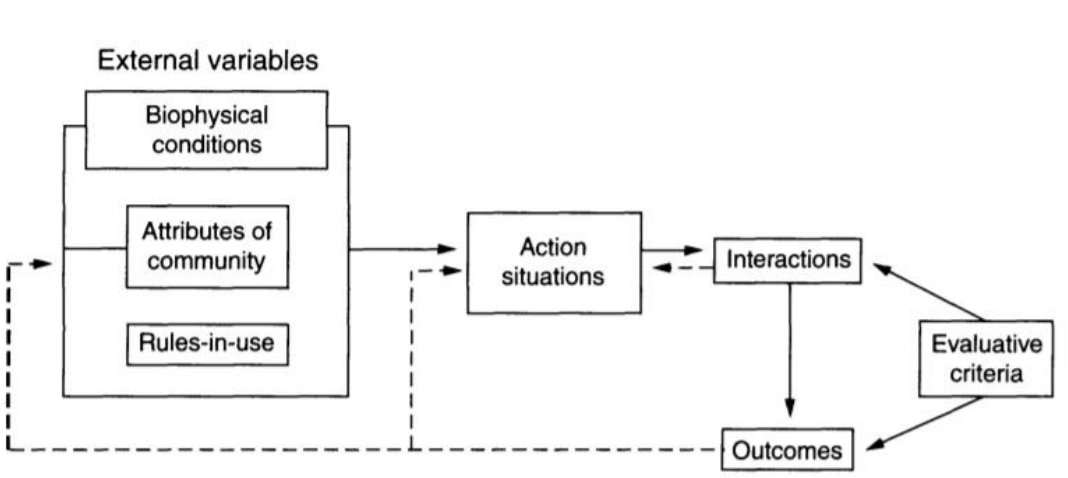
3.5.3. Rights of Members in RECs

The IAD framework consists of a set of building blocks that explain human interactions and outcomes across different settings. Thereby it is a suitable framework to analyze rights of members since it establishes external variables, which are the contextual factors and aspects

of the social, cultural, institutional, and physical environment that set the context for an *action situation* to be situated, and in this manner also study its interactions and outcomes (Grassroots Economic Organizing, 2021). In this research the RECs are presented as the action situation.

Figure 3. *The Institutional Analysis and Development Framework*

Source: Ostrom (2010)



These external variables constitute the *biophysical conditions*, *attributes of the community* and *rules in use*. In this research the focus of the biophysical conditions will be on the fourth type of good presented by (Ostrom, 2010), namely the c*lub good* or *toll good,* which stands for a group of individuals creating a private or public association to provide themselves with *subtractability of use* of certain goods and services they could enjoy while excluding non-members from participation and consumption of benefits.

The attributes of the community refer to the history of the community according to prior interactions between members, homogeneity, or heterogeneity of internal attributes of members and the social capital of who may participate in the *toll good*. This can be explained as the bonding and social capital of members, as well as the ability to mobilize resources based on the social norms mentioned by (Warbroek et al., 2019): trust, intimacy, and reciprocity, in summary the relations, involvement and interaction of members of the REC.

Lastly, the rules in use present the specifying of common understanding of the individuals involved in the REC, that is, the developing of a self-organized system where members create boundary rules to determine the use of a resource or services, or the establishment and operation of a REC. Ostrom (2010) describes as the rules determining who could make use of the resource, choice rules related to the allocation of the flow of resource units, and forms of monitoring and sanctioning rule breakers. This refers directly to the rights and responsibilities of members, namely, who is allowed to participate or not, who is allowed to do or not, who is allowed to take decisions or not, who is entitled to benefits or not, and if so, how many according to hierarchy and contribution, and who is to be sanction for breaking the rules. The principles of the ICA (2017) and Vansintjan (2015) further refer to this with the one-member one-vote system, open membership, education, and training in cooperatives.

Through the following table is possible to analyse the links between the democratic qualities previously explained and the ICA principles listed in section 3.4.

Table 3. *Relation of ICA principles to the democratic qualities*

ICA Principle	**Democratic Qualities**
1. Voluntary and Open Membership	Participation/ Rights of Members
2. Democratic Member Control	Participation/ Rights of Members
3. Member Economic Participation	Rights of Members
4. Autonomy and Independence	Participation/ Rights of Members
5. Education, Training, and Information	Participation/ Acceptance
6. Cooperation among Cooperatives	Participation/ Acceptance
7. Concern for the Community	Participation/ Acceptance/ Rights of Members

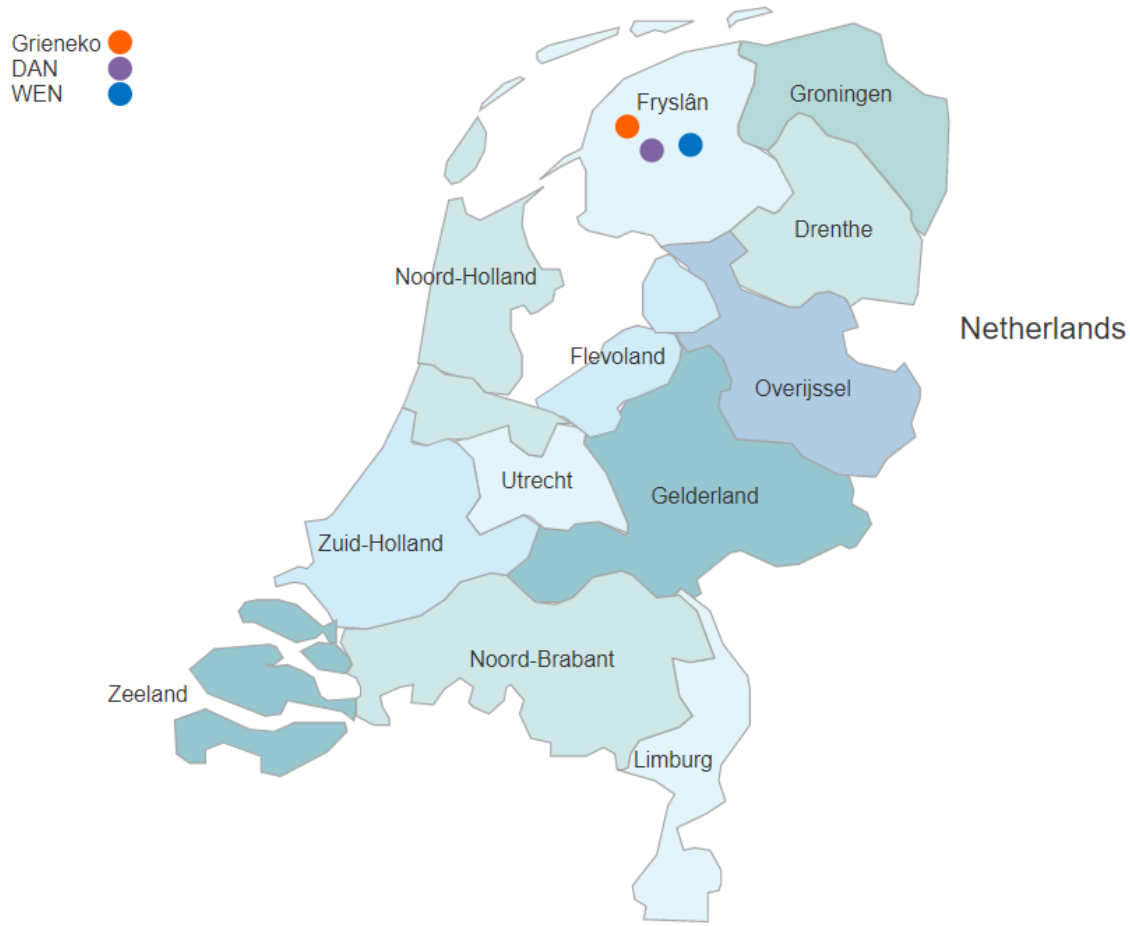
The thesis aims to answer the question: How do RECs contribute to the democratization of the energy transition in local communities? through the sub-questions, on democratic qualities and its influence over the *establishment* and *operation* of RECs and their contribution to the energy transition. In that manner, some of the criteria, that derive from the principles of the ICA, may just apply for either *establishment* or *operation* or may also

overlap. For instance, the acceptance of a REC might only apply for its creation phase or the establishment of a new project. It can also be that acceptance comes after the REC was establish, as citizens from the surrounding areas observe the benefits of the initiative. However, participation and rights of members might be qualities that are present throughout both, the processes of establishment and operation of the REC, namely in the decision-making process and on the democratic control of the cooperative through their members.

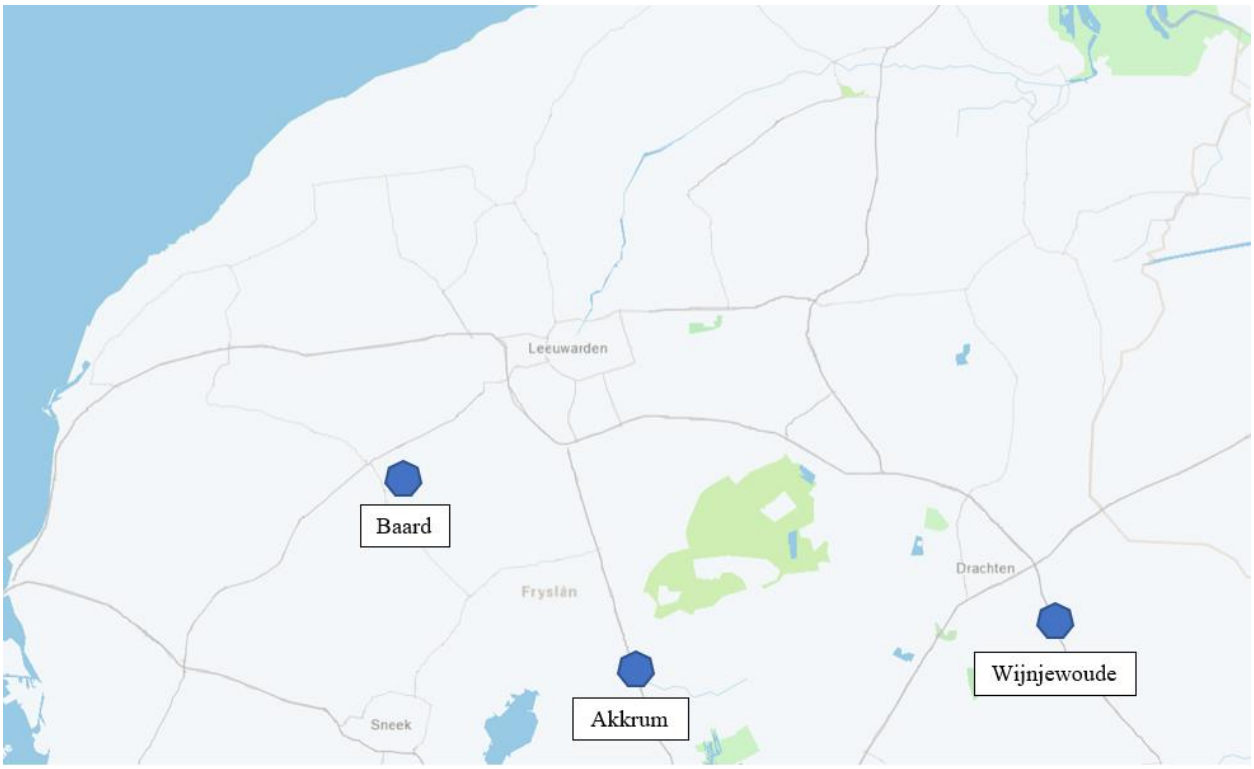
4. Case Study Results

This chapter presents the findings about democratic qualities within RECs and the democratization of the energy transition in local communities through RECs, based on the theoretical framework and the data collected through document reviews and interviews regarding the three selected cases in Friesland. Additionally, it makes the comparison of three cases based on the ICA principles.

Map 1. The selected *RECs in the Netherlands*



Map 2. The selected *RECs in Fryslân, the Netherlands*



4.1. Duurzaam Akkrum Nes

Duurzaam Akkrum Nes (DAN) is an energy cooperative located in the villages of Akkrum and Nes, which belong to the municipality of Heerenveen. DAN exists since 2014 and defines itself as a cooperative which is a democratic form of association that pursues specific goals (DAN, 2021):

- Stimulating and realizing energy savings in Akkrum and Nes;
- Stimulating and realizing sustainable energy production by its members;
- Stimulating the use of sustainable materials;
- Contributing to the liveability of Akkrum and Nes.

The cooperative establishes that every resident of Akkrum and Nes, and its immediate surrounding areas can become a member and participate in the decisions making of the REC through the general members' meeting (DAN, 2021). DAN has focused itself on energy efficiency measures in the past years, such as a campaign to reduce the heating

temperature of boilers to save money and gas for households, heat scans to know the insulation requirements of households and shared electric cars. However, recently they have started to pursue new and more ambitious projects: Their own solar park in Akkrum and Nes and the creation of the "Cooperating Heerenveense Energie Coöperatie", a joint cooperative with Aldeboarn Aengwirden cooperative, supported by the municipality of Heerenveen to build the Klaverblad Noordoost solar park. It is thought that the creation of this solar park will enhance participation and support among residents (DAN, 2021).

The cooperation was formed by a group of highly enthusiastic and motivated people, most of them were already related to renewable energy and sustainability through their former jobs or careers. An enthusiastic leadership and a strong community involvement, as well as the support from a special figure: "Bouwe de Boer, energy coordinator of the municipality of Leeuwarden" was necessary for the creation of DAN. The process started with the participation of the whole village in the opening of the water season event, an event that happens every year on the same day. On this day, the community organizes activities, such as solar boats race, promotion of solar panels and food stands (Interviewee 1, Energy coordinator of the municipality of Leeuwarden). The main motivation for founding the cooperative was the thought that the energy transition should not start from above, but from the ground level, from the people (Interviewee 3, Board of the cooperative), there were already other cooperatives in other villages, "they started and then we followed". Board of the cooperative, interviewee 2, said that they were very interested in the energy transition and that they wanted to do things different. Having a cooperative was the best option because that would also support the establishment and growth of "Energie van Ons". It was beneficial for the regional umbrella organization "Ús Koöperaasje" to have an energy cooperation in Akkrum and Nes, because more customers would be buying energy, locally produced, from "Energie van Ons". This retributes the cooperative with €75 a year per customer buying electricity from "Energie van Ons", which money can be used to further develop activities in benefit of the village. Thereby, DAN is involved in the creation of the "Cooperating Heerenveense Energie Coöperatie" because having more solar fields means more profits reinvested in the energy transition and in insulation of old houses (Interviewee 2).

4.1.1. Participation

In the cooperative, decisions are made in consensus with the 135 members. The members have the right to vote because the cooperative follows the principle of one member-one vote. The cooperative informs the members through an email and then the meeting takes place once a year. In this meeting, both the board and members can make proposals for the cooperative, and then the members, who are the owners, vote upon these proposals (Interviewee 3). All in all, members always agree on the proposals of the board (Interviewee 2), because "members are 'sleeping members'; they do not say a lot, so actually only a small group of active people makes the decisions, and the members accept" (Interviewee 3). The board of the cooperative also meets once every month to discuss matters of the cooperative.

In order to involve the community in the activities of the cooperative, events take place in the village two or three times a year. During these events, the cooperative has a stand in the crowd where the members can inform the community about the cooperative and its activities. The cooperative also informs people about its activities through a newsletter in their webpage and through the local newspaper, where a column is written every month by a member of the cooperative. However, they lack professionalism regarding newsletter, webpage, and social media, which results from having many enthusiastic people in the cooperative, but lacking specialists (Interviewees 1 and 3).

Furthermore, to give back to the community and obtain visibility, the cooperative made an energy efficiency campaign of heat scans, in which households could be scanned to find insulation opportunities and save energy. Hundreds of households participated without being members of the cooperative, nevertheless, the villagers still do not know exactly what the cooperative does. "We have 130 members, but I think 15 are active […]. We have to do more" (Interviewee 2). For the solar park project, they chose a different decision-making structure to speed up the process due to bureaucracy. They gathered the members on a meeting and 99% agreed that in relation to democracy, 80% of the board members would have equal decision-making power as the whole assembly during the process of the

preparation of the solar park (Interviewee 2). They hope that participation and visibility will increase in the community once they begin with the construction of the solar park, as members can be actionists of the project.

4.1.2. Acceptance

According to the energy coordinator of the municipality of Leeuwarden and member of the cooperative, interviewee 1, acceptance of the energy transition has locally increased over the years due to the activities of the RECs. 12 years ago, there were no energy cooperatives in Fryslân, today there are 60. Similarly, 10 years ago there were no customers of local energy, today there are more than three and a half thousand. People feel connected and they are proud of the energy cooperatives, however its growth rate is very slow. Interviewee 3, mentions that although the community was very supportive in terms of acceptance when creating the cooperative, they do not really participate in the cooperative's matters. When planning the solar park creation, they informed the community through a flyer. Afterwards they organized a meeting for the whole village, to which only 60 people attended. All of them were very pleased with the project.

Interviewee 1 believes that to advance the energy transition through the energy cooperatives, constant support from the province of Fryslân in terms of information, communication, project leaders and financing is needed. Interviewee 2 thinks that this energy transition can't obligate people to participate, it must affect them financially in their electricity bills, namely it should be cheaper and financially viable for people to be motivated to accept it.

4.1.3. Rights of Members

Regarding the members of the cooperative, the average age is 62, 95% are men and most of them are retired or pensioned (Interviewee 1). According to Interviewee 3, members of the cooperative are households or families, namely a man and a wife together, however it is mainly older people who participate. Interviewee 2 said that members are mostly old people because younger people are always busy.

Becoming a member is an easy task and very much accessible, people are only required to pay a yearly fee of €10, live in Akkrum and Nes, and be a natural person. Organizations or companies cannot be members. According to the statutes of the cooperative, the monetary benefits of the cooperative cannot be invested in the members directly, they should be re-invested in the village to enhance the energy transition.

4.2. Grieneko

The energy cooperative Grieneko is located in the villages of Baard, Easterlittens, Húns, Leons, Wiuwert, and Britswerd. Grieneko has as main goals (Grieneko, 2019):

- The promotion of the use of green forms on energy.
- Advising members on energy consumption and savings.
- Finding solutions for sustainable energy production.
- Promoting information and activities in the field of sustainability.

Grieneko was founded in 2015 with the main motivations of achieving a liveable world for their children and grandchildren, adopting energy efficiency measures, producing its own energy through renewable sources, and re-investing the profits of the cooperative in sustainable energy and social projects (Grieneko, 2019). Their projects and activities consist of facilitating solar panels for households' own energy generation, shared electric cars with accessible prices, and energy efficiency measures, namely insulation of households.

According to board of the cooperative, interviewee 4, the motivations to create Grieneko started with a concept report of the future of Baard, in which they realized that most of the villagers' concerns were about dealing with environmental issues, using less traditional energy, namely fossil fuels, and moving to a more environmentally sustainable system. Other three villages were also interested in the proposal, and that led to the creation of a cooperative that would have a legal status in contact with Ús Koöperaasje. Grieneko has received support to structure the cooperative and their projects from the Mienskipsfûns which is a subsidy from the province of Fryslân, support from the municipality of Leeuwarden and from the EU LEADER programme. They have received around €100,000

in total. According to cooperative advisor and member of the cooperative, interviewee 5, in Fryslân there has been support from professionals and the government in stimulating these kinds of cooperatives. He also states that the creation of the cooperative was part of a roll out process of other cooperatives, happening in the Netherlands around 7 years ago with the "boom" of green energy production through solar panels.

4.2.1. Participation

Interviewee 4 remarks that Grieneko is democratic in terms of decision making. They have biannual meetings with the members in which the board proposes the agenda. Everything above €2,500 should be voted by the members according to the one member-one vote principle. However, he mentions that normally only 40% of the members of Grieneko attend the meetings and the remaining 60% are informed online through the website. Moreover, it is a small village thereby the word is shared easily. Decisions that involve a cost below the €2,500 are taken only by the board, in which a scheme of 3 out 5 votes are valid to make decisions. Interviewee 5 explains that members are not active in the cooperative because it does not drive them financially and they attend the meetings only when there is a benefit involved.

According to interviewee 4, Grieneko involves the community through information meetings, a monthly newsletter, assistance to people in acquiring subsidies or loans, and guidance in construction activities. Grieneko also supports 50 people in a training school for technicians in building construction and installations. This training is financed by subsidies that Grieneko receives.

Interviewee 4 says that the board is constituted by old men, the distribution of members is equal in terms of gender, however he distinguishes the problem that not many young people are getting involved. He states that 35% percentage of the members has higher education and 50% medium education. Interviewee 5 refers to participation in terms of gender and age as mostly the old male being interested in the cooperative. Mobility advisor and cooperative member, interviewee 6, argues that mostly old people participate in the cooperative because younger people do not have the time to do so or are not interested in

joining a three-hour meeting. He says that a solution for this issue could be digitalised methods of participation, like polls or online webinars, in which people can watch only the parts of the meeting interesting for them.

4.2.2. Acceptance

In terms of acceptance interviewee 4 touches upon the notion that the people were very sceptical of the cooperative on its creation phase and they did not allow them to discuss wind energy. All in all, through informing about energy they slowly gained acceptance from the people. Nevertheless, the Frisian government does not allow the establishment of onshore windmills and therefore they have not advance in their windmill projects. He mentions that the creation of Grieneko increased the acceptance of the cooperative, because at the beginning they had between 20 and 40 members, and nowadays they have 174 which is 50% of the village from which 50% buy energy from Energie van Ons. In spite of that, he argues that they are now in a standby position regarding the energy transition, owing to the fact that people don't trust the government, they feel that they don't have any influence. Therefore, the main goal for the government is to build trust, not to force the transition but to stimulate it, through community involvement and bottom-up approaches, "less discussion and more action".

Interviewee 6 argues that working "together with other actors like the government or the region it's slow. It's not really helping the process. I think businesses and cooperatives can work together, and also schools, businesses in the surroundings and maybe sport clubs, among others". Moreover, Interviewee 5 explains that in order to involved more people in these energy cooperatives it is necessary to increase visibility through commercial and marketing approaches, the offer of these cooperatives has to be better, the product has to be better and the prices cheaper: "I don't see a growth of all of these energy cooperatives because the system and the proposition it has in the marketplace is not attracting a huge amount of people. […] A lot of people are interested in it, but do they want to join Energie van Ons? Then the proposition has to improve".

Interviewee 6 states that the shared electric car from the Grieneko is not there anymore, since the prices of usage were too expensive, namely €4.75 per hour. Even so, he alludes that he is financing, together with his wife, a shared electric car as an own initiative in Baard, with lower prices; €2.5 per hour, €25 a day and €0.25 for every kilometre. He believes that acceptance of shared electric cars is growing, for the reason that people are realizing the financial benefits are better, namely cheaper prices and less maintenance. In relation to that, Interviewee 6 believes that this kind of energy transition initiatives must sprout from a bottom-up approach, not from the government, because they never ask the right questions regarding if people want a specific project. He also states that Grieneko did increase the acceptance of the community towards energy initiatives and the energy transition, however they missed out the involvement of younger people, as younger people are concerned with the economic aspect over the sustainable one; "Only a few people have money, a house, and I think that's a little bit of a problem now with the people in the cooperatives, because they're retired, they have a house, they have money in the bank. But if you are younger, […] then it's different. You're not going to invest in 20 solar panels when you barely can buy a house". Related to the fact that mostly old people participate in such initiatives interviewee 6 believes that cooperatives have a bit of an "old stigma", thus they might seem as antiquated.

4.2.3. Rights of Members

Besides the common rights of members, such as voting and having a voice in the planning of the energy cooperative, members of Grieneko are entitled to a member card from which they receive certain benefits, such as: lower rates for construction timber, insulation materials and LED lights. To become member of Grieneko it is required to live in the villages in which Grieneko is present, only households and farmers can become members, and the membership fee is €20 a year; if members are consumers of Energie van Ons, then the yearly fee is €10.

The money Grieneko receives from Energie van Ons as a remuneration to the number of consumers that are in the villages, is used in environment-friendly actions within the

village, such as facilitating solar panels at the sports facility or at the school, or insulation measures. (Interviewee 4) comments that 5 to 8 thousand euros are spent yearly on this.

4.3. Wijnjewoude Energie Neutraal

Wijnjewoude Energie Neutraal (WEN) was founded in 2015 in the village of Wijnjewoude as a local energy cooperative where residents could become members and determine how the village could become energy neutral within ten years. In 2016 WEN board members gathered to define its mission, norms and values and the action plan to follow regarding energy savings and sustainability. WEN established its goals as follows (WEN, 2021):

- Tangible realization of a helpdesk and energy park
- Generation of cash flows that return to the society
- Energy neutrality as a village in 10 years

In 2016 the most profitable business cases for WEN were the solar energy on large roofs and "the helpdesk", an information desk to inform the members about technical and financial possibilities of energy saving and sustainable energy (WEN, 2021).

One of the main motivations for the creation of WEN was the realization of the problems caused by the gas production in the north of the Netherlands, such as earthquakes; and the desire to make the village energy neutral (Interviewee 7, Program manager). Thereby it was mainly an environmental motivation that drove the three first members to create the cooperative. Despite that, other members' motivations are "the care of the environment", "a better future for their children", but most of all "financial motivation" and "the thought that energy will be eventually cheaper" (Interviewee 8, Master student Cultural Anthropology; Sustainable Citizenship).

During the course of time, there has been interest from several interest groups (companies, lobby groups, private entities, etc) in adopting WEN for different purposes, and one of these purposes is consolidating gas as a mean to the energy transition, and in WEN they have the perfect pilot to look for what the possibilities are (Interviewee 9, Representative of the local council). "The natural gas in Holland is losing its function and the same systems

that we have now can be used for hydrogen in the future, therefore we have maybe ten years to fill the gap, and WEN is a very interesting pilot to bridge the time between natural gas and hydrogen (Interviewee 9).

To finance the cooperative plans, Gasunie, the municipality of Opsterland and the province of Fryslân became their main supporters for the first three or four years. However, they also received funding from the Ministry of Commerce, which was €4.3 million to develop their projects on energy efficiency measures to reduce the use of fossil fuels and the creation of a biodigester for the fermentation of dung and production of biogas and green gas as end product, to supply the net (Interviewee 7).

4.3.1. Participation

Interviewee 7 says that WEN has officially two members meeting a year, and informally meetings could take place more often. During these meetings, the board members make the decisions according to the one member-one vote principle. Members are also able to propose projects or ideas, but he mentioned that this does not happen very often. According to interviewee 7, it is very easy to participate in WEN, as becoming a member does not cost anything. They did this with the purpose that everyone could be a member and have voice and a stand in decisions. He mentioned that currently around 1/3 of the whole village is member. Regarding participation, interviewee 7 mentions that gender is no issue within members of the cooperative, because most of the time a family is a member, so both man and wife. Interviewee 8 states that the division between gender is quite equal, however people focusing on the technical aspect of the energy transition are only men, while women focus on communication and creating a support base. Most of the members of the cooperative are retired, but that is also because it is a voluntary work that consumes a lot of time; therefore, it would not be possible to have a normal job besides this project (Interviewee 8).

The main discussion and participation process in WEN is related to “Klein Groningen”, a smaller sector of the village where WEN is planning to build their fermenting installations. However, the problem arises because WEN and the entities supporting the project have not

been clear about it, “Last year, the people who are responsible for the policy of the municipality, ergo the executive board of the local council: the mayor and alderman presented us with a plan to put a field of solar panels in the same area. But people in the surroundings were a bit sceptical, whether it was just solar panels or something more, because they heard some of the plans for fermenting cow dung. But at that time, our mayor and the board told us there was no plan for a massive fermenting installation, although 6 months later we learned they already issued an application for a subsidy for a fermenting plant (as part of a larger transition plan)” (Interviewee 9). The project is on hold for the moment as opponents have raised their voices against it. In that regard WEN has heard the claims of this minority, which is around 10 to 60 people, against the cooperative projects. At the current state there are no decisions being made because there is also no guideline or support base to say what percentage of the village in favour of the projects is enough to carry them out (Interviewee 8). Interviewee 9 mentions that WEN plans are based on around 250 members and that derives the notion that they have a massive support for their plans, although it might not be the case. He believes that 90% of the village is supportive of WEN as it goes to energy neutrality, however when it comes to the fermenting installation, he thinks only 5% would be supportive.

4.3.2. Acceptance

Interviewee 7 says that the community was sceptical in terms of acceptance to having a renewable energy community, “they thought it was never going to happen”. However, after WEN got the funding from the Ministry of Commerce this perception changed, because there are only around 30 of these projects in the Netherlands, and of these, only three are in Fryslân. With this money WEN also gave €2000 to each household of the village to better insulate their homes, regardless of being member of the cooperative or not. In accordance with what interviewee 8 said, nowadays the majority of the community is pro WEN and enthusiastic about the energy transition, nevertheless people who live in “Klein Groningen are against.

Not all the community has become member of WEN because, although they are in favour of the energy transition, they do not agree on the way WEN is carrying out their plans, and

"they feel like this energy transition is being forced upon them" (Interviewee 8). Furthermore, the idea of the PAW or proeftuin (experimental garden) which is the €4.3 million subsidy programme, is that WEN can experiment and decide the best way to use the money to enhance the village, nevertheless the municipality is still in control of the guidelines and namely the plans (Interviewee 8). Interviewee 7 feels "that the governments are struggling with these kinds of cooperatives. The Netherlands has a very powerful government but tackling climate change cannot be done by the government alone". Interviewee 7 believes that the governments are struggling with these bottom-up initiatives because "they are losing grip", namely the power balance within the government is being shifted towards the citizens. The struggle thus manifest itself in the desire to further keep the power. He further remarks that solving problems and politics do not go well together: "We feel that now, in our village and in our municipality, the political party desires to play the thing in a political way, but we just want solve the problem!". Furthermore, both interviewees 8. and 9. allude that the bottom-up approach of the energy transition is being abused by the government and private companies, (Interviewee 9) so that the sense of participation is undermined, because there is no due process.

4.3.3. Rights of Members

Regarding member rights, everyone can become a member, nonetheless the conditions for membership are related to the post code of the households, members must live in Wijnjewoude. Members are entitled to vote in meetings and influence decision making, all in all benefits are not share between members, but profits from the cooperative should be reinvested in the village, i.e., an electric car to support the social store in Wijnjewoude to deliver the groceries to the houses (Interviewee 7).

4.4 Comparative Analysis of the Three Cases

The democratic qualities in RECs can be defined through the ICA principles and the definition of RECs given by the RED in the CEP. For instance, all three interviewed cooperatives show degrees of democracy in their establishment and operation phases, since they fulfil the principles and the definition mentioned above. To better understand the

connection between the principles and the democratic qualities, table 3, presented in section 3.5.3., shows the relation overview.

Principle 1. Voluntary and Open Membership

The selected RECs fulfil the first ICA principle, since they have open memberships to all natural persons, living geographically close to the respective villages, that are voluntarily willing to become members. In DAN and Grieneko the membership fees are quite accessible, €10 and €20 a year, respectively. In WEN, people can become a member for free. However, most of the members and the people willing to participate in the cooperative are old, retired men. Although in Grieneko and WEN the members are equal in terms of gender, the members of the board of the three cooperatives are only old white men. In addition, the distribution of functions within the cooperatives favours the role of men in more technical aspects, while women have roles in communication and creating support bases.

Principle 2. Democratic Member Control

All three RECs also comply with Principle 2., since they follow the one member-one vote principle that structures the cooperatives in a way that members are the ones voting on or making decisions, however within the three cooperatives only a few members are active, which contributes to the board having more weight over decisions than the members. This is related to the fact that in all three cooperatives the board members propose the projects or decisions. Members do have the power to propose projects or decisions, but as one of the interviewees mentioned “they are sleeping members”, who trust that the board is making the right decisions. In that regard the notion of trust and delegating power tacitly through trust is important to understand the dynamics of decision making within cooperatives. Having a known community and trusted leadership in the cooperative is vital for it to succeed, because members and people from the community tend to demarcate themselves from the cooperative activities as they do not find them interesting.

On top of that, the cooperatives have some variations in the decision-making structures. For instance, Grieneko’s members should vote on decisions that entitled costs higher than

€2,500, decisions regarding lower costs are taken only by the board. DAN voted on a decision-making method that was a bit undemocratic to facilitate and speed up the bureaucratic processes of their solar park, 99% of the members agreed that 80% of the board members would have equal power to the whole member's assembly regarding this specific project (Interviewee 2). Again, the notion of trust plays an important role in this case.

Although these forms of participation and decision making are based on the democratic member control principle, this does not entail the inclusion or involvement of the community in the energy transition through the RECs. For instance, RECs inform and consult the broader community of their plans, activities, and projects. However, when decisions are being made that might affect the broader community, these decisions are taken, only by the members and the board of the cooperative, which means a form of exclusion to the broader community. This can also be explained as a *toll good* from the IAD framework in which the *good* is not the energy that is to be produced, but the decisions from which the broader community is being excluded. The *rules in use* regarding the cases define that in order to take decisions that might affect or benefit the community, an individual must become a member of the cooperative. Moreover, the *attributes of the community* are explained in the sense that the cases present homogenized communities, ergo most people living in the villages are Frisians with a shared cultural identity and history, which improves self-organization based on trust. In relation to this and the second principle, members of RECs can advise and propose projects within the cooperative, nevertheless, most of the time the last decision is taken by a few members and the board, because most members in cooperatives are either "sleeping members" or busy with everyday life, and they trust the members of the board, who are known by the whole community. Therefore, the degree of relations between members or citizens of the communities, play a crucial role on participation, decision-making and acceptance of the establishment and operation of the RECs. Differentiating the participation processes of the cooperatives and those of the government is also vital to understand the democratization of the energy transition. RECs are not alternative governments, they can make decisions within the cooperatives that will affect the nearby communities, but in the Netherlands the

participation of the broader society comes through representative democracy, which stands over democracy in RECs.

Principles 3. Member Economic Participation and Principle 7. Concern for the Community

These principles are both fulfilled in all three cooperatives as all benefits or surpluses that the RECs produce are reinvested in the cooperative, but mostly back in the community. For instance, DAN states that the margin of benefits of their future solar fields will be used in insulation measures for households, Grieneko uses the money received from Energie van Ons to facilitate solar panels in the school village or the sports facility, as well as insulation measures, and WEN supported insulation of households, and the social store of the village with an electric car. All these measures taken by the cooperatives and the thought of "giving back to the community" are deeply rooted in the motivations of the cooperatives to achieve sustainability and the energy transition locally, but also in the interactions and the degree of relations between citizen and neighbours of the villages. Reinvesting the profits from the cooperatives back to the community indirectly increases the acceptance of the community towards the cooperative and lastly the energy transition, as the community can directly benefit itself from the initiatives of the cooperative and the renewable energy projects. Moreover, the processes of participation and rights of members are crucial to decide the destination of the surpluses of the cooperatives.

Principle 4. Autonomy and Independence

Principle 4 stands for self-help organizations that maintain the autonomy of the cooperative regardless of the agreements they have with governments or organizations to raise capital. Autonomy appears also in the RED as a criterion for RECs. This principle is fulfilled by DAN and Grieneko. Although both cooperatives have received monetary support from the government or organizations in a certain period, they have remained autonomous in the sense of decision-making. However, the case of WEN is different. WEN became part of the PAW or "Proeftuin" receiving a significant subsidy to carry out their projects in Wijnjewoude, still this programme led WEN to loss of autonomy, because the support

group behind WEN is expecting a certain output of their projects, and the municipality who is in control of the guidelines, has influence over WEN.

According to the CEP and the RED the energy transition should be a citizen driven transition, ergo a bottom-up process, which for instance is fulfilled on the first stages of the establishment and operation of RECs, namely citizen driven initiatives starting local energy cooperatives. However, to further advance their projects and enhance the energy transition, cooperatives need financial support from external parties, such as the government, who seems to be internally confronted by the bottom-up approaches, which must be implemented according to the EU directives. In that sense, albeit the government does promote bottom-up approaches and initiatives, because of the EU and the CEP directives advocating for the inclusion and ownership of citizens over the energy sector, there are still forms of non-participation and exclusion within the initiatives pushed by the government, and therefore as seen as in the case of WEN, autonomy of cooperatives is lost in the process.

Principle 5. Education, Training and Information

Principle 5 is successfully approached by all three cooperatives. They are concern in educating and informing about sustainability, climate change, renewable energy, energy efficiency and energy transition not only to their members but also to the broad local community. In some cooperatives they carry out these information measures with the purpose of gaining more members, but also as a genuine form of involving the community in the energy transition. Although these cooperatives fulfil this principle, it is important to remark that the degree to which this principle is fulfilled is different in each cooperative. For example, DAN lacks professionalism in this aspect: interviewees mentioned that there are many enthusiastic people willing to contribute, but specialists are needed to improve information sharing through the webpage, newsletter, and social media. Grieneko informs the community through information meetings, a monthly newsletter, assistance to people in acquiring subsidies or loans, guidance in construction activities and by providing support in a training school for technicians in construction and installations, however these methods barely have an influence in younger people of the community. In addition, some

interviewees mentioned that WEN indeed informed the community about their plans to make the village energy neutral, while one interviewee mentioned that WEN and their supporters were not transparent with their plans on the renewable energy facility.

Principle 6. Cooperation among Cooperatives

The three cases comply with principle 6. All of them are affiliated with Ús Koöperaasje and Energie van Ons, the regional bottom-up organization that supplies green energy, locally produced in the north of the Netherlands. Moreover, DAN goes further on this principle with the creation of the Cooperating Heerenveense Energie Coöperatie to install solar fields. This principle is important because in accordance with the ICA, the movement of cooperatives strengthens itself with cooperation among cooperatives. As a result, participation and acceptance is increased towards the energy transition. An example of this is the sprouting cooperatives that created momentum around a decade ago and that gave birth to some of these cooperatives, by the only fact that other cooperatives were being created.

Analysing the information above, it is possible to argue that the cases present different degrees of participation, acceptance and right of members. Furthermore, according to the principles of the ICA and the democratic qualities presented by each cooperative, it is possible to state that in the broad spectrum of democracy, the cooperatives are indeed democratic. Interesting to mention for this research analysis is that although RECs are democratic, this do not entail that the energy transition is being democratic. According to the findings, the acceptance and the democratization of the energy transition is related to two main reasons: *The economic aspect* of the energy transition and *the government.*

Believing that the energy transition is going to happen or not is not a topic of discussion anymore between the citizens of every village where the cooperatives are located, on the contrary each citizen of the community is aware of related topics such as climate change, the environment and renewable energy, in part thanks to the work of the cooperatives since their establishment. However, in order to the energy transition to become a strong movement in the local communities, it should be financially viable for all, not only for the

ones that are able to buy electric cars and install solar panels in their roofs, but also for the less benefited in terms of salaries. Renewable energy should be cheaper and more attractive than fossil fuels for the vast majority of the population in local communities to fully accept and embrace the energy transition, because individuals will always look for their own benefit, even if it is for a couple of euros less. Interviewee 5 explains that the products offered, and the marketing of the RECs should be better and more attractive, because the consumers are driven by economic interest. Either if it is a REC or Energie van Ons offering a product, it does not help to say that this kind of energy is greener, locally produced or helps the environment, when the prices are higher than the ones offered by energy traditionally produced or energy produced in a demarcated place.

Furthermore, the energy transition in local communities should be viable in terms of inclusion, namely that RECs must find innovating ways to include younger populations into action, who are busy with work, family, children, and everyday life. Most of the cooperatives are formed and directed by retired people, who have enough time and money to invest in the energy transition, however it is not possible to focus on the energy transition when your basic financial needs are not covered. For example, the increased acceptance of electric cars results from their financial benefit. They are becoming cheaper and require less maintenance, thereby helping the environment is an extra when deciding the type of transport citizens choose.

The bottom-up approach is the main contribution or concept that RECs bring forth to understand the democratization and acceptance of the energy transition from a governmental perspective. Interviewees mentioned that to advance the energy transition locally they need support from the government in terms of information and communication. Furthermore, they need financial support to achieve higher quality and professionalism in cooperatives. Nevertheless, besides financial support in bottom-up approaches, the government needs to focus in building up trust in the local communities and changing the way they are carrying out things, because people feel that they are not being heard, people feel that this transition is being force upon them and that they don’t have any influence on it. In order to change the communities’ perspective towards the government, the sense of

participation should stop being undermined, by the stimulation of the transition through transparency and due processes when implementing renewable energy or energy efficiency projects. Although RECs are crucial tools for the democratization of the energy transition because they tend to increase acceptance and thereby reduce NIMBYism, only 97 thousand people participate in RECs in the Netherlands, which represents a very low percentage for country of more than 17 million inhabitants. Thereby, the government should take on account and involved, not only the cooperatives, but the whole communities in decision making processes regarding energy projects. In this manner, the government should serve only as an observer and supporter in bottom-up initiatives, so that real citizen participation and decision-making take place.

Asking the right questions regarding the choices of people towards a certain project is key to achieve the energy transition, because acceptance of the energy transition is linked to a certain type of technology in each specific REC. It is observed that solar panels are the most accepted renewable energy technology in most RECs, while biodigesters and onshore windmills are not that popular. Therefore, asking the local communities about their needs and the desired type of technology is key to enable the right financial support and to tackle rejection and further barriers and regulations respecting a specific technology, i.e., the rejection towards the biodigester in WEN and the barriers to onshore windmills in Grieneko, which are not allowed in the province of Fryslân at the moment. Additionally, to increase acceptance, ownership of these renewable energy facilities should be shared with the broader community. People most affected by the establishment of such facilities should be able to buy shares of the project or be retributed in some way for the simple fact that the burden of such facilities lies upon them.

5. Conclusions and Recommendations

This chapter presents the answers to the research questions, the reflections on research limitations and recommendations for decision-makers.

5.1. Conclusions

The objective of this research is to assess democracy in RECs through their democratic qualities and their contribution to the democratization of the local energy transition in the province of Fryslân. A main research question and three sub-questions were formulated to achieve the research question.

To answer the first research question (*To what extent is the establishment and operation of RECs democratic?*), a theoretical framework based on the ICA principles, energy democracy, the definition given by the RED regarding RECs and the motivations and definitions from the literature review served to define the democratic qualities in RECs (participation, acceptance and right of members). This theoretical framework was developed and applied to analyse the establishment and operation of RECs regarding democracy. To answer the second research question (*How do the democratic qualities influence RECs in Fryslân?*), the identified qualities in the literature review as well as the data collected from the interviews showed that RECs were influenced in different levels of democracy, ergo all of them differently presented participation and decision-making processes where they involved the members of the cooperatives and promote the involvement of the local communities. Furthermore, rights of members seemed to be directly related to participation processes in the operation of RECs, as mostly the only right of members is to vote on decisions that either they or the board of the cooperatives propose.

The aspect of community acceptance is interesting in the sense that it can be a great barrier or driver that influences the establishment and operation of RECs. For instance, acceptance of the local community is related to trust and support to specific projects, mainly the initiatives regarding the establishment of renewable energy facilities, as other minor projects such as insulation of households, are already commonly accepted. During the

establishment phases of RECs, acceptance is key to achieve greater numbers of members and thereby support for action, whereas in the operation phases, acceptance of the local community is also vital if a specific project is to be develop. The cases of DAN and WEN regarding the solar fields and the biodigester exemplify this situation. Summarizing the third research question (*How do RECs in Fryslân compare to each other in terms of democratic qualities?*) it is important to remark that all three cooperatives are democratic, however the difference between cooperatives results in the due processes of participation when starting new renewable energy projects. The local community plays a major role on this, because although they might not be members of the cooperatives, the local community can either advance or stop renewable energy projects, as they are still being represented by the elected people, who veil for their interests. This then leads to answer the main research question (*How do RECs contribute to the democratization of the energy transition in local communities?*). RECs do contribute to the democratization of the energy transition locally, not only because people that become member of the cooperatives tend to act in favour of it, but also because the work cooperatives do of informing, educating, and training people in matters of the energy transition is crucial for it to advance. However, as mentioned before, energy cooperatives in the Netherlands entail only 97 thousand members from a country of more than 17 million inhabitants. If the number of inactive members is counted, then the *real* total number of participants is drastically reduced.

All in all, this research is aimed at qualitative, in-depth case studies. Therefore, there is no room for statistical generalization, but rather it is limited to analytical generalization. In that regard, although the research was based on data from three different cases, the socio-economic and political contexts of the energy cooperatives in Fryslân and the Netherlands is similar. Accordingly, it is possible to generalize that similar results might be found among cooperatives in other regions of the Netherlands or other European countries with similar contexts. Nevertheless, this was a first attempt to assess democratic qualities within RECs and RECs as a tool for the democratization of the local energy transition in a Netherlands/European context. To contest and compare the findings, future studies can be carried out in other regions of the Netherlands and other European countries with different socio-political environments.

5.2. Recommendations

The research finds that two main reasons can hinder or drive the local energy transition, namely the financial aspect and the government, either by providing support or hindering bottom-up approaches. In summary the energy transition needs to be financially viable and affordable for all. The energy transition should provide cheaper prices than traditional energy sources, because although people might be aware of the challenges of climate change, economic interest is the driver of society. Moreover, programmes to include the youth in the energy transition should be created, as there is a clear lack of participation from younger populations. It might be perceived that in these cases democracy in RECs is exclusive of old generations, since participation depends on the availability of time and the financial aspect, which are mostly covered in older generations. On the side of the government, the bottom-up approaches should be *real* bottom-up approaches, namely due processes should take place in which the government serves only as observer and supporter. In that way it is possible to start building trust in society regarding the energy transition. The transition should not be forced upon the people, but rather stimulated.

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Appendix A. Interview Design

Introduction

Several regulations and measures have been applied in Europe in response to the Paris Agreement (2015). The Clean Energy for all Europeans Package (CEP) and its respective directives, as well as the National Climate Agreement, in the Netherlands, establish that a reduction of greenhouse gas emissions must take place to mitigate and tackle Climate Change. The Energy Transition is the pathway to achieve this goal through the transformation of the energy sector from fossil fuel based to zero-carbon by the second half of the century.

Such importance has been given to the energy transition that relevance was also given to the *Renewable Energy Communities/ Cooperatives*, providing them with legal frameworks at the European level in the CEP. The EU is focusing in democratizing the energy transition because they believe that doing so, it will gain further strength. Therefore, democratizing the energy transition implies democratizing the means. According to this, the research aims to give answer to: How do RECs contribute to the democratization of the energy transition in local communities?

The interviews to be developed aim to collect data on democratic qualities. The following criteria are used to encompass the research purposes: (i) participation, (ii) acceptance and (iii) rights of the members. The data collected will serve to analyze RECs in terms of democratic qualities, with the final purpose of adding knowledge to field of RECs.

Questions

Questions on participation

1. Why was this cooperative created?
    a. What were the motivations and reasons for establishing this cooperative?
2. Can you describe the establishment process of the cooperative?
    a. Did the community receive support from external parties, i.e. other companies or organizations or was it merely a community initiative? Why?
3. How are the decisions made within the cooperative?
    a. Who makes the decisions? Why?
    b. What type of ad-hoc or regular meetings take place?

4. What methods are used to make sure that all members of the cooperative and people from the community somehow participate in the cooperative?
5. How would you define participation of different members within the cooperative in terms of gender, age, profession, and degree of studies?

Questions on acceptance

6. How did people react at first to the idea of having a renewable energy community?
    a. Were they supportive? Enthusiastic? Sceptical? Resisting?
    b. Did something change before and after the cooperative was already created in terms of community acceptance?
7. Are there any other projects being developed in the cooperative?
    a. When developing other projects, how did you perceive the acceptance of the members and the surrounding community/not members?
8. To what extent did the cooperative increase the acceptance of renewable energy in the community?
    a. How do you explain this increase?

Questions on rights of members

9. Who can become a member of the cooperative?
    a. Does it have to be a person from the community or does the cooperative also accepts members foreign investors? Why?
10. What do people need to do to become a member of the cooperative?
    a. Is there any entrance-fee or contribution in kind required?
11. What are the rights of members?
    a. Are they entitled to retribution or benefits from the activities of the cooperative? If yes, what are they?
12. How do the retribution or benefits mechanism work?
    a. Can only individual members benefit or are there also community benefits?
13. Does the cooperative structure follow the "one member-one vote" scheme or which mechanism is used to take decisions?
    a. Who are allowed to vote?
    b. Do any members have veto power?

Appendix B. Informed Consent Form

Informed consent form for individual interviews for thesis studies in MSc MEEM

Title research or acronym: *Renewable Energy Communities as a tool for the Democratization of the Local Energy Transition in the Province of Fryslân, the Netherlands*

I declare to be informed about the nature, method and purpose of the investigation. I voluntarily agree to take part in this study. I keep the right to terminate my participation in this study without giving a reason at any time.

My responses may be used solely for the purposes of this study. In its publications, they may *(please tick one of the options):*

O be cited with my name or function revealed
O be cited anonymously, thus without identifying context
O only used as information source

During the course of the interview I keep the right to restrict the use of (some of) my answers further than indicated above.

Name participant: .....

Date: ..... Signature participant: .....

I declare to fully adhere to the above.

Name researcher: Javier Gerardo Chávez Hernández

Date: 15/06/2021 Signature researcher: