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STVK02
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Between People and Energy

A comparative case-study analysis of the role of Energy Communities in Belgium and the Netherlands

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Abstract

Energy communities are on the rise in the EU. Viewed as a potential driver to a socio-technical transition towards renewable energy, they are given substantial room for growth within EU policy. In some EU member states, they are flourishing, while in others they barely exist. This thesis analyses how the density of energy communities affects the shares of renewable energy in a state's energy mix. This was researched through a comparative case-study between the two EU member states Belgium and the Netherlands. Grounded in transition theory, the study tests the hypothesis that the case which has a higher energy community density, also has higher renewable energy shares. In the end the study gave the opposite result. This led to a theory-related discussion, concluding that energy communities still theoretically are on a *niche* level, blocked by a systematic *lock-in* towards current fossil fuel regimes. In order for energy communities to be a key vehicle in the renewable energy transition a *punctuated equilibria* is needed. This could possibly stem from increased EU policy support or a stronger citizen's movement by making energy communities more accessible to everyone. Furthermore findings regarding the size of energy communities led to a discussion on limitations and suggestions to future research.

Key words: energy community, transition theory, EU, Belgium, The Netherlands
Words: 9987

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Abbreviations

CEC: Citizen Energy Community
CEP : Clean Energy For All Europeans Package (2019)
EC: Energy Community (including both RECs and CECs)
EU: European Union
JRC: European Commission’s Joint Research Centre
REC: Renewable Energy Community
RE: Renewable Energy

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1.Introduction

> "If we wait for the governments, it'll be too little, too late; if we act as individuals, it'll be too little; but if we act as communities, it might just be enough, just in time"
>
> *Rob Hopkins*

Climate change is and remains one of humanity's biggest political challenges, and requires fundamental changes in human life and organization of societies (Steffen, 2011, p.21). Energy transition exists in order to reduce climate change and is needed for states to achieve their goals within the Paris Agreement (Roehrkasten, 2018, p.6). Renewable energy plays a key role in the decarbonization of global energy systems, which is of high importance in order to create a sustainable future on earth (Sanderink, 2020, p.101). Within the renewable energy transition, there is an increasing light shining on decentralized energy initiatives (Burger, 2012, p.2). The European Union provides a growing support for this, which has cleared the way for what is now acknowledged as *energy communities (*JRC, 2020, p.4*)*.

Through renewable energy generation and other energy activities with environmental objectives, they are viewed as a potential driver to a transition towards renewable energy in the EU. The renewable energy transition could come from the energy industry's big actors - but it could also come from the people (Vansintjan, 2015, p. 47). Through energy communities, citizens from all groups of society are given the possibility to engage in the transition towards renewable energy, and take the fight against climate change in their own hands (Magnusson & Palm, 2019, p. 15).

However, the development of energy communities looks really different between EU member states. Transition research has a core ambition to better understand transitions and to explore the possibilities of acceleration (Loorbach *et al*, 2017, p. 602). In some countries they are flourishing, while in others they barely exist. This creates the potential of analysing a counterfactual situation through comparison within the EU, in order to explore the potential of energy communities and their role in a socio-technical transition towards renewable energy. Through a comparative case-study on Belgium and the Netherlands, I will analyse if this new force affects shares of renewables in the energy mix and therefore has the potential to contribute to more sustainable societies.

1.1 Research question

The thesis holds a purpose of gaining insight in the potential of ECs to be a key vehicle for the RE transition within the EU. With a theory testing approach, the thesis aims to deepen the understanding of ECs and their role within climate and energy politics. This broader subject is concretized to a comparison between the cases Belgium and the Netherlands, by measuring ECs through their density in regards to population, and shares of renewables in the energy mix by its RE share of gross final energy consumption. With regards to this, my study asks the following research question:

> *Does the density of energy communities affect the shares of renewables in the energy mix?*

1.2 Disposition

In order to answer the research question, I will analyse the causal relationship between EC density and shares of RE in the energy mix. This will be done through a comparative case study on Belgium and the Netherlands. A background chapter provides a brief overview of the energy transition in the EU and ECs placement within EU legislation. This is followed up by a literature review and motivation of the study's internal relevance. The theoretical framework will be explained in a chapter on transition theory, which leads up to the hypothesis. Afterwards the method is explained. Lastly the results are presented, divided into chapters on the control variables and the independent and dependent variables. This is followed by the analysis and discussion presenting the conclusions that can be drawn from the comparison. The study then ends in an outlook to future research.

1.3 Background

1.3.1 Energy Transition in the EU

The EU has taken big steps in the field of energy transition and climate policy (Jordan & Rayner 2010, p.55). Since energy was made an area of shared competences with article 194 in the TFEU, the energy policy of the EU affects all member states (EU, 2012). The final target set for the EU's energy and climate strategy is to achieve climate neutrality by the year 2050. This is the long-term strategy at the heart of the European Green Deal, as the EU's commitment to global climate action under the Paris Agreement (European Commission, 2019a). To achieve these goals, great transitions have to be made in switching from fossil fuels (Sanderink, 2020, p.101). Consequently, energy transition has to occur in one way or another in all EU member states.

The European Commission's *Clean Energy for All Europeans Package* (CEP) broke new ground in the European legal framework of energy. For the first time, the rights of citizens and communities to engage directly in the energy sector were recognized. The CEP set up a regulatory framework that put consumers at the heart of the energy market. Within this package several new measures were made in order to ensure energy efficiency, but also to empower consumers on the path to climate neutrality. (European Commission, 2020, p.10 ; Nouicer & Meeus, 2019, p.68).

In this study, the transition towards renewable energy is operationalized through shares of RE in the energy mix. This is measured through the share of RE in the gross final energy consumption. This since it is the closest proxy to the indicator, and as referred to in the EU Directive 2009/28/CE on the promotion of the use of energy from renewable sources (Cadoret & Padavano, 2016, p.263).

1.3.2 Energy Communities

Over the past decade there has been an increasing amount of citizen led energy initiatives inside the EU. The phenomena has many names, such as community energy and energy cooperatives. Although they take slightly different forms, they all involve citizen's participation in the energy sector by varying degrees of community involvement in decision making and sharing of benefits (Reijnders *et al*, 2020 p. 153). The CEP counts certain categories as ECs (JRC, 2020, p.4).

ECs are formally defined in two separate laws of the CEP, with two definitions: "Renewable Energy Communities" (REC) and "Citizen Energy Communities" (CEC) (REScoop, 2019, p.1). The legal framework for RECs is set in the revised Renewable Energy Directive (2018/2001). Roles and responsibilities for CECs were introduced in the revised Internal Electricity Market Directive (2019/944), which is also referred to as the E-directive (JRC, 2020, p.7).

These two types of citizen energy initiatives differ in some ways, although they can both be referred to as ECs (JRC, 2020, p.7). Both definitions are framed as "a particular way to organise collective action around an energy-related activity - namely through a legal entity" (REScoop, 2019, p.3). Ownership structure is characteristic for ECs and makes them different from other energy initiatives.

They are market actors acknowledged by the CEP, who combine non-commercial economic aims with environmental and social objectives (JRC, 2020, p.7 ; REScoop, 2019, p.3). With support schemes such as feed-in tariffs, citizens are encouraged by the EU to become knowledgeable participants in energy transitions (JRC, 2020, p. 32). The name ECs therefore include both RECs and CECs, in line with the definition similar to the one of REScoop and the data from the JRC (REScoop, 2019, p.1 ; JRC, 2020, p.7). REScoop is the European federation of citizen energy cooperatives, a growing network of 1900 European energy cooperatives and 1 250 000 citizens who are active in the energy transition. Their members are named REScoops and are considered as ECs (REScoop, 2019, p. 2). The JRC is the European Commission's Joint Research Centre, and their report with an overview of ECs has been an important source of data for the study (JRC, 2020).

ECs perform a range of activities across the energy sector (REScoop, 2019, p.2). In the JRC report it becomes clear that generation is the most frequent activity performed by ECs (JRC, 2020, p.13). Such as installing community owned windmills, or putting solar panels on the roofs of private homes, farms and public buildings. By generation it means that the members of an EC collectively use or own a generation asset which often provides solar, wind or hydro energy. When the members do not consume the energy themselves, they feed it back into the network or sell it to a supplier (JRC, 2020, p. 12). Both CECs and RECs perform similar activities, but differ in some ways. CECs do not necessarily have the same obligations of having the activity placed locally or geographically close. Given the name, RECs have to be based on RE, but a CEC can also be based on fossil fuels. Although most of them are not, since solar and wind power are by far the most commonly used technologies (JRC, 2020, p. 25).

ECs come with social, economical and environmental benefits (Magnusson & Palm, 2019, p.1). Investment returns go back to the community instead of to big energy companies (REScoop, 2020, p.21). Social benefits of ECs can be promotion of energy democracy and citizen empowerment, where citizens go from disengaged to active consumers (Heldeweg & Saintier, 2020, p.2). Economical and social benefits motivate many citizens to become involved (Nouicer & Meeus, 2019, p. 84). Although this study will be focused on the environmental benefits of ECs, which proves to intuitively frame the causal mechanism of the relationship between the independent and the dependent variable of this study. According to the Renewable Energy Directive 2018/2001, ECs are seen as a way to expand RE. Through accelerating the production of RE, ECs are potentially at the forefront of the RE transition. With their contribution to the RE transition, the environmental benefits of ECs are therefore decarbonisation of the energy system (REScoop, 2020, p. 21 ; Nouicer & Meeus, 2019, p. 84). ECs are one *way of doing things* and not *the only way* of transitioning towards renewables. With the right support, they could be transformative and influential for the energy systems of the world. This makes for a probabilistic view of causality, instead of a deterministic (Teorell & Svensson, 2007, p.241).

The revised Renewable Energy Directive 2018/2001 obliges all EU member states to provide a framework that promotes and facilitates the development of RECs (Nouicer & Meeus, 2019, p. 85). CECs are given a level playing field as new market actors through a legal framework in the revised Electricity Market Directive (JRC, 2020, p. 8). They should be protected by the Union Law and not face regulatory restrictions (Nouicer & Meeus, 2019, p. 85). By 2021, all member states have to transpose the directives of the CEP into national legislation (European Commission, 2019b).

In order to get a good grasp of the amount of ECs in a country, an EC density index was created (Figure 4). Approximate number of ECs in several member states were put in relation to population. The data on ECs were retrieved from the JRC (JRC, 2020), and population data from Eurostat (Eurostat, 2021a). Both numbers are from 2019. This indicates a certain density that makes a clearer view of the amount of ECs in each member state.

2. Literature review

ECs has sparked the interests of many researchers. Some researchers concentrate on in-depth-case studies analysing more or less successful cases (Reijnders *et al,* 2020 ; Gorroño-Albizu *et al*, 2019). Comparative studies are also quite common within the field.

Palm *et al,* (2020) analyzes countries all over the EU in order to explore under which polycentric settings they evolve (Palm *et al*, 2020). The aim for many researchers is to find what institutional settings are favorable for ECs to grow (Kooij *et al*, 2017 ; Palm *et al*, 2020). It is of importance to research what bottlenecks or obstacles that come in the way for sustainability transitions (Meadowcroft, 2009, p. 329).

ECs can be seen as one approach to realization of decentralized energy solutions (Reijnders *et al*, 2020). A lot of research speaks for a decentralization of energy systems (Reijnders *et al*, 2020, p.138 ; Lowitzsch, 2019 ; Burger, 2012, p.2). Energy decentralization in general has been researched as an important tool in energy transition (Heldeweg & Saintier, 2020).

The internal relevance of this thesis stems from a perceived lack of research on the ECs role in the RE transition. According to Roerkahsten (2018), contributing to the understanding of the drivers and barriers of solutions to the energy transition is an important task within energy research (Roehrkasten, 2018, p.10). There is a need to map, characterize and investigate the amount of community energy initiatives across Europe, in order to see how they can evolve and develop (Hewitt *et al*, 2019). Since energy is so connected to climate policy, I also consider knowledge in this area vital for anyone interested in environmental governance and the politics of climate change.

3. Theoretical framework

By seeing the subject as a case of a wider concept, the study can be grounded in theory (Teorell & Svensson, 2007, p. 47). The following chapter aims to describe transition theory which is frequently used in the research field of sustainability transitions (Markard *et al*, 2012, p. 955).

3.1 Transition theory

Transition theory is a multidisciplinary scholarly field that studies the conditions for innovation and change in big technical systems (Loorbach *et al*, 2017, p. 600). Big technological changes are called *socio-technical transitions*. Throughout these processes there are balanced states of how societal functions are provided, like mobility, water supply or energy generation (Geels, 2002, p. 1257). These are referred to as *dynamic equilibriums*, and transition as a term refers to a nonlinear shift from one dynamic equilibrium to another (Loorbach *et al*, 2017, p. 600). In line with transition literature the term transition will be referring to *sustainability transitions*. These transitions threaten existing and stable arrangements which are currently facing sustainability challenges. Some actors will try to stay in the old equilibrium due to the benefits that come with continuing with existing technology and infrastructure. Because of these benefits, there is a *path dependency* where old structures persist due to unwillingness to change.

Although, old structures inevitably reach points where the systems cannot change further beyond optimization, which creates tensions. The sustainability issues of the energy systems based on fossil fuel technologies can pose as an illustrative example. When powers from the outside disturb the current system, it has to reorganize itself towards a new equilibrium. This often happens through a chaotic pattern of change. It does not change gradually, but in a shock-wise manner over a long period of time. Disruptive innovations make society reach tipping points and punctuated equilibrium, where the system changes into a new form. (Loorbach *et al*, 2017, p.600).

Moving towards RE can be conceptualized as a socio-technical transition, and the energy sector is seen as a socio-technical system. Energy is a large and diverse socio-technical system that lies at the core of sustainability. It is a commonly used topic within transition research, especially the transition to RE systems (Loorbach *et al*, p. 600). It is such a big system that consists not only of one single regime but a complex array of intertwined ones (Meadowcroft, 2009, p. 329) Within it lies different actors, norms, material artifacts and knowledge, which together provide services for society. The fact that it is a system indicates how different parts cooperate and depend on each other, which matters when the system is transforming. It marks how complex transitions are, and how it is a merging of layers within society (Markard *et al*, 2012, p. 956). Socio-technical transitions are changes in society where big and important technology changes, which also changes the lives of people in their everyday life. Therefore these changes are not only technological but also social and political. Examples of socio-technical transitions in history are the shift from carriages to automobiles, and the implementation of pipe-based water supply. Within transition research, systemic transformations are analysed over time, especially concerned with governance for transformation towards sustainability and climate objectives (Markard *et al*, 2012, p. 956). The transition theory will help understand the possible transition pathways of energy communities in the RE transition.

Technology in itself does not fall into one category of social sciences but instead it cuts across levels and sectors. To be analyzed through social sciences, technology is abstracted in order to fit for research (Rip & Kemp, 1998, p. 340). Within the theory there is a *multi-level perspective* (Markard *et al*, 2012, p. 958). The multilevel perspective is not an ontological description of reality, but more of an analytical and heuristic framework to understand transitions (Geels, 2002, p. 1273). The perspective is made in order to explain *path dependency* and *lock-in effects* towards existing socio-technical systems and technologies, such as coal fired power plants. The theory proposes that transformation happen in relation to multiple levels; *landscapes, regimes* and *niches.* The levels are embedded and constantly dependent on each other (Geels, 2002, 1261 ; Bäckstrand & Kronsell, 2015, p.11-13). They are important tools for transition analysis. Depending on these niche-regime-landscape interactions, one can investigate how transitions evolve and which transition pathways they follow (Markard *et al*, 2012, p. 958, 963).

The most central notion is that of the *regime.* It is the dominant and stable arrangement in a societal system. The dominant regime can be understood in the interaction with the landscape and niches, since the regime has to withstand pressure in the form of norms and preferences, as well as resist new innovations and progressive alternatives. The regime is the network of actors who exercise the power to establish or bring up a social order tied to a certain distribution of resources. To find out who has the position of the regime, one can ask which actors benefit from current production, innovation and market solutions. In order to resist change, regime actors can mobilize power strategies. Policy makers and business actors can form alliances which make the regimes very resistant. *Lock-in effects* are the old equilibrium and the path dependency of institutions and other aspects that stand in the way of sustainability transitions (Loorbach *et al,* 2017, p.605). For instance the modern fossil fuel economy is big and deeply intertwined in our societal systems. This can be described as a sociotechnical *lock-in* (Meadowcroft, 2009, 329). In order to change a regime through a transition process, challenging structures have to find their way around the people in power which benefit from the current situation (Bäckstrand & Kronsell, 2015, p.11).

The *landscape* gives a context for transformation, since changes always happen in a wider net of institutions, earlier changes and norms over time. The landscape is the slowest to change of all levels. The regime actors are affected by the aspects of the landscape, such as dominant discourses steering society and culture ; how people want to use technology and which systems are desired by the masses (Bäckstrand & Kronsell, 2015, p.11). Changes in the landscape can put pressure on existing regimes, and create shifts in socio-technical systems through opening a *window of opportunity* for niches (Markard *et al*, 2012, 958). In this way a new regime can finally be established (Geels, 2002, p. 1262).

The *niche* is a concept that exists independently from the regimes, and can be conceptualized as protected spaces such as specific markets or user domains. Radical innovation can develop inside niches without pressure from the current regime (Markard *et al*, 2012, s.957). Protections of niches can be subsidies or consumption by societal groups close to the project. While only being a niche phenomena, an innovation will meet difficulties in growing due to current regime structures that are more dominant (Geels, 2002, p. 1272). Real change happens when the current regime is weakened by the influence of niches (Bäckstrand & Kronsell, 2015, p. 13). After times of experiments and networking, niche innovations can start competing with established technologies. With the help of a window of opportunity, they can lead to the reach of a new equilibrium (Markard *et al*, 2012, s. 957). This would mean an entirely new energy system, where energy services come from new sources and technologies.

This *multi-level perspective* offers explanations to technological transitions (Markard *et al*, 2012, p. 958). It describes the forces of the political sphere that react to global sustainability challenges such as climate change. This can be seen as in line with the main goal of political science, deepening the knowledge of politics and common resources such as the environment (Badersten & Gustavsson, 2015, p. 17). The role of governments and institutions has remained largely unexplored in transition theory until recently (Bäckstrand & Kronsell, 2015, pp. 11-13). Transitions are much more than merely technological shifts; they pose questions of power, democracy and indicate socio-cultural change with deep effects (Loorbach *et al,* pp. 600-601). The theory keeps an integration of ideals from different disciplines that all fit within the *multi-level perspective* (Geels, 2002, p. 1273). This shows how it is a multidisciplinary field that at the same time holds the role of the scientific study of politics within it.

Within transition theory it is mentioned how radical innovations break through with a certain hybridization and add-on effect. This means that new technologies link up with established technologies to solve particular bottlenecks. Already existing, but sub-optimal technologies have big advantages concerning prevailing infrastructure, financing, insurances, user habits, judicial aspects etc. Actors in the fossil fuel industry will probably advocate for a more centralized energy system, which could threaten citizen initiatives (Gorroño-Albizu *et al,* 2019, p. 2). To combat this situation, system improvement or system innovation ought to be made, with fundamental adjustments to dominant designs (Meadowcroft, 2009, pp. 329-330). Old and new technologies could cooperate and form a symbiosis (Geels, 2002, p. 1271). In which ECs connect with already existing RE technologies, they could be seen as the niche that will change the current regimes and landscapes, and create a new energy system consisting of renewables.

3.2 Hypothesis

The hypothesis of the study is that ECs have the power to break through the current regime and change the energy system towards renewable energy. In line with the perceived enthusiasm in EU policy, ECs could be a driving force in the RE transition that is so strong that it will change socio-technical systems and be a driving force towards a socio-technical transition. The hypothesis therefore assumes that the Netherlands, which has a higher amount of ECs, would also have a higher amount of RE shares of the gross final energy consumption than Belgium. This hypothesis will be tested through a comparative case-study.

4. Method

4.1 Research approach

To have an objective or realistic view of social phenomenons lay the groundwork of an ontological perception that it is possible to achieve objective knowledge of the world also through social science (Teorell & Svensson, 2007, p.279). Through measuring what I claim to measure, and present this knowledge in a systematic and transparent way, I wish to write a highly valid and reliable study. In order for a study to be valid, operationalization of the most important terms is needed (Teorell & Svensson, 2007, pp. 57-59). In this study this is demonstrated through constant definitions and explanations of terms and concepts throughout the text, as well as chapter 4.5 which specifically operationalizes the control variables. To ensure intersubjectivity, sources are clearly cited throughout the study. To make sure the process is transparent and understandable from outside my own mind and research process, this method chapter explains how the comparative method has been used and why so.

In order to be able to generalize the results of the study, the variables are made comparable and take forms that exist in several environments. This is a foundational criteria in order to be able to contribute to research (Teorell & Svensson, 2007, p.237). ECs is a variable that is generalizable but at the same time legally defined through EU law, therefore not too broad or diffuse. RE is in itself also a variable that can be measured in many countries, thanks to accessible data.

In this study I will mainly use the theory in order to direct the light towards the phenomena that can explain the situation. As transition theory is considered well developed, this comparative case study will not be theory developing, but used for a theory testing objective. Through testing, one can assess the validity and scope and conditions for theories (George & Bennett, 2005, p. 75). The theory is highly present throughout the study. It is tested by theoretically framing a clear hypothesis, which is tested on empirical material. The cases were selected with care, in order to try the causal inference and investigate whether or not it gains support from empirical material (Esaiasson *et al*, 2017, pp. 41- 42).

To be able to make a causal inference, four criterias ought to be fulfilled: contrafactual difference, chronology, isolation and causal mechanism (Teorell & Svensson, 2007, p. 64). Contrafactual difference is achieved through the case-study design and how it resembles a contrafactual situation. Since the cases are different in the independent variable but similar in other aspects, we are able to see how the two different situations affect the outcome. Data availability does not allow for an inference about the chronology of events, although it would have been optimal to gain data over a longer period of time. This will be discussed further in chapter 6.2 concerning limitations. Isolation is achieved through the case selection approach with similar control variables. The causal mechanism would be the explanation of the effect, *why* ECs would lead to RE. Why ECs could make a difference in the RE transition is investigated through the background chapter through the information given about the activities of ECs. Through RE generation they would contribute to higher shares of RE in the gross final energy consumption. Thus through doing a case-study and analysing the EC density and how this affects the RE shares, there is a gained understanding of the causality between the phenomenon and how they are potentially interlinked (Teorell & Svensson, 2007, p. 261).

4.2 Comparative method

The study is a comparative case study analysis between two cases. An explanatory purpose aims to describe causality between variables. Detecting potential relationships between variables is made possible through the comparison. Comparative methods are highly grounded in variable thinking (Teorell & Svensson, 2007, pp. 22-27, 236). A distinction between independent and dependent variables is central in order to make explanations within social science, since it describes the characteristics of what is explained (Esaiasson *et al,* 2017, p. 51). The method allows for an understanding of the conditions, and why certain effects occur or fail to occur (Palm *et al,* 2020, p.15). The causality will be strengthened by the contrafactual aspect of the *Method of Difference* (Teorell & Svensson, 2007, p. 229). As my cases resemble a contrafactual situation, a hypothetical difference can be analysed. This poses a response to the fundamental problem of causal inference, which indicates that it is not possible to see the actual contrafactual difference in studies that are non-experimental (Teorell & Svensson, 2007, pp. 28, 64). The comparative method is structured in the way that the researcher approaches all cases in the same way which reflects the goals of the study. This in order to do a systematic comparison between the cases. The method also provides a focus in the way that it does not analyse all aspects of the cases, but only those deemed relevant (George & Bennett, 2005, p.67). Single case studies can go to depths to answer a research question, but the risk remains that it reflects too much the researchers own interests and that the results are not as generalizable as with a comparison (George & Bennett, 2005, s.70).

Case selection is a big part of the comparative study, and selection should be done from a relevance that stems from the research problem as well as the theory (George & Bennett, 2005, s.83). Defining the universe of possible cases that are relevant for the explanation is essential (Geddes, 1990, pp. 5, 17). Since my study is based on EU policy, the universe to me would be the EU member states. Selection ought not to be done from interest or data accessibility, but from a thorough design that holds an experimentative and isolating approach (Teorell & Svensson, 2007, p. 222). Case selection comes down to the question of where to put the variation.

4.3 Case selection

John Stuart Mill's *Method of differenc*e (Mill, 1967 [1843]) has guided the case selection of the study. This selection design makes up for two cases that are similar in all relevant aspects, apart from the independent variable that could explain the dependent variable. A potentially causal relationship will be analyzed, aiming for a causal inference from a simple type of question: *does X lead to Y?* The aim is to look for co-variation in the variables (Teorell & Svensson, 2007, p. 240). This logical approach ensures an isolation of the independent variable, while controlling for other confounding variables. According to King *et al*, choosing cases from the dependent variable will skew the study in a certain direction (Teorell & Svensson, 2007, p. 224-226). Unnecessary risks of angling the study is avoided through choosing the cases from the independent variable (Geddes, 1990, pp. 24-25). Unfortunately it is impossible to invent countries that fit perfectly with one's chosen field of study. On that account it is important to remember that the cases selected are never perfectly similar or different in the relevant variables (Anckar, 2008, p. 399). The selection strategy therefore serves as guidance for ideal types (Teorell & Svensson, 2007, pp. 222-227).

This case selection strategy led to the choice of Belgium and the Netherlands. The choice was made from the *Method of Difference,* and the relevant control variables have been narrowed down to three political factors that can be seen as competing "drivers" to the RE transition. Although many aspects can be seen as influential, a few had to be chosen. Limitation of time has naturally framed the thesis and has somewhat affected the methodological choices such as the control variables, which is normal within the scope of a Bachelor's thesis (Teorell & Svensson, 2007, p. 21). Looking for drivers in a known direction is complex, especially in a situation in such flux as the RE transition, with a multilayered complex socio-technical change (Meadowcroft, 2009, p. 390). The cases were chosen from relevant findings of these variables. Through keeping the control variables constant, alternative explanations were controlled for (Teorell & Svensson, 2007, p. 227-228).

The control variables were chosen with a background in relevant literature concerning drivers to RE transition, describing where the two cases are situated in regards to several relevant aspects. Many factors can be seen as drivers for the transition to renewable energy, and they can differ between countries. Economic and environmental drivers have earlier been widely studied. High GDP or good biophysical conditions are often seen as main drivers for RE transition, although this is not the entire image. Even though the issue can be analyzed from a solely technological or biophysical perspective, state investment in RE is first and foremost a political decision (Cadoret & Padavano, 2016, pp. 261-262). Consequently it is fitting to look for political drivers for government deployment of RE, that is how governments choose to distribute and position RE.

On the state level it is the government who finances RE as a response to multiple political factors. The RE share of the gross final energy consumption is therefore affected by the state's deployment of renewable energy. Transitions to RE take different forms, even within the EU where economies are intensely interlinked (Cadoret & Padavano, 2016, p.262). Many researchers stress political factors and their relevance for efficient energy transition. Effective RE policies are not solely connected to the level of economic development or if the country has a lot of wind or sun. Instead they look to political settings such as public opinion and power in decision-making. They claim that targets of countries are easy to identify, but realised RE policies have to be evaluated against a background of current challenges and driving forces behind environmental policy making (Lowitzsch, 2019, p.31). Also Melnyk *et al* concludes that a high BNP is not leading to a high share of renewables (Melnyk *et al*, 2020, p.42). Roehrkasten claimed developing economies invested more in renewable energies than industrialized ones in 2015 (Roehrkasten, 2018). The study will therefore contribute to the political science research of transition studies, leaving out more technical, economical or biophysical parts.

Political pressure, quality of governance and *lobbying power of the manufacturing industry* have been selected as the most important political drivers that could serve as control variables. The Netherlands and Belgium are comparable in all of these three political aspects. Furthermore both countries mention in their National Energy and Climate Plans that they will turn away from fossil fuels (European Commission, 2021), both are members of the EU, and both will have to transposit the CEP and therefore the juridical framework that is supporting the development of ECs.

4.4 Material

The study calls for multiple data sources. Mainly quantitative indicators have had importance in overviewing the situation. The material used in this thesis relies on a strategic selection of secondary sources, which were all selected by the principles of source evaluation (Esaiasson *et al,* 2017, p. 298). Data on ECs were found in a report by the European Commission's Joint Research Centre (JRC). The report is an overview of ECs, energy and social innovation in Europe. The report illustrates how this concept of citizen-owned energy services has been applied across the continent (Hockenos, 2020). It is considered reliable since it comes from the Joint Research Centre of the European Commission, written by scientists employed by the EU in order to give independent and scientific counseling and support of EU policies (JRC, 2020). To see the relation to shares of RE in the energy mix, the study relies on data from Eurostat's data browser (Eurostat, 2021b). Both numbers are obtained from the same year of 2019. The data concerning the control variables are retrieved from the article by Cadoret & Padovano (2016). It would have been optimal if data concerning these variables also were from 2019, the same year as the other variables. Although the article is a few years older. Numbers from Transparency International aim to support further the results concerning quality of governance.

In order to access primary material, a different research approach could have been embraced. Doing interviews and exploring deeper the phenomena, many interesting discoveries could have been made. Although this would make for an entirely different study.

4.5 Control variables

In this section the control variables will be operationalized in order to provide for a clear case selection according to Mill's *Method of Difference*.

4.5.1 Political pressure

Citizens in Europe prove to be highly concerned about climate change, and in general want to support the EU in its efforts to tackle the issue (Special Eurobarometer 490, 2019). People's values and preferences play an important role in healthy democracies. Some are reasoning that when people reach a certain materialistic standard, they will become more concerned about environmental issues. Political pressure proves to be important in order to motivate a government towards creating change and moving towards a RE transition (Cadoret & Padovano, 2016, p.262). Therefore a high amount of political pressure would indicate a higher share of renewable energies. The control variable of political pressure is operationalized through the *Special Eurobarometer 490 on Climate Change,* from April 2019. Here citizen support was measured through a population survey on opinions regarding climate change politics. The results given and used for the comparison are the numbers of the population's thoughts on how important they find it that their national government sets ambitious targets to increase the amount of RE used, such as wind or solar power, by 2030. The EU average is 92% (Special Eurobarometer 490, 2019). Big researchers within transition theory make clear that social environments affect the forms of socio-technical transitions (Rip & Kemp, 1998, p.337). Cultural and symbolic elements have big meaning in transitions (Geels, 2002, p. 1259). This little gathering of statistics of population opinion is a minimal indicator, but could as well represent the people's opinion on renewable energy which ought to be quite important in the transition process since it shows connections between social and technical elements.

4.5.2 Quality of governance

In order for political pressure to have an effect on policy, RE transition highly depends on the fact that policies reflect the people's preferences. This possibility of people's voices being heard can be operationalized through quality of governance. Corruption is a standard measure of this (Cadoret & Padovano, 2016, p.262). If a country has a high level of corruption, they respond less to the citizen's preferences and studies show that more corrupt countries have less stringent environmental regulations than less corrupt ones (Fredriksson & Svensson, 2003, p.1397). Therefore quality of governance functions as the second control variable. Measurements in the article by Cadoret & Padavano have been used in order to see where the cases are placed in relation to each other and other EU member states (Figure 2). Placements in the yearly index from Transparency International have been added as well, since the index from this NGO also indicates the level of corruption (Transparency International, 2021a) .

4.5.3 Lobbying power of the manufacturing industry

Some studies associate corruption with lobbying activities (Cadoret & Padovano, 2016, p. 262). It can therefore help to analyse the combined effects of corruption and industry size. Size of the manufacturing industry indicates lobbying efficiency which has an effect on energy policies and therefore RE shares as well. In literature the way of measuring lobbying has often been through activities proxied by the value added by the energy industry as a percentage of GDP, in which a higher ratio indicates a higher penetration of lobbyists, which leads to less efficient RE policies. The operationalization in this study is also borrowed from the article by Cadoret & Padano (Figure 3). It measures the lobbying strength of the industrial sector (Cadoret & Padovano, 2016, p.264).

Lobbying activities might be far more complicated than this, although the sector is often prone to resisting the deployment of RE. The manufacturing industry relies heavily on energy, and they therefore tend to resist the added cost that RE comes with. This industry is also often opposed to environmental regulations in general, and RE deployment makes part of this (Cadoret & Padovano, 2016, p.267). Public policy can be seen as an outcome of competition between different groups. Many groups can get access to the decision process, and the government will consult different groups in environmental issues. Since environmental policy often impacts business, business will often tend to mobilize against regulations that would mean higher costs for them, or other disadvantages (Carter, 2018, p. 188-189). Therefore lobbying power has a role to play in the RE transition, and a more powerful lobbying sector would indicate slower change.

5. Results

In this chapter the final analysis of the variables and the answer to the research question will be presented. In line with the purpose of the study, the analysis will be made through a comparison between the two cases, structured by distincted results to the different variables. The summary table shows the applied comparison and clearly states its findings, supporting the conclusions and the logic of inference that can be drawn from it.

	The Netherlands	Belgium
EC density	28,94 / million	2,97 / million
RE share of the gross final energy consumption	8,7 %	9,9 %
Political pressure	91 %	92 %
Quality of Governance	8,7 %	7,4 %
Size of manufacturing industry	13 %	17 %

Figure 1. Summary of results

5.1 Control variables

The results of the analysis of the control variables provide the study with two cases that are comparable in regards to aspects that in earlier research are seen as important political factors for RE transition. Concerning political pressure, Belgium proved to be similar to the EU average, with 92% of the population finding it important that the government sets ambitious targets to increase the amount of RE used by 2030. This would indicate that the Belgian population generally is in favor of renewables. For the Netherlands the same indicator gave 91% of the respondents finding it important (Special Eurobarometer 490, 2019). Belgium and the Netherlands therefore have quite similar numbers of this control variable, and both are close to the EU average. The variable of political pressure can be seen as connected to a country's quality of governance, since policies in a good democracy also reflect the preferences of the people. What people think about renewable energy is therefore important in order for a state's RE transition (Special Eurobarometer 490, 2019). In both cases this shows a positive result that would indicate a helpful driver to RE deployment.

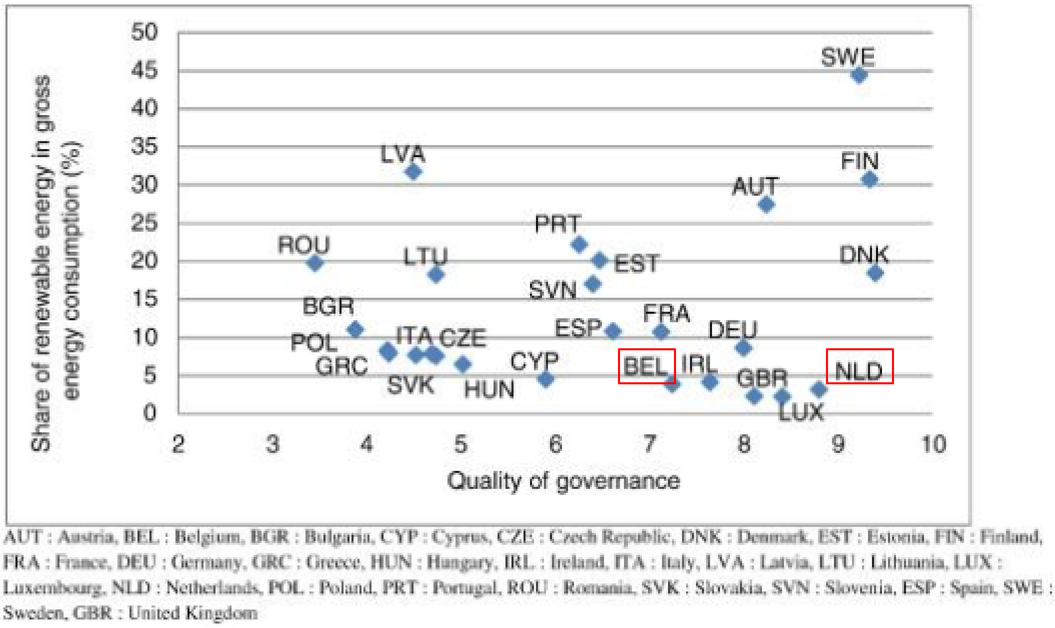
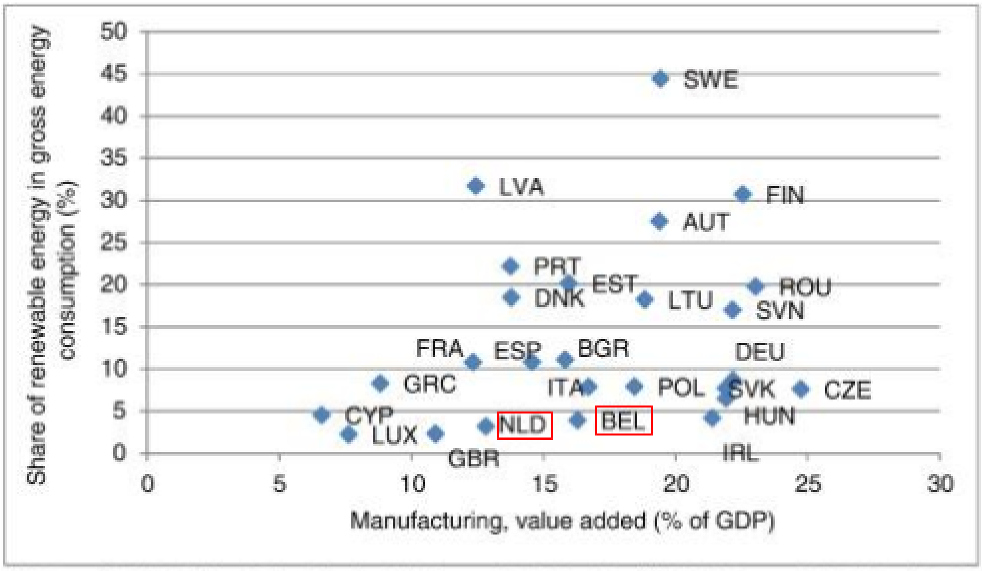


Figure 2. Quality of governance (Cadoret & Padovano, 2016, p.266).

With regards to quality of governance, Figure 2 illustrates that the Netherlands has a higher quality of governance, around 8,7 on the scale. Belgium is not far away, and also has a relatively high number. It is around 7,4 on the scale shown in the diagram of the article (Cadoret & Padovano, 2016, p. 266). This indicates fairly low rates of corruption. Transparency international rated Belgium on place 15/180 (Transparency International, 2021a). The Netherlands have a slightly better score from Transparency international of a rank of 8/180 (Transparency International, 2021b). Even though they differ slightly, when looking at Figure 2 we can see how both cases are in the upper half of the plot diagram. This means that they both have relatively low corruption rates, and that both governments ought to have good possibilities of implementing the people's wishes when it comes to RE. The fact that the Netherlands has a higher number in this control variable would only speak in favor of the hypothesis, since a good quality of governance would be helpful to the RE transition.



AUT : Austria, BEL : Belgium, BGR : Bulgaria, CYP : Cyprus, CZE : Czech Republic, DNK : Denmark, EST : Estonia, FIN : Finland, FRA : France, DEU : Germany, GRC : Greece, HUN : Hungary, IRL : Ireland, ITA : Italy, LVA : Latvia, LTU : Lithuania, LUX : Luxembourg, NLD : Netherlands, POL : Poland, PRT : Portugal, ROU : Romania, SVK : Slovakia, SVN : Slovenia, ESP : Spain, SWE : Sweden, GBR : United Kingdom

Figure 3. Lobbying power of the manufacturing industry (Cadoret & Padovano, 2016, p.265)

The cases are also comparable concerning lobbying power of the manufacturing industry. As Figure 3 indicates, both cases lie in the middle of the plot diagram. Although the number was slightly higher in Belgium. In Belgium the number is around 17 % of the GDP, which lies around the middle of the scale. The Netherlands has a slightly lower rate of about 13 % of the GDP, which would also speak in favor of the hypothesis, indicating that they would have a higher RE share.

These findings indicate that there are not any strong factors from the outside that would disturb the causality of the study's inference. We will now move on to the explaining and outcome variable, taking a closer look into whether or not the hypothesis is correct.

5.2 Independent and dependent variables

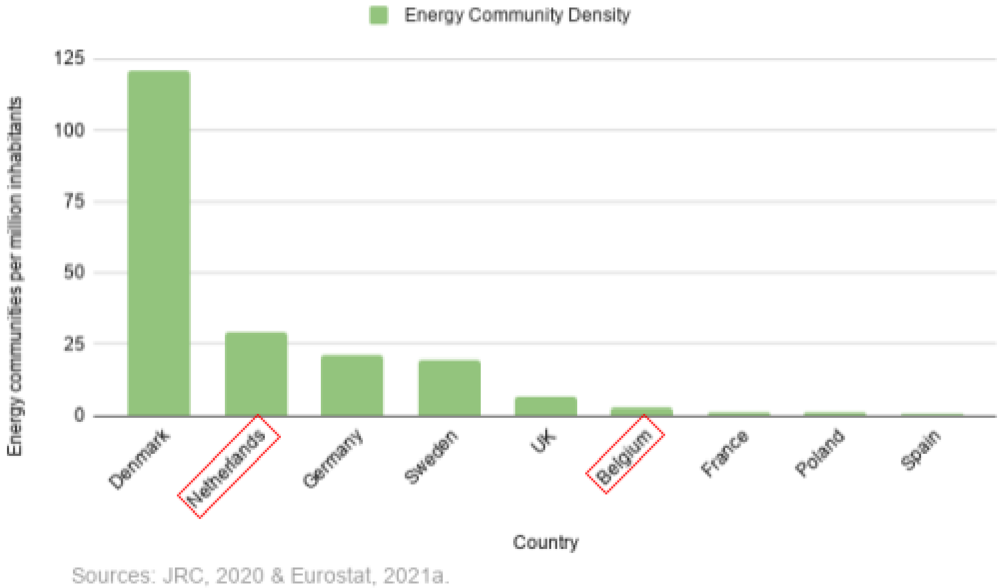


Figure 4. Energy Community Density (JRC, 2020 ; Eurostat, 2021a).

EC density of the cases are demonstrated in Figure 4, where amounts of ECs are put in relation to population. Both numbers are concerning the year 2019. When it comes to the independent variable, the Netherlands clearly has a higher EC density. The total number of ECs is around 500 (JRC, 2020, p. 5). The density number is 28,94 per million people (Figure 4). Although the number is far from Denmark, who has the highest EC density of 120,69 ECs per million, ECs are currently flourishing in the Netherlands (Palm *et al,* 2020, p. 66). Between the years 2017 and 2018, ECs in the Netherlands saw almost a 20% growth (Reijnders *et al,* 2020, p.144). It is also expected that they will continue to grow in the future (Palm *et al,* 2020, p. 66). With the logic of the *Method of Difference*, this is the main reason why the Netherlands were chosen for the comparison.

Belgium's EC density is only 2,97 per million (Figure 4). The state keeps only 34 ECs according to the JRC (JRC, 2020, p. 5). This amount is minimal compared to the Netherlands. Next to other countries analysed in the JRC report, they are on 6th place with only France, Poland and Spain having lower densities (JRC, 2020).

Finally, shares of RE in the gross final consumption of energy was received from Eurostat and then compared between the cases. In 2019, Belgium had a 9,9 % share of RE in gross final energy consumption (Eurostat, 2021b). Although this is not a gigantic number, Belgium has made clear progress in increasing their share of RE and reducing the use of fossil fuels. In Belgium's National Energy and Climate plan a target was set in order to reduce greenhouse gas emissions from the energy sector by 35% from 2005 levels. They also wish to significantly reduce energy demand. Still, Belgium remains reliant on fossil fuels. They face energy security challenges, and nuclear energy covers over half of the electricity demand. Almost half of Belgium's gas imports come from the Netherlands, although it will be phased out in mid-2022. The phasing out of big energy sources creates energy security issues for the country. (IEA, 2021a). With regards to the hypothesis it is assumed that the EC density does not affect the Belgian RE shares, since they have the lower number of EC density.

The Netherlands actually has a lower share, with 8,7% of RE shares in the gross final consumption of energy in 2019 (Eurostat, 2021b). The Dutch energy supply is characterised by high shares of natural gas, which accounts for 83% of the energy mix. A lot of the production used to be exported, although it has quite recently been decided that the Netherlands will reduce their production of natural gas. Still they remain reliant on fossil fuels. Having access to a natural resource in this way is sometimes referred to as the *Dutch Disease*, which claims that when a country has a valuable natural resource, they will focus their economy around it and have problems with developing and keeping up with other states (Beckman, 2013). The problem remains with regards to sustainability issues, making fossil resources an obstacle to progressive change in energy systems (IEA, 2021b). The Dutch state aims to make a big contribution to the Paris Agreement, and the Dutch government is taking measures to contribute to a 49% reduction in greenhouse gases in 2030, compared to 1990 (European Commission, 2021). Nevertheless a low share of renewables caracterise the Dutch energy mix (Palm *et al,* 2020).

When doing the comparison between the cases, a finding concerning the sizes of ECs were made. When researching EC development in the Netherlands, member data was found from *Hier Opgewekt*, an information-spreading organization on local energy initiatives, and *Ecopower*, a Belgian EC. It turns out that ECs in the Netherlands tend to be smaller than in Belgium. Belgium has a lower EC density, but each entity generally holds more members. In Belgium the question of size becomes evidently important. Most of the ECs in Belgium are small, but there is an exception that could be viewed as a critical case. It turns out that one single Belgian EC counts almost as many members as all of those in the Netherlands combined. *Ecopower* is an EC which is really big and had 60 976 members in 2020 (Ecopower, 2020). Still Belgium only has around 34 ECs (JRC, 2020, p.5). The Netherlands has around 500 ECs (JRC, 2020, p.5), but around 88.000 members (Hier Opgewekt, 2020). These results concerning member data will be discussed further in the limitations chapter 6.1.

The analysis ends with a slightly surprising inference. The case with the highest EC density turned out to be the country with the lower RE share of the gross final energy consumption. Furthermore, the discovery of issues concerning amounts of members has led to several questions concerning EC research. The results lead up to a discussion where transition theory enters into the image of the potential of ECs to play a key role in the RE transition.

6. Discussion

6.1 In relation to transition theory

In order to further interpret the result of the study, the discussion circles back into transition theory. The results and its potential explanations are discussed through the theory, investigating whether or not the hypothesis gains support from empirical material. It ends with an inquiry of data accessibility and how it poses research limitations.

A possible conclusion drawn from the summary of results in *Figure 1* could be that ECs are not influential enough to change the RE share of the gross domestic consumption. Referring to the situation in the Netherlands, the country remains dependent on fossil fuels even though they have a relatively high EC density (IEA, 2021b). I could therefore state that no positive pattern between EC density and shares of RE in the energy mix were found in this study. ECs might be flourishing at a local level, but they have neither changed the bigger picture nor contributed to a RE transition in the Netherlands or Belgium. However, this conclusion could be argued against from a theoretical standpoint. Transition theory gives two possible explanations to why ECs have not yet reached a place where they could be the key to the RE transition.

Firstly, the result can be explained through the earlier mentioned *multi-level perspective*. In both the Netherlands and Belgium, ECs are still an innovation on the niche level. They have not been able to break through the current regime, which is necessary in order to affect the independent variable. First when the niche would reach a sufficient mainstream level, the effect that the hypothesis suggests could be seen. Changes in the socio-technical landscape could trigger a process of a new equilibrium, where the niches could have the possibility to make real change (Geels, 2002, p.1272). A lot of aspects speak for the fact that renewable energy is the future, and ECs tend to grow as seen in the Netherlands. This speaks to the conclusion that ECs are still on the niche level, but carries the possibility of breaking through the political landscape in the future.

Secondly, stemming from the theory it can be claimed how a *lock-in effect* is preventing the cases from fully transitioning to renewables with the help of ECs. Biophysical conditions make the Netherlands a tricky case when it comes to RE analysis, since they have access to, and therefore heavily rely on, natural gas extraction (Beckman, 2013). The second theoretical explanation is therefore that there is a current *lock-in* towards fossil fuels in the Netherlands, that prevents ECs from making a big difference. If there is an influence from them, it is so small that it becomes insignificant next to the big actors. In many cases still, there is a *lock-in* to the current actors in power and to the fossil-fuel based energy system (Meadowcroft, 2009, p. 329). This is another interpretation of why the hypothesis failed.

These two aspects prevent ECs from breaking through and affect the energy mix. Still there is a big emphasis on the word *yet* stemming from the result. This speaks against the first mentioned, more pessimistic conclusion. ECs are not *yet* capable of breaking through the fossil fuel regimes and changing the shares of RE. The old equilibrium has not been punctuated, and a new threshold has not been reached. When it does, it could enable the socio-technical transition to RE. What follows as important questions to this analysis is then *what could create this punctuated equilibrium?*

Transitions have the possibility to occur when developments at multiple levels link up and reinforce each other (Geels, 2002, p.1272). Pressure that is being put on the regimes in order to create change are not entirely spontaneous. Part of these pressures come from policy, such as subsidies, taxes and national policy frameworks (Meadowcroft, 2009, p.328). This speaks well for the potential of ECs to grow when being given support from actors with much power, such as the EU. This may be discovered when the transposition of the CEP in the EU member states will take form at the end of 2021 (Hewitt *et al*, 2019). ECs may have started as a tiny niche led by enthusiastic individuals driven by environmental objectives, but is growing and spreading through increased European policy support (Palm *et al*, 2020). This indicates that ECs are on a good way to move further in the transition.

Many technological breakthroughs come from pressing problems that set in motion searches for different solutions. Poverty and stressful circumstances push for people to look for solutions (Rip & Kemp, 1998, pp. 362-363). Climate change is said to be such a disruptive landscape change that the result may come with transition paths for energy regimes (Rip & Kemp, 1998, p. 328). For instance, effects of climate change that lead to shortages of energy supply could lead to a *punctuated equilibrium* and an overturning of centralized energy systems, which leaves room for EC expansion and the RE transition. This since local production poses a good alternative when it comes to energy security issues (Burger, 2012, p.2 ; Lowitzsch, 2019, p. 177).

Rip & Kemp (1998) mention how it is worth pondering whether or not people have the technology and sociotechnical worlds that they really wish for. Are ECs really accessible to everyone? Citizen involvement is still considered a new phenomenon which is dependent on a community's access to capital, technical knowledge and institutional settings (Magnusson & Palm, 2019). Not everyone knows what they can have, which makes transition not only a question of technological development but also one of knowledge spreading and accessibility (Rip & Kemp, 1998, p. 345). With the expansion of the RE market, as well as EU support, it will be more accessible for the average citizen to install their own solar panels for instance. This shows how aspects are dependent and different innovations spur one another towards a transition. Slowly the transition to RE could include more and more people, and an EC landscape could slowly take form. ECs have an unique commercial structure, they do not compete with each other but help one another. They all wish for each other to grow. The "Strawberry Model for Growth" explains how ECs encourage the movement to spread. When reading about models like this, one is given hope that ECs will continue to spread and change the energy system (Vansintjan, 2015, p. 67). To make ECs accessible for everyone and not only privileged groups remains a challenge, but could pose as the enabling factor towards making ECs the key to the RE transition. What creates the *punctuated equilibrium* could therefore be a citizen-led movement, and a shift in power could finally make citizens the main actors of the RE transition in the EU.

6.2 In relation to limitations

Apart from the theory-based concluding points, there is another aspect highly relevant in response to the first conclusion. This concerns the discoveries on size mentioned in the results chapter, which proves to be relevant to the causal mechanism and the mere hypothesis of why ECs would lead to an increased share of RE in the energy mix. The quantitative understanding of how citizen ownership affects energy transitions is limited. Confusion within definitions and differences between different types of community energy, creates problems in data collection and research (Gorroño-Albizu *et al*, 2019, pp. 1-3, 10). The example makes it clear how EC density is lacking as only measurement of ECs causal effect on RE shares. For instance, the size of ECs through member numbers is not taken into account in the JRC report, which provided the data of the study. Therefore, counted into the EC density are both big and small communities, which could generate widely different amounts of renewables. This can be illustrated through the findings of *Ecopower.*

Intuitively this affects the study's inference, since normally a big EC would contribute more to the RE transition (JRC, 2020, p. 25). Although they will count for the same number as a small EC in the statistics that made for the case selection. The possibility for ECs to generate RE would be the causal mechanism, and the earlier logic was that when ECs grow in numbers, they ought to generate more renewables. If this can't be measured through counting ECs, then the quantification ought to change in order to fully understand the causality of the situation. Suggestions to other additional measurements more than mere numbers, are size through amounts of member, or effectiveness through generation capacity and electricity sold to customers measured in kWH. Several authors mention a perceived lack of quantification in the field (Gorroño-Albizu, *et al,* 2019). In order to see how development of ECs are related to RE shares, data over time could make for a solid chronological analysis. REScoop also makes their own material, and have begun to address the need for further data collection and overviews of the development of EC (REScoop, 2020).

7. Conclusion

7.1 Summary

The analysis concludes that contrary to the hypothesis, no patterns were discovered and no evidence was found that ECs play a key role in the RE transition. However, the hypothesis cannot fully be falsified. Transition theory allows for an interpretation of the future role of ECs. The study shows that more factors than EC density matters in order to investigate their transformative role. Data findings did not entirely support the theory and the thesis does not allow for a conclusive result due to these limitations. Inconclusiveness is coloring the discussion, meaning that just because we cannot see it in this scope that ECs have an effect on RE transition, it does not mean that it is impossible for them to play a key role in the future.

What we can learn from this study is that ECs have not *yet* led to an increased share of RE in the energy mixes of the two cases. Necessary aspects for a RE transition would be a *punctuated equilibrium*, that *lock-in* effects are solved or that accessibility increases so that ECs could expand more and leave the *niche* level. Another necessary aspect in order to make more valid research is to start tracking data of size and membership when analyzing the phenomena.

By the results of this thesis I wish to contribute to a nuancing of research on ECs. Building on earlier research of how ECs are developed between countries and which institutional environments that makes them thrive, the thesis has attempted a test of their potential to change the socio-technical energy system through a transition theory analysis. ECs have proven to be a phenomena widely acknowledged by the EU, and will probably remain an actuality in the future of EU energy policy.

7.2 Future research ideas

In moving forward with the subject, possible future research ideas could be pursuing studies over time in order to see a potential covariance between the development of ECs and the transition towards RE. An approach like this could better take the important aspect of chronology into consideration. Another suggestion is to research the possible thresholds that could cause a *punctuated equilibria.*

Concerning generalizability, the study aims mainly to explain the selected cases but could also be generalized towards other EU member states. Other countries with high or low EC density could be analyzed from the same method and theoretical framework. Although one should consider the limitations of size that case studies with a small number of cases have (Teorell & Svensson, 2007, p.241).

Some researchers claim that a solid energy system based on small RE sources would be impossible without smart grid networks, since the growing shares of RE need more structured metering of electricity flows (Melnyk *et al*, 2020, p.37) Grid innovation and expansion plays an important role in regards to the RE transition, especially if a decentralization would occur. Therefore it would also be of interest to research the future for smart grids in relation to EC expansion.

Another suggestion is the effect of EU policies that support ECs, such as researching the impact of the member state transposition of the CEP. Transition theory and the multilevel perspective could be used further, for instance to compare ECs to other citizen initiatives that have been transformative for society.

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