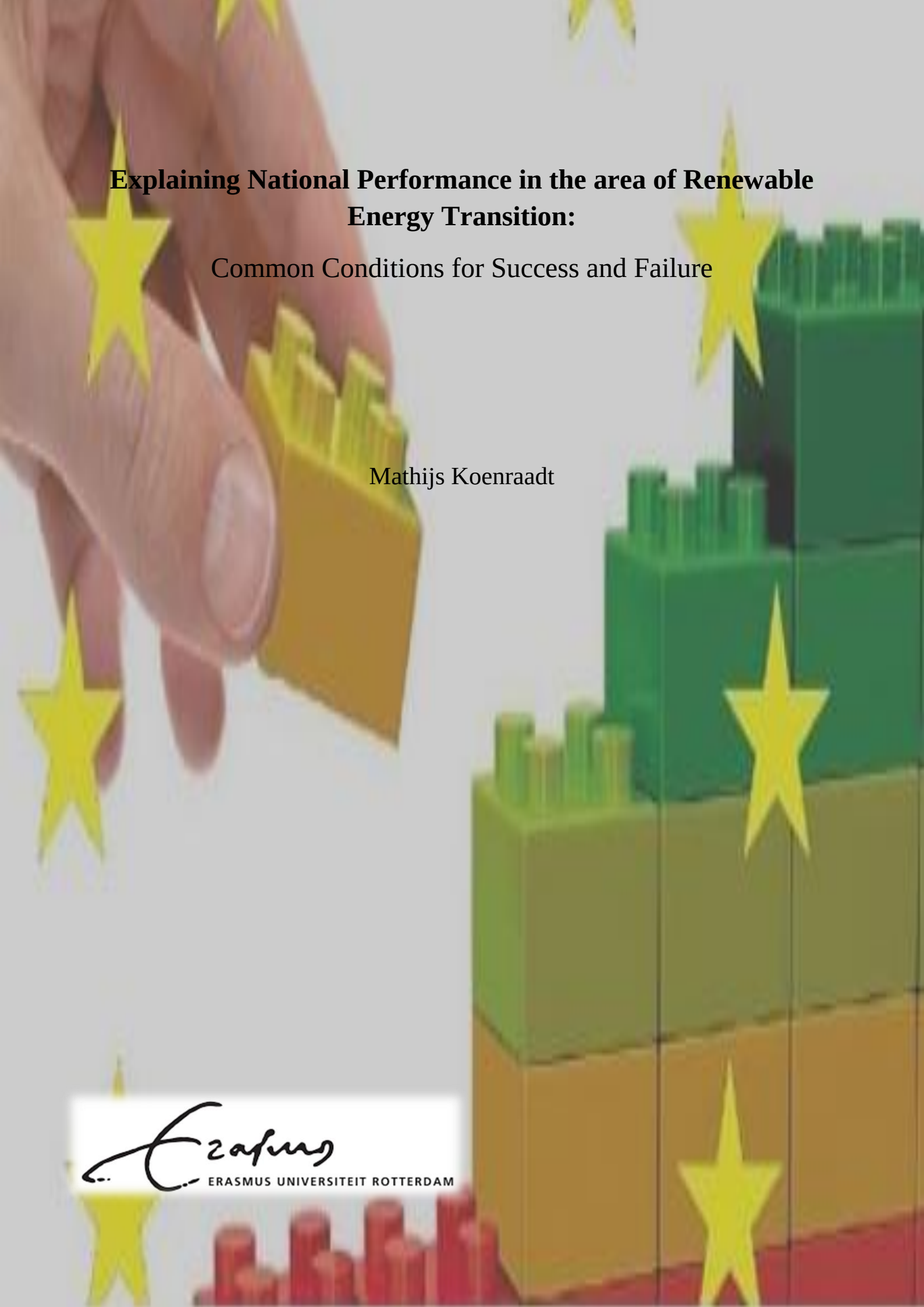

Explaining National Performance in the area of Renewable Energy Transition:

Common Conditions for Success and Failure

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by

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Summary

Reports on the progress regarding the EU 2020 renewable energy goals show that national results divert substantially. Whereas some EU Member States achieve more than is required by the Renewable Energy Directive (2009/28/EC), others fall short. Research in the area of environmental policy performance is ever growing and researchers have applied a wide range of theoretical approaches that focus on different causal factors. The theoretical framework of this thesis draws on previous academic research that has identified statistically significant factors for environmental policy performance overall. These factors are neo-corporatism, multilevel governance, left-wing party strength, and energy dependency rate. Another factor, drawn from qualitative research, is public support. This thesis has tested whether these factors are also significant for national performance in the area of renewable energy transition (abbr. RET). More specifically, this thesis shows which factors co-vary with national performance in the field of RET. The methods that are used for the detection of co-variation are the mixed systems strategy - combining the more common Method of Agreement and Method of Difference - and crisp-set Qualitative Comparative Analysis (cs-QCA). The cs-QCA also allows to detect *combinations* of factors that lead to performance or lack of performance; however, as is shown later, the cs-QCA does not yield any clear results in that respect. Still, the cs-QCA identifies three factors showing a sufficiently consistent correlation with performance to infer a possible causal relationship. These three factors are: neo-corporatism, multilevel governance, and energy dependency. A comparative case study, centred on the Netherlands and Denmark, provides more insight regarding these three and additional factors derived from academic literature, policy documents, and expert interviews. The comparative case study analysis does not find compelling evidence for the importance of neo-corporatism for RET-performance; but, it finds a link between multilevel governance and public support. In addition, energy dependency seems an important factor and connects to so-called 'vested interests.' The 'policy instruments perspective' revealed that the type of political economy paradigm is important for RET-performance. Government action regarding the RET is to some extent also dependent on the political party/parties in power. Combinations of these factors operate in a particular way as to contribute to low or high performance. The evidence suggests that high performing countries have a greater readiness to intervene in the market; they have a more decentralized energy system characterised by high shares of local ownership in renewable energy sources (RES), which on its turn enhances public support for RES; and they have secured broad political support for the RET, which is more likely if there is an absence of strong incumbents and a presence of a green industry.

Preface

This thesis aimed to identify structural factors that explain why some countries do much better - or worse - compared to other countries when it comes to attaining their national renewable energy targets set by the EU Renewable Energy Directive of 2009. It has been written to fulfil the graduation requirements of the International Public Management and Policy program at the Erasmus university Rotterdam. I was engaged in researching and writing this thesis from January to July 2017.

My reasons for choosing this particular topic are varied. First of all, it connects my interest for European integration and cooperation as well as sustainability and climate change. Secondly, I wanted the subject of my thesis to resonate closely with the title of the Master programme. Thirdly, I wanted my thesis to have a practical and social relevance. Lastly, I recalled and took note of a lecturer once saying that the EU 2020 goals would constitute a fine topic for a thesis.

First I would like to thank my supervisor - Prof. Dr. M. Haverland - for his excellent guidance. I also want to thank all of the interviewees without whose cooperation I would not have been able to conduct this research. And I thank Mr. O. Blarel and the peers in my thesis circle group for their feedback.

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List of abbreviations

cs-QCA - crisp-set Qualitative Comparative Analysis

COV approach - co-variational approach

EU - European Union

IPCC - International Panel on Climate Change

MLG - multilevel governance

PV - photovoltaic

RES - renewable energy sources

RET - renewable energy transition

* the terms independent variable, factor, and condition are used interchangeably, but they mean the same.

Introduction

In 2010 the European Union (EU) adopted a long-term strategy for energy policy and climate change, called the 20-20-20 climate and energy package (Birchfield & Duffield, 2011). Part of this EU climate and energy package is the deployment of renewable energy technologies. Renewable energy is a significant aspect of environmental or climate policy since it is a key mechanism used to reduce carbon emissions. The EU goal is to have 20 percent of its final energy consumption covered by renewable sources in 2020. Renewable energy sources (RES) include on-shore and off-shore wind energy, solar energy or photovoltaic's (PV), thermal energy, biomass, and hydropower. The 2009 Renewable Energy Directive has set a target for each Member State as a share of gross final energy consumption to be covered by renewable energy sources in 2020. Member States are given flexibility in their plans for achieving their targets enabling them to adopt policies that fit best with the national context (Notenboom & Boot, 2016).

The European Commission's renewable energy progress reports clearly show that the Netherlands is lagging behind in respect of the EU 2020 renewable energy targets. In fact, regarding the deployment of renewable energy sources it is one of the lowest-ranking among EU-countries (IEA, 2014). Besides that, the Urgenda versus the Dutch government trial in 2015 concluded that the Dutch government neglects its promised actions against climate change and thereby failed to ensure the welfare and safety of its citizens (The Guardian, 2015). The Dutch government must review its actions and take bolder measures in order to comply with accepted international obligations regarding CO2 emission reduction. Denmark, on the other hand, is internationally acclaimed for its energy transition, the so-called '*grøn omstilling*.' It has an enviable record of increasing the share of renewable energy; half of Denmark's electricity will be produced from wind by the year 2020. This difference between the Netherlands and Denmark is remarkable, even more so because these countries are quite similar in many regards. As neighbouring EU countries, natural and climate conditions are very much alike, they are similarly developed and wealthy countries, and culturally they do not differ that much either.

The question that automatically arises is why some countries are performing much better regarding the deployment of renewable energy sources (RES) than others. Our knowledge about the underlying causes of these performance differences and similarities is still limited. Qualitative research in the form of detailed case studies and small group comparisons has identified a variety of factors that affect environmental and climate policy performance and the findings depend very much on the specific context of the cases. However, there are also statistical or large-N studies that focus on environmental policy performance. Statistical studies rely on correlations between causal factors and environmental outcomes in order to infer causation. These studies mainly provide structural explanations based on socioeconomic conditions and political or institutional factors. Given the fact that the EU-countries that are of interest for this study do not differ that much with respect to socioeconomic conditions, the

main focus of the research will be on the effect of institutional and political factors on environmental policy performance.

Hence, the main research question is:

What explains the different levels of performance among EU-Member States with respect to the renewable energy transition?

Related sub-questions are:

Do institutional factors (i.e. neo-corporatism, multilevel governance, and energy dependency) matter for performance in the field of renewable energy transition?

Do political factors (i.e. political parties and public opinion) matter for performance in the field of renewable energy transition?

This research approach is novel because factors that have been proven statistically significant for environmental policy performance overall, have not yet been tested against EU renewable energy transition achievements. The idea for this research corresponds with the following argument made by Frendreis (1983): 'the prime area in which the comparative method should be systematically applied, is in the evaluation of research results from different studies. Studies that reproduce previous findings in new settings are correctly interpreted as furthering the generalizability of such findings' (p. 269).

Also, the relevance of this research is quite clear. In their *Handbook of Research Methods in Public Administration*, Yang and Miller (2007) point out that a good and significant research question should have the potential to contribute to knowledge and theory development, as well as managerial and policy practices. In other words, helping understand and improve administrative performance regardless of theoretical perspectives is at the very least as important as validating or extending a single theoretical perspective. And this is even more true for climate and energy policy because the negative consequences of climate change are diverse and can be severe. The International Panel on Climate Change (IPCC) has also stated that climate change occurs at a far faster rate than was previously thought. Stabilising the climate will require greenhouse gas emissions to be reduced to virtual zero in the coming decades. A fundamental transformation of our energy system is needed to realise this. This transformation of our energy system entails a phase out of fossil fuel technologies; replacing them with renewable energy technologies. Therefore, achieving a deepened understanding of how and under which circumstances the state fails and succeeds to meet climate mitigation targets - of which renewable energy targets are an important subset - can be considered a key research objective, with potentially far-ranging implications for environmental policymaking in practical settings. A state-centric research approach is appropriate as states continue to play a key role in steering the renewable energy transition (Duit, 2014).

The main claim at which this thesis arrives is that performance in the area of RET mainly depends on the willingness of states to intervene in the market. States that are more ready to steer and coordinate the economy (e.g. through high taxes and/or subsidies and industry policy) are doing better than more liberal-economic states that rely on freer market

instruments while emphasizing cost-efficiency. The political willingness to intervene in the area of RET also depends on the political party in power and the presence or absence of strong vested interests.

The first chapter summarizes the academic literature concerning environmental policy performance. The second chapter explains which elements of this academic literature were adopted for this research and elaborates them. The third chapter presents the research design, i.e. the methods that were chosen to conduct this research. The fourth chapter explains how the data was collected and prepared for analysis. The fifth and final chapter presents the analysis and the ensuing findings. The thesis finishes with a conclusion and recommendations for future research.

Chapter 1: Academic literature review

This chapter discusses the current state of academic literature on environmental policy performance. In his book '*state and environment*,' Duit (2014) made an inventory of previous studies on environmental policy performance. He concluded that, despite a fairly substantial number of studies on this topic, a coherent understanding of what causes better environmental performance is yet to emerge. The literature on environmental policy performance is typically based on state-centric studies. State-centric studies aim to explain differences in the ability of the national government to address environmental issues. State-centric studies consist of investigations of the state as an agent in relation to environmental matters. They generally employ some sort of measure of state behaviour or policy outcomes as a dependent variable. State-centric studies are usually interested in understanding particular aspects of public government (e.g., policies, institutions, or bureaucratic organizations) in relation to environmental matters. However, research concerning environmental policy performance is not characterised by a dominant theoretical framework. This is mainly because no single theoretical framework can encapsulate the numerous factors that affect climate policy performance. Researchers have therefore applied a wide range of theoretical approaches that focus on different causal factors (Duit, 2014).

Major works on environmental outcomes and on climate or energy policies generally emphasize the importance of structural features. Structural features are features that do not change over the medium term. The structural approach primarily draws on large-N studies in which indicators of environmental policy performance are regressed against a set of socio-political explanatory factors. Taken together, they find that the factors which most consistently correlate with national environmental performance are institutions that require consensus, corporatist interest group systems, and strong green or left-wing parties (Karapin, 2012). Scruggs (1999) for example examined the relationship between national political and economic institutions and environmental performance. His statistical analysis finds that neo-corporatist societies achieve much better environmental outcomes than more pluralist systems. However, another structural factor - i.e. multilevel governance - seems to influence the way in which corporatist arrangements affect environmental performance. Like Scruggs Walti (2004) found that corporatist accommodation structures have a pollution-reducing effect. Yet, she finds that this effect is only significant in the context of strong multilevel structures. In other words, in systems that are not characterised by multilevel governance, corporatist accommodation structures seem to have no effect. When Walti (2004) uses the term multilevel governance, she refers to decentralized governance; her statistical analysis compared multi-tiered (i.e. federal) systems to one-tier (i.e. unitary) systems.

Other statistical studies tend to point to the importance of political ideology. McRight, Dunlap, and Marquart-Pyatt (2016) used Eurobarometer survey data to show that there is a consistent ideological divide on climate change views in western European countries. Citizens on the right of the political spectre are less likely to believe that climate change is caused by human action, to perceive it as a threat, and to express willingness to pay for climate

mitigation policies. It is logical to assume that the concerns of constituencies are reflected in the political parties' programmes. Also, as left-wing governments tend to be more interventionist in their economic policy making, they would be more inclined to accept that governments need to install environmental measures in order to correct for market failures (Neumayer, 2003). Left-wing parliamentary strength is proven statistically significant for environmental policy performance, although not for left-wing dominated government (Neumayer, 2003; Jahn, 1998).

Then there are also statistical studies that point to GDP and fossil fuel prices. An IMF working paper on the trends and determinants of green investment by Eyraud, Wane, Zhang and Clements (2011) affirms that income (GDP per capita) and oil prices have a positive impact on green investment. In contrast, Marques and Fuinhas (2011) refute that income and prices of fossil-based fuels are significant for the development of RES, at least not for the investigated period of 1990 to 2006, suggesting that it was not the market that encouraged the deployment of RES. This shows that there is not always consensus among quantitative studies as to which factors are significant. Yet, both sources have found that greater energy dependency has a negative effect on the deployment of RES. This means that the higher energy imports are, the lower the commitment is to RES. This result may be an indicator of a certain vicious circle into which a country enters when it uses heavily imported fossil sources. Contrarily, one would expect countries that are very much dependent on other countries for their energy supply to invest more in RES as a means to decrease their energy dependency and to enhance their energy security.

Next to statistical research there is qualitative research on environmental policy performance. These studies have emphasized the importance of collaborative institutional arrangements with the private sector (businesses) and civil society for effective climate policy (Laes, Gorissen, and Nevens, 2014). Collaborative institutional arrangements - in contrast to authoritative top-down government - are not only important to secure political agreement around the climate change agenda but also to establish forms of governance that could channel the participation of civil society in the implementation of collective tasks oriented to secure continuous support of society (Knieling & Filho, 2013). These claims display a certain resemblance with the findings of Scruggs (1999) and Walti (2004).

Chapter 2: Theoretical framework

This chapter explains which elements of the literature review were used for this research and elaborates the underlying theories. Only some of the factors that were identified statistically significant for environmental policy performance were selected as independent variables and tested against the dependent variable by means of qualitative comparative research. Most of the quantitative studies mentioned in the previous chapter studied the effect of various factors on environmental policy performance in areas other than renewable energy transition, e.g. in the area of air quality control. Neumayer (2003) states that - strictly speaking - from this evidence one cannot infer that the concerning factors have a similar impact with respect to other aspects of environmental policy. On the other hand, there is no reason to presume that a similar effect does not exist (p. 19). As such, statistical studies have made an important contribution to research concerning environmental policy performance. They have drawn attention to the institutional and political context that can aid or hinder clean energy transformations. By statistically comparing a large number of countries, they can control for various economic and structural variables (Bayulgen & Ladewig, 2017). The results of these statistical studies help guide and focus in-depth research involving smaller numbers of cases.

Considering the aim of this research it is important to take the neo-corporatist/pluralist factor into account because most statistical studies found that neo-corporatist structures are correlated with a better environmental record. Neo-corporatism is characterised by high level policy concertation and interest aggregation and representation along functional lines. Neo-corporatism entails a limited number of 'dominant peak associations' that have access to the political and policy processes. Pluralism, on the other hand, is characterised by much more limited policy concertation and competitive interest representation/aggregation (Scruggs, 1995, p.3). Scruggs (1999) explains two principal mechanisms through which neo-corporatism should enhance environmental performance: producer group encompassingness and consensual policy-making. Neo-corporatism enables actors to overcome collective action problem; it reduces policy paralysis (p. 14). Corporatist systems have two main advantages in overcoming collective-action problems compared to more pluralist systems. First, the power of national peak associations over local units facilitates the pursuit of national rather than particularistic interests. And because peak organizations ‘encompass’ a broader national constituency, they will be more likely to consider diffuse environmental benefits compared to individual firms or unions. Secondly, corporatist arrangements are associated with effective schemes to compensate losers in economic adjustment (e.g. through tax reductions). Scruggs (1999) also mentions that the threat of strict regulation provides an incentive for business and governments to pursue flexible and co-operative steps and that monitoring and enforcement of environmental regulation is easier when there is a history of producer-government trust (p. 5).

Walti (2004) found that corporatist accommodation structures account for high environmental performance only in strong multilevel systems. This finding is surprising insofar that it seems contradictory to the purported explanation for why corporatist accommodation structures account for high environmental performance. Multilevel governance namely tends to fragment the policy process and multiply so-called 'veto points'. According to the 'veto players theory,' the more access points that are available into the decision-making system, the more durable the status quo is (Bayulgen & Ladewig, 2016). However, Walti (2004) explains the outcome of her analysis as follows: assuming that corporatist arrangements provide access to both economic and environmental interests, the outcome of the research suggests that environmental groups are able to outweigh economic interests more easily in multilevel systems. Also, multilevel governance may make advocacy groups more responsive to local, and hence green, concerns (p.621). While many studies that have compared national environmental policy performance have ignored multilevel structures, it is not illogical to think that multilevel structures matter for the renewable energy transition and was therefore included as a second factor.

Besides institutional factors, political factors may be important for performance in the area of RET. Therefore, green/left-wing political party strength was taken into account and tested. Income level and oil prices were ignored in this research, because income levels between western-European states do not differ that much and oil prices are largely determined by world market trends, meaning that the effect of crude oil prices on EU-countries is rather similar. A country's energy dependency rate, on the other hand, is a factor of interest.

One independent variable is drawn from qualitative research. Qualitative research often points to the importance of strong public support. Strong public support would be one of the preconditions for achieving far-reaching changes (Laes, Gorissen and Nevens, 2014). Knill and Tosun (2012) emphasize that while there are many policy-specific and institutional factors that might hamper the transition towards renewables, it is ultimately the social acceptance of public policy that matters for successful implementation. In this light, it may be interesting to look further into this factor. From practical experience it is for instance known that it can be difficult for government agencies to deploy RES - windmills as a case in point - due to public resistance. This is also referred to as the Not-In-My-Backyard (NIMBY) effect.

To conclude, the particular institutional and political factors enumerated above compose the independent variables of interest for this study. Also from a theoretical point of view it is interesting to see if and how these factors relate.

Chapter 3: Research design

This chapter considers the conceptual and methodological issues involved in the attempt to compare countries' environmental (climate) policy performance. Sections 3.1 discusses what is meant by the selected dependent variable and how this is determined or measured. Section 3.2 elaborates the applied research methods that are based on the co-variational (COV) approach. Lastly, section 3.3 discusses the use and benefits of the subsequent comparative case study.

Climate policy performance in the context of the EU 2020 Climate and Energy goals has three pillars: reducing CO2 emissions, increase the share of renewable energies sources (RES), and increase energy efficiency. However, considering the limited time available for conducting this research and taking into account the methodological challenges involved in assessing relative state climate performance, I decided to focus on one aspect of climate policy performance, namely the national renewable energy targets. The reason for excluding the energy efficiency pillar is based on the fact that the efficiency targets are only indicative, whereas the stipulated targets for CO2-reduction and the share of RES are binding (Harmsen, Worrell, Wesselink, & Eichhammer, 2011). And I have chosen to exclude the CO2 emission pillar because CO2-reduction can be an unintended outcome or caused by external factors. For instance, a decrease in greenhouse gas emissions in former Soviet republics (including the former German Democratic Republic) is more the result of modernization processes than a result of deliberate climate mitigation policies by governments (Karapin, 2012). For these reasons it may be best or most fair to focus on renewable energy shares when assessing national climate policy performance.

§ 3.1 Defining performance

At this stage it is important to specify the dependent variable Y (i.e. performance). A problem that students of environmental performance face is establishing performance indicators due to a dense variety of definitions. Performance can relate to concepts like accountability, results, outcomes, effectiveness, and consequences. Often a distinction is made between 'output' (i.e. what is produced) and 'outcomes' (i.e. the broader consequences of policy implementation) (Duit, 2014).

The concept of 'performance' here is results oriented, drawing attention to the record of accomplishment i.e. the actual share of RES in the overall energy mix compared to the 2020 target. So, the respective renewable energy share targets defined by the EU for its Member States constitute the standards on which judgments are made. A country shows performance when it achieves its sub- and final renewable energy targets that were set out by the EU. Note that this paper does not conduct 'policy evaluation' or 'policy performance measurement' which is particularly concerned with effectiveness and efficiency and usually involves cost-benefit analyses. In reality, policy evaluation is important because judgements on the basis of

outputs do require nuance. While Germany for example has the greatest market penetration of PV, that achievement has cost the German taxpayer dearly ('Sunny, windy, costly and dirty,' 2014). Still, taking stock of the costs and benefits of RES would go beyond the purpose of this paper.

The choice to focus on the EU 2020 goals was partly based on practical considerations. A great contribution has been made by European Commission and monitoring and assessment bodies in standardizing reporting and making data available. Biannual reports evaluate the progress of its Member States in a uniform manner. The projections concerning the attainment of the 2020 goals are pretty reliable as we now find ourselves in 2017, thus quickly approaching the 2020 deadline. This way the concept of environmental policy performance is already made concrete for research and it allows to make reliable inferences.

When people try to explain why some EU-countries are progressing at a much faster pace than others with regard to the RET, they often point to the fact that some countries have started early with promoting RES. These countries would have a head start or a vantage of some sort that would enable these countries to rapidly increase the total share of RES in the total energy mix. It is true that the natural conditions for renewable energy sources differ widely across Europe. Except for Denmark, countries leading in renewable energies are countries with good conditions concerning rainfall, distribution of rainfall over the year and inflow which in turn make a high production of electricity from hydropower possible. These countries are Austria, Sweden, Portugal, Finland, Spain, Italy, and France (Reiche, Bechberger, 2004). Yet, the different starting points and geographical conditions should not determine their ability to attain their respective national RES-target. Because when Brussels set out individual targets for each Member State it took account of the Member States' different starting points and potentials (including natural endowments). The EU was also mindful of the existing level of energy from renewable sources and the energy mix with account being taken of Member States' past efforts with regard to the use of energy from renewable sources. The increase in each Member State's RE-share is also weighted by their GDP. Altogether, this formula ensures that the targets are fair, equal, and achievable for each Member State (EC/28/2009, par. 15). It also makes the EU 2020 RE-targets good parameters for cross-national performance as it eliminates many of these factors that have a potential influence on performance. This will in turn render inferences about causal relationships more reliable.

§ 3.2 The co-variational approach

The research method that is best suited to answer the main- and sub-questions of this thesis is the co-variational (COV) approach. This methodological approach presents empirical evidence of the existence of co-variation between an independent variable X and a dependent variable Y to infer causality. While co-variation is not a sufficient condition to suggest a causal connection, it is a necessary one. The basic means for establishing the existence of general relationships is the detection of co-variation. Detection of co-variation is the essential

mechanism for explanation of variation in the statistical and comparative methods. (Frendreis, 1983, p.257).

The comparison that exploits spatial variation in the independent variable of interest, that is, variation across cases at the same time period, is called cross-sectional design (Blatter & Haverland, 2012). Only a comparative approach that evaluates the effects of institutional factors (e.g. neo-corporatist and multi-level institutions) against the (empirical) outcomes of alternative institutional arrangements (i.e. those lacking corporatist and multilevel institutions) can provide an appropriate basis for an evaluation of the consequences of institutional structures (Scruggs, 1999). The comparative approach is essential to test theories of the role of institutions and politics on environmental performance outcomes. Scruggs (1999) claims that the only way to gain any real confidence that some factors matter and others do not is by comparing different configurations of relevant institutional and political factors (p. 10).

3.2.1 The mixed systems strategy

While the tenets of the COV approach hold fort, the problem with the COV approach is that it typically focuses on a single independent variable (X) which is believed to influence the dependent variable (Y). Following the COV approach, the researcher then employs either the Most Similar - or Most Different System Design as a means to eliminate irrelevant variables from consideration. One could develop multiple COV schemes to test multiple independent variables, however these independent variables or factors would then not compete. Another problem is the difficulty of identifying cases that are truly comparable - identical or different in all respects but one. A solution was brought forward by Frendreis (1983) - the so-called 'mixed systems strategy.' A mixed systems strategy implies that both the Most Different System Design (MDSD)[1] and the Most Similar System Design (MSSD)[2] are employed. Both methods are important analytic tools to structure case comparisons. The MDSD (also known as the Method of Agreement) is used to compare that group of countries that show a lack of performance and respectively that group of countries that do well in the field of RET as a way to identify factors that can explain their similarities. The MSSD (also known as the Method of Difference) is used to compare cases with many similar conditions but with different outcomes in order to identify which factor(s) matter(s) in explaining this difference.

[1] The Most Different System Design (MDSD) or the Method of Agreement: 'the MDSD is used to study cases or situations with many differences, but with similar outcomes. The big puzzle is how to explain this similarity. Normally, the conditions with the same values across cases have important explanatory power to do this' (Yanwei Li, 2016, p.142).

[2] The Most Similar System Design (MSSD) or the Method of Difference: 'the MSSD is applied to study cases with many similar conditions that have different outcomes. The question is which conditions matter to this difference. The conditions with different values across cases are important in explaining it' (Yanwei Li, 2016, p.142)

So, the goal of the mixed systems strategy is to identify which conditions could account for the similarities and differences regarding RET-performance. Or to put it differently, the MDSD, like the MSSD, is a 'method of elimination' (Moses & Knutsen, 2007); possibly the mixed systems strategy already filters out irrelative factors that can be excluded from the QCA, and is therefore applied prior to the QCA.

A mixed systems strategy is no more susceptible to any of the basic problems inherent to comparative research. It suffers equally from the 'small N, large number of variables' problem and from difficulties with cross cultural comparability. As regards the generalizability of results a mixed systems strategy is superior, because the sample cases are not selected in such a way as to hold either the dependent or control variables constant, the researcher need not systematically exclude certain cases. As a consequence, over-determination and selection bias become a lesser problem. The mixed systems strategy also relieves the researcher of the problem of finding in the sampling process cases that are similar or identical on key variables (Frendreis, 1983).

3.2.2 Crisp-set qualitative comparative analysis

The mixed systems strategy also has an important limitation and that is its failure to handle the interaction of conditions (for example the interaction between multilevel governance and neo-corporatism). Therefore, Qualitative Comparative analysis (QCA) will follow up on the mixed systems strategy. Compared to the mixed systems strategy that only identifies single factors that can explain the outcome, the QCA will facilitate studying how combinations of the identified factors influence RET-performance. For it may well be possible that performance - or the lack of performance for that matter - only occurs when a combination of certain factors come into play.

QCA is often presented as a third way between quantitative statistical techniques and case study methodology. QCA is appropriate for analyzing mid-sized (that is, medium-N) datasets. Such a mid-sized N is usually defined as being somewhere between 10 and 50 cases. QCA aims at causal interpretation by making use of so-called truth tables. An analysis of the truth table is performed with the help of specialized computer software. This software relies on straightforward rules of logical minimization (the Boolean algebra), a process by which the empirical information in the truth table is expressed in a more parsimonious yet logically equivalent manner by looking for commonalities and differences among cases that share the same outcome. In essence, QCA enables to identify respectively the necessary or sufficient conditions for the occurrence of performance and non-occurrence (i.e. lack) of performance (Schneider & Wagemann, 2012).

§ 3.3 Comparative case study

A comparative case study can be very useful to clarify the results that emanate from the QCA analysis. The question then is: do the results resonate with what is known about processes and mechanisms operating at the case level? (Ragin 2006). Examining in a more profound manner two cases is a sensible approach to making progress in examining and explaining variation in performance. Possibly, alternative or complementary explanations will emerge for the different outcomes in the two cases. The major advantage of small N research is the ability to collect a broad and diverse set of observations per case (Blatter & Haverland, 2012, p. 144) Admittedly, while small N-cases have high internal validity; its weakness resides in the fact that it has low external validity.

The two types of analysis - COV analysis and case study analysis - complement each other well as they can somewhat make up for the weaknesses inherent to each approach. Also, good comparative studies combine deductive and inductive approaches to test hypotheses concerning causal relationships. Both approaches are used during the case study analysis; the case study will test the theories that have initially informed this inquiry while also relying on specific observations and real examples to form broader generalizations and theories based on the observed cases.

Chapter 4: The collection and preparation of the empirical data for analysis

Chapter 4 explains how the empirical data on the cases' outcomes and conditions was collected and prepared for analysis. To apply the COV approach the outcome (i.e. the dependent variable) and conditions (i.e. the independent variables) first need to be calibrated. Calibrations in cs-QCA is about defining the qualitative difference in kind that characterizes the underlying concepts, resulting in the dichotomization of conditions and outcomes (Ragin 1987). Dichotomization means attributing scores - absent (indicated by O) or present (indicated by X) - to countries regarding the dependent and independent variables of interest. The need for dichotomization also constitutes the main concern and criticism of cs-QCA. It is not always easy to make such distinctions. The decision on where to put the threshold is not only to a considerable extent arbitrary, but also crucially influences the results of the analysis (Schneider & Wagemann 2012). Section 4.1 and 4.2 explain how this was done as regards the selected dependent variable and independent variables of this research. This process resulted in table 1 (see pages 25-28).

§4.1 The dependent variable

Data on the dependent variable (performance) is collected through the European Commission progress reports. They show that although the EU as a whole seems to be on track to achieve the 2020 renewable energy target, differences between Member States are considerable. There are two possible outcomes: a Member State either succeeds in meeting its RE-targets or it fails to meet its targets. The latest biannual progress reports by the European Commission shows that in particularly France, Luxembourg, the Netherlands, the United Kingdom, and Ireland have difficulties to achieve their RET-targets. On the other hand a number of countries may even exceed their RET-target considerably, among others, Austria, Denmark, Germany, Italy, and Sweden (Notenboom & Boot, 2016). As the trajectory in the Renewable Energy Directive becomes steeper closer to 2020, especially for those Member States that are already progressing slowly, additional measures might be needed for a number of Member States. Figure 2, sourced from the European Commission Renewable Energy Progress Report of 2015, shows projections of the Member States' expected deployment of RES in 2020 and whether this meets the official target that was set by the Commission for each member state (see appendix A). The newest Renewable Energy Progress Report by the European Commission was published on February 1, 2017. It shows that, according to 2015 estimates, 25 Member States already exceeded their 2015/2016 indicative RET trajectories in 2015. Three Member States (the Netherlands, France, and Luxembourg) had 2015 RES estimated shares below their 2015/2016 indicative RED trajectory. Table 6 summarizes past, current, and expected renewable deployment at Member States level (see appendix A).

§4.2 The independent variables

4.2.1 Neo-corporatism (X-1)

The following three sources were used to calibrate and classify countries on neo-corporatism (X-1): Siaroff (1999); Liefferink, Arts, Kamstra & Ooijevaar (2009); and Jahn (2010) (see appendix B: table 7, 8, and 9). There is little controversy when it comes to categorizing countries as neo-corporatist or pluralist. It is possible to categorize countries as corporatist or pluralist using measures from Lijphart & Crepaz (1991) and Siaroff (1999). Both use a combination of past indicators to derive their own uni-dimensional measures of corporatism. Lijphart & Crepaz (1991) provide an average of standardized values for twelve experts' measurements of corporatism on a scale of -2 to 2. Siaroff (1999) uses a similar method as Lijphart & Crepaz and averages 23 experts' rankings of corporatism on a five-point scale from 0 to 5. Just to give an idea, these experts' measurements and rankings of corporatism consider i.a. indicators of social partnership, industry-level coordination, and indicators of overall national policy-making patterns. A country is categorized as corporatist if it scores above 0 on Lijphart & Crepaz's scale or above 2,5 on Siaroff's scale (see appendix B: table 7). Another point of reference is provided by Liefferink, Arts, Kamstra & Ooijevaar (2009) who codified 24 countries in their sample as either neo-corporatist, liberal-pluralist, or statist on the basis of several data sources, namely Williamson 1989; Van Waarden 1995; Siaroff 1999 (see appendix B: table 8).

It is important to consider the argument of some researchers who claim that neo-corporatist structures have become less prominent over time, because this may render inferences as regards the relationship between corporatism and current performance less accurate; thus forming a limitation of the results. However, Scruggs (1999) contents the demise of corporatism, as do Liefferink and Jordan (2005) who affirm that national decision-making procedures, coordination mechanisms, and political traditions have endured. Moreover, Detlef Jahn (2016) developed a corporatism index and applied it to 42 countries on an annual basis from 1960 to 2010. His study demonstrates that there is overall no decline of corporatism over the past five decades. In some strongly neo-corporatist states like Sweden there has been some reduction of corporatist arrangement, but they are definitely still neo-corporatist. There are also countries, such as the Benelux region, that increased their degree of corporatism. The conclusion is that over time different countries take the lead in corporatist arrangements. Over the period from 1960 to 2010 the countries with the highest corporatism scores are Austria, followed by Sweden, Belgium, the Netherlands, Norway, and Germany. Other countries with high scores are Finland and Denmark (see appendix B: table 9).

4.2.2 Multilevel governance (X-2)

This sub-section explains how the cases were calibrated and classified with respect to multilevel governance, using the article of Walti (2004). Walti (2004) took into account four dimensions of multilevel governance by differentiating between the extent of 'self-rule' (i.e. the degree to which sub-national governments can act independently) and 'shared rule' (i.e. the opportunities of sub-national governments to participate in the national decision process and

the need for the central government to coordinate policies with sub-national governments). Besides that, Walti differentiated between the 'right to decide' (policy-making) and the 'right to act' (policy implementation). Walti (2004) used several data sets to score individual countries on all four dimensions and finally combined the four variables into an additive index, which is referred to as the multilevel governance index (MGI), standardizing each of them to fall between 0 and 1 (see appendix B: table 10). Walti's (2004) MLG-index is used to calibrate countries on multilevel governance (X-2). Although Walti's MLG-index is based on older data, I did not consider this problematic given the fact that multilevel governance in the form of unitary or federal structures tend to be stable over time. When a country has a MLG-index score of below 0.40, this is classified as relatively low (i.e. absent); above 0.40 means MLG is (relatively) high, thus present.

The calibration and classification of countries on variables X-3, X-4, and X-5 requires a slightly different approach because these variables are not based on additive indexes.

4.2.3 Left-wing party strength (X-3)

The strength of green/left-wing political parties was assessed with help of *comparative politics data sets*. Green/left-wing party strength (X-3) is measured by considering two aspects: cabinet composition (using the Schmidt-index) and the percentage of left seats in parliament both around the year 2013. This particular year was used as a reference year because 2013 is positioned between the enactment of the Renewable Energy Directive in 2010 and the mid-term progress reports of 2015 and 2017. The threshold that is chosen for classifying the presence of green/left-wing party strength is 25 percent of left seats in parliament. In most cases, 25 percent or more leads to a cabinet composition where there is at least balance of power between left and right or a more powerful position for left, there is only one exception to this and that is Germany. Furthermore, in coalition/multi-party-systems an occupation of 25 percent of parliamentary seats implies considerable party strength as consent from left-wing parties is then often pivotal for the approval of legislation.

4.2.4 Public support (X-4)

Public support for renewable energy (targets) was assessed by using a special Eurobarometer survey on attitudes towards climate change and renewable energy targets that was conducted in 2013. Citizens of the EU-countries that took part in the survey were asked the following question: 'How important do you think it is that the (NATIONALITY) government sets targets to increase the amount of renewable energy used, such as wind and solar power, by 2030?' While this survey specifically refers to targets for 2030, I infer a similar level of support for the 2020-targets (see appendix B: figure 3). To classify favourable public opinion as absent (O) or present (X), I had to draw the line somewhere. The most logical thing to do is to consider EU-averages. This means that when the Eurobarometer poll shows a result of 48% or 50% for a particular country, favourable public opinion in that country is considered respectively low and high, because these figures are respectively below and above EU-average (i.e. 49%). In reality of course, these figures can be better considered as medium; judging favourable public opinion as respectively absent or present gives a distorted depiction

of reality. Even so, for the sake of conducting research by means of the COV approach I am compelled to dichotomize.

4.2.5 Energy dependency (X-5)

The energy dependency rate shows the extent to which an economy relies upon imports in order to meet its energy needs. Data on the countries' energy dependency rate is collected through *Eurostat*. Data shows that the average EU-dependency rate on energy imports fluctuates around 50%. Countries that have an energy dependency rate of below 40% will be scored as low (X) and countries that have an energy dependency rate of above 40% will be considered high (O). Remember that table 1 shows the absence (O) or presence (X) of conditions that would be favourable to RET-performance and statistical research has found that a low energy dependency correlates with (high) performance. Although the data on energy dependency refer officially to the year 2010, energy dependency rates are quite stable on a short to medium term.

The collection and preparation of the empirical data for the COV analysis has resulted in table 1 depicted below. Table 1 shows the collected empirical data on the independent variables of interest and the dependent variable for each case. The vertical most left colon of the table enumerates the five independent variables of interests (X-1 to X-5). The top horizontal row depicts the cases that are examined. The cases situated on the left side of the table (i.e. the NL, UK, IE, LU, and FR) have a red-striped table background since these countries do not achieve their RE-targets; the cases situated on the right side of the table (i.e. BE, DE, DK, AT, FI, SE, ES, PT, IT) have a green-dotted table background as these countries do achieve their RE-targets. The decisions concerning the dichotomization of the outcome and independent variables are, when necessary, further described in footnotes under table 1.

Table 1: Depiction of data collection and classification on the dependent variable and independent variables for 14 EU-Member States.

	NL	**UK**	**IE**	**LU**	**FR**	**BE**	**DE**	**DK**	**AT**	**FI**	**SE**	**ES**	**PT**	**IT**
X1 Neo-corporatism	X	O	O	X	O	X	X	X	X	X	X	X	O	O
Detlef Jahn (2010)[3]	1,08	-1,33	-0,46	0,24	-0,23	1,21	1.01	0,68	2.06	0,99	1,26	0,59	-0.02	-.0.11
X2 Multilevel Governance	O	O	O	O	O	X	X	O	X	O	O	O	O	X
MLG index[4]	0.27	0.27	0.17	0.08	0.27	0,33	0.83	0,35	0.42	0.31	0.30	0.38	0.01	0.35

[3] Jahn (2016) uses Crepaz & Lijphart-scale for corporatism: -2 strongly pluralist; 2 strongly corporatist. 0 is the dividing line between pluralism and corporatism.

[4] Source: Walti (2004) Generally, below 0.40 is characterised as low; above 0.40 can be characterised as high. However, it is known that Spain, Belgium, and Italy also have some form of decentralized government. In comparison, Belgium and Italy score relatively high on the federalism scale and that is why for Belgium and Italy, although scoring below 0.40 on the additive MLG-index, MLG is still considered present (see table Walti 2004).

X3 Green/Left-wing Party strength: - Cabinet composition (around year 2013)[5]	- 3	O 1	O 2	- 3	X 5	- 3	O 2	X 4	- 3	- 3	O 1	O 1	O 1	- 3
- % of left seats in parliament (around year 2013)[6]	X 25.3 Green party: 2.7	O 0 Green party: 0	X 22.3 Green party: 0	X From 21.7 to 31.7 Green party: 10.0	X 53.5 Green party: 2.9	X 26 Green party: 8.6	X 30.6 Green party: 10.0	X 34.2 Green party: 0	X 28.4 Green party: 13.1	X 33.0 Green party: 5.0	O 0 Green party: 0	O 0 Green party: 0	O 0 Green party: 0	O 47.1 Green party: 0

[5] Comparative Political Data Set
Cabinet composition (Schmidt-Index):
1. Hegemony of right-wing (and centre) parties.
2. Dominance of right-wing (and centre) parties.
3. Balance of power between left and right.
4. Dominance of social-democratic and other left parties.
5. Hegemony of social-democratic and other left parties.

[6] Data stems from the Comparative Political Data Set of Klaus Armingeon, Christian Isler, Laura Knöpfel, David Weisstanner, Sarah Engler and refer to the national parliament. Note that these figures also include green parties.

X4 Favourable public opinion[7]	X 63 %	X 54 %	X 59 %	O 42 %	O 42 %	O 48%	O 47 %	X 57 %	X 50 %	X 50 %	X 68%	X 56 %	O 39 %	X 49 %
X5 A low energy dependency rate in 2010 [8] Eurostat	X 30.3%	X 28,2%	O 86,6 %	O 97,1 %	O 49 %	O 78,2%	O 60,3 %	X -15.7%	O 62,9 %	O 47,8 %	X 36,6 %	O 76,7 %	O 75,1 %	O 82,6 %
Dependent variable (Y) RET-performance Projected RES share 2020 </> RES 2020 target[9] % realised	O 13.0 % < 14.0 % 93	O 14.8 % < 15.0 % 98	O 15,5 % < 16.0 % 97	O 8.3 % < 11.0 % 75	O 23.5 % > 23.0 % [10] 91	X 13.9 % > 13.0 % 107	X 18.5 % > 18.0 % 103	X 33.8% > 30.0% 113	X 35.2 % > 34.0 % 104	X 42.4 % > 38 % 112	X 56.2 % > 49 % 115	X 20.9 % > 20.0 % 101	X 33.4 % > 31.0 % 108	X 19.8 % > 17.0 % 116

[7] Source: http://ec.europa.eu/public_opinion/archives/ebs/ebs_409_en.pdf

Public attitude towards RES is measured through Eurobarometer data. Surveyed EU-citizens responded to the following question: 'How important do you think it is that the (NATIONALITY) government sets targets to increase the amount of renewable energy used, such as wind and solar power, by 2030?' As an EU-average, 49% of the respondents state it is 'very important' Public opinion towards RES is characterised as favourable (comparatively high/present) if the result is above 49% and unfavourable (comparatively low/absent) if the result is below 49%.

[8] Source: http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdcc310&plugin=1

The energy dependency shows the extent to which an economy relies upon imports in order to meet its energy needs. The average dependency rate of the EU-28 is around 50%. Any rate below 40% will be considered low (absent) any rate above 40% will be considered high (present).

[9] Data stems from the latest biannual Renewable Energy Progress Report, issued by the European Commission and published on February 1, 2017: https://ec.europa.eu/transparency/regdoc/rep/1/2017/EN/COM-2017-57-F1-EN-MAIN-PART-1.PDF

[10] Although France is expected to meet its 2020 target it is characterised as low-performing since France - together with the UK and the Netherlands - had 2015 RES shares below their 2015/2016 indicative RET trajectory: 14.5 < 16 (14,5/16 x 100% = 91).

O = trait absent in case
X = trait present in case

NL = Netherlands, UK = United Kingdom, IE = Ireland, LU = Luxembourg, FR = France, BE = Belgium, DE = Germany, DK = Denmark, AT = Austria, FI = Finland, SE = Sweden, ES = Spain, PT = Portugal, IT = Italy

Chapter 5: Analysis

Chapter 5 describes the analyses and results of the research methods that were introduced in chapter 3.

§5.1 Application of the mixed systems strategy

A data matrix (see table 2, p. 31) is best suited to explain the analysis of the mixed systems strategy. Table 2 is in fact a simplified representation of table 1. The presence (indicated by 1) or absence (indicated by 0) of each condition is listed in table 2 for all cases, along with the respective outcome, that is, the attainment of the RES-target (1) or the failure to attain the RES-target (O) under the letter P(erformance).

Results of the Most Different System Design (Method of Agreement):

The Method of Agreement comes down to the following reasoning: if all cases that show the same outcome - either performance or a lack thereof - have only one condition in common, the condition in which alone all the cases with the same outcome agree is the cause (or effect) of the outcome (Moses & Knutsen, 2007). Table 2 shows that the five underperforming countries (row 1 to 5) differ regarding all independent variables of interest, except one - multilevel governance (MLG). MLG is absent (0) in all the cases of countries that underperform and this factor has therefore high explanatory relevance. When we analyse row 6 to 14, we can see that the performant countries do not share a particular condition with the same value; they show very diverse values on all independent variables of interest.

Results of the Most Similar System Design (Method of Difference):

The Method of Difference aims attention at cases that differ on outcome, but that are similar with respect to all independent variables of interest except one. The reasoning behind this method is as follows: if there is an instance in which a case showing performance, and another case showing a lack of performance, have every condition in common except one, then that condition in which alone the two cases differ is the effect, or the cause, or an indispensible part of the cause of performance. Furthermore, the variation in outcomes (performance) cannot be explained by those factors that are similar (Moses & Knutsen, 2007). Table 2 shows that the United Kingdom (UK) and Sweden (SE) differ with respect to outcome as the UK shows a lack of performance (P = 0) while SE shows performance (P = 1). When looking at the conditions, MLG is absent (0), Left-wing party strength is absent (0), Favourable public opinion is present (1), and a low Energy dependency rate is present (1) in both cases. So, these four conditions cannot account for the difference in outcome. Only Neo-corporatism could explain the difference in outcome, because Neo-corporatism is absent (0) in the UK while present (1) in SE. Analyzing table 2 in a similar manner, one can see that Luxembourg and Germany are similar with respect to all independent variables except multilevel governance and this is also true for Luxembourg and Belgium. The Netherlands and Sweden

score similar on all independent variables except green/left-wing party strength, as do France and Portugal. Ireland and Portugal score similarly on all independent variables except favourable public opinion, as do Luxembourg and Finland. And the Netherlands and Finland score similarly on all independent variables except energy dependency.

5.1.1 Discussion of findings

It is worth to consider independent variable X-2 (MLG) in relation to the performant countries because through the MDSD we saw that the underperforming countries all scored low on MLG. However, one can also see that MLG is also low (absent) in five out of nine countries that *do* perform well. This obviously reduces the explanatory relevance of X2. Nevertheless, the MDSD has identified multilevel governance as an explanatory factor for cross-national differences in performance.

The MSSD does not provide a single answer as to which independent variable could explain the different levels of performance in the field of RES. The MSSD identifies all independent variables - neo-corporatism, multilevel governance, left-wing party strength, public opinion, and energy dependency - as potential causal factors for the cases' different display in outcome.

Thus, the mixed systems strategy has not eliminated any factor from consideration; it has not filtered out any of the independent variables as completely irrelative to RET-performance. This means that all five independent variables have to be included in the QCA.

§5.2 Application of the crisp-set Qualitative Comparative Analysis (cs-QCA)

The mixed systems strategy has identified all five independent variables as potentially relevant factors for the difference in outcome (performance). And it has shown that all underperforming cases are conditioned by an absence of multilevel governance. However, not all performant cases are conditioned by a presence of multilevel governance; nor do these cases share any other factor with the same value. So, an absence of multilevel governance does not always lead to a lack of performance. Seemingly, a combination of certain conditions lead to a particular outcome. The cs-QCA allows to assess the relative importance of the independent variables as well as the detection of combinations of factors that lead to a particular outcome.

The dichotomization of the outcomes and conditions as explained in chapter 4 resulted in the data matrix that is depicted on the next page.

Table 2 Data Matrix

		Conditions					Outcome
row	Case	N	M	L	F	E	P
1	NL	1	0	1	1	1	0
2	UK	0	0	0	1	1	0
3	IE	0	0	0	1	0	0
4	LU	1	0	1	0	0	0
5	FR	0	0	1	0	0	0
6	BE	1	1	1	0	0	1
7	DE	1	1	1	0	0	1
8	DK	1	0	1	1	1	1
9	AT	1	1	1	1	0	1
10	FI	1	0	1	1	0	1
11	SE	1	0	0	1	1	1
12	ES	1	0	0	1	0	1
13	PT	0	0	0	0	0	1
14	IT	0	1	1	1	0	1

Note 1: N = neo-corporatism, M = multilevel governance, L = left-wing party strength, E = low energy dependency rate, P = performance

Note 2: ~N = absence of neo-corporatism, ~M = absence of multilevel governance etc.

Note 3: NL = Netherlands, UK = United Kingdom, IE = Ireland, LU = Luxembourg, FR = France, BE = Belgium, DE = Germany, DK = Denmark, AT = Austria, FI = Finland, SE = Sweden, ES = Spain, PT = Portugal, IT = Italy

Note 4: 1 = present; 0 = absent

In a standard data matrix, each row denotes a different case (or unit of observation). While in a truth table (see table 3 below), each row instead represents one of the logically possible combinations (or configurations) of conditions. Since each single condition can occur either in its presence or its absence, the total number of truth table rows is calculated by the expression 2^k. The letter k represents the number of conditions used and the number 2 the two different states (presence or absence) in which these conditions can occur. Each row denotes a qualitatively different combination of conditions. The formula 2^k yields the number of logically possible combinations or truth table rows, or logically possible cases. The number of truth table rows increases exponentially with the number of conditions (Schneider & Wagemann, 2012).

Table 3: Truth table

Row	Conditions					Outcome	Case
	N	M	L	F	E	P	
1	1	0	1	1	1	0	NL*
2	0	0	0	1	1	0	UK
3	0	0	0	1	0	0	IE
4	1	0	1	0	0	0	LU
5	0	0	1	0	0	0	FR
6	1	1	1	0	0	1	BE, DE
7	1	1	1	1	0	1	AT
8	1	0	1	1	1	1	DK*
9	1	0	1	1	0	1	FI
10	1	0	0	1	1	1	SE
11	1	0	0	1	0	1	ES
12	0	0	0	0	0	1	PT
13	0	1	1	1	0	1	IT

* NL and DK are similar on all conditions, but differ with regard to outcome, they are contrasting cases.

As I have selected 14 cases and five conditions, there are 32 (2^5) potential combinations of conditions - but table 3 only displays the observed combinations of conditions. Because of the limited diversity problem,[11] the observed cases may occupy only a small portion of the potential combinations of factors (conditions). This represents an analytic problem, since the solution formula greatly depends on the decision of which rows are included in the process of logical minimization (Schneider & Wagemann, 2012). The truth table shows that there are only 12 observed combinations of conditions because Belgium and Germany share a similar combination of conditions and this is also true for the Netherlands and Denmark. This means there are 20 logical remainders. Logical remainders are rows in a truth table without empirical information, implying that the combinations of conditions do not exist empirically (Yanwei Li, 2016).

The truth table provides a first answer: all rows that are linked to the outcome value of 1 are the sufficient conditions. For example, the seventh row in table 3 shows that a combination of conditions where neo-corporatism, multilevel governance, leftwing party strength, favourable public opinion is present and a low energy dependency rate is absent is a sufficient condition for performance - i.e. it leads to performance (P=1). This answer, however, is often not very informative simply because there are many such rows in the truth table. It is possible to develop an individual explanation for each single case, but this would make it impossible to provide a systematic explanation of the outcome across cases. The goal is to obtain a more succinct and parsimonious answer. For this, QCA applies the rules of Boolean algebra (Yanwei Li, 2016).

The main interest is to explain both performance and lack of performance in the field of RES. Asymmetric causality[12] means that the explanation of the former does not say much about the latter. It is therefore necessary to analyse the occurrence of performance and the non-occurrence (i.e. lack) of performance separately (Yanwei Li, 2016).

[11] The limited diversity problem means that there is no empirical evidence at hand to show the logically possible combinations of factors (conditions) in an analysis (Yanwei Li, 2016, p. 182).

[12] Asymmetric causality means that "insights on the causal role of a conditions are of only limited use for the causal role of its absence, and the explanation of the occurrence of an outcome does not necessarily help us much in explaining its non-occurrence (Yanwei Li, 2016, p. 183). As an hypothetical example, if the QCA would find that leftwing party strength in combination with a favourable public opinion and a high energy dependency rate leads to performance, then we cannot automatically infer from this result that the combined absence of these three factors leads to a lack of performance.

5.2.1 Explaining the occurrence of performance

Analysis of the truth table is primarily geared towards uncovering sufficient conditions. But before analyzing the sufficiency of conditions, I first analysed the consistency[13] and coverage[14] of necessary conditions[15] (see the definitions in the footnotes below).

Necessary conditions

Generally speaking, a condition X is necessary if, whenever the outcome Y is present, the condition is also present. In other words, Y cannot be achieved without X; no case with Y displays ~X; on the presence of ~X, Y is impossible (Schneider & Wagemann 2012). Conversely, it is also possible that the absence of a particular condition (~X) constitutes a necessary condition for the absence of the dependent variable (~Y).

A relation of necessity can be written as follows:

X ← Y (read: "if Y, then X," or "Y implies X," or "Y is a subset of X").

or conversely,

~X ← ~ Y (read: "if ~Y, then ~X," or "~Y implies ~X," or "~Y is a subset of ~X").

Consistency assesses the degree to which the cases sharing a given condition or combination of conditions agree in displaying the outcome in question. A simple, straightforward measure of the consistency of a crisp-set relation with sufficiency is the proportion of cases with a given cause or combination of causes that also display *the outcome in question*. For example, if 4 out of the 5 cases displaying a cause or causal combination also display the outcome in question, then the proportion consistent is 0.80. Let's take the factor multilevel governance as an example. If you look at table 4, you can read that multilevel governance is present in 44 percent of the performant cases. Hence, multilevel governance is absent in 56 percent of the performant cases. Thus, the consistency of multilevel governance in relation to the occurrence of performance is 0.44. As for the absence of multilevel governance in relation to the occurrence of performance the consistency rate is 0.56. In general, consistency scores should be as close to 1.00 (perfect consistency) as possible. With observed consistency scores below

[13] The consistency of a necessary conditions assesses the degree to which this condition overlaps with a particular outcome relative to all cases with the same outcome (Yanwei Li, 2016, p. 183).

[14] The coverage for necessary conditions is mostly about the relevance of the necessary conditions. High coverage of a necessary condition implies that it is a relevant necessary condition, whereas low coverage of a necessary condition implies that it is a trivial necessary condition (Yanwei Li, 2016, p. 183).

[15] The formal expression of a necessary condition hypothesis is "Y only if X." A condition X is necessary if, whenever the outcome Y is present, the conditions is also present (Yanwei Li, 2016, p. 183).

0.75, it becomes increasingly difficult to maintain that a relation exists (Ragin, 2006). Of course, for necessary conditions there is a consistency threshold of 1.00.

Coverage, by contrast, assesses the degree to which a cause or causal combination ‘‘accounts for’’ instances of an outcome. When there are several paths to the same outcome, the coverage of any given causal combination may be small. Thus, coverage gauges empirical relevance or importance of the causal condition—the degree to which instances of the causal condition are paired with instances of the outcome (Ragin 2006). Again, let's take multilevel governance as an example. If you look at table 4 you can read that 100 percent of all cases that are conditioned by the presence of multilevel governance show performance. But also 50 percent of all cases that are conditioned by an absence of multilevel governance show performance.

In short, consistency concerns correlation and tells whether a (possible) relationship between X and Y exists, while coverage tells something about the relative importance of the independent variables.

Table 4: Analysis of necessary conditions for performance

Conditions	Consistency	Coverage
NEO-CORPORATISM	0.78	0.78
neo-corporatism	0.22	0.40
MULTILEVEL GOVERNANCE	0.44	1.00
multilevel governance	0.56	0.50
LEFT-WING PARTY STRENGTH	0.67	0.67
left-wing party strength	0.33	0.60
FAVOURABLE PUBLIC OPINION	0.67	0.67
favourable public opinion	0.33	0.60
LOW ENERGY DEPENDENCY	0.22	0.60
low energy dependency	0.78	0.70

Note: the presence of a factor is expressed by putting capitals and the absence by a small letters.

The results of the analysis in table 4 show no necessary conditions because none of the conditions reach a consistency of 1.00. Factors with the highest consistency and coverage are the presence of neo-corporatist structures and the absence of low energy dependency (i.e. high energy dependency). So, high-performing countries often have neo-corporatist structures and/or a high energy dependency rate. That neo-corporatism correlates with performance is in line with the results of statistical studies on environmental policy performance; but a correlation between high energy dependency and performance contradicts these studies.

Sufficient conditions

After analyzing necessary conditions, I analysed sufficient conditions. A condition can be considered sufficient if, whenever it is present across cases, the outcome is also present in these cases. In other words, there should not be a single case that shows the condition but not the outcome.

This can be expressed as follows:

$X \rightarrow Y$.

This statement should be read: "if X, then Y," or "X implies Y," or "X is a subset of Y." In short, when we hypothesize that X is sufficient for Y, then the following patterns in the data will confirm that: first, we expect to see cases with both X and Y. Second, we expect no case with X and ~Y. Third, we do not have any expectations about the value of Y for cases with ~X. Hence, our claim $X \rightarrow Y$ is falsified if and only if we find cases that are simultaneously members of both X and ~Y (Schneider & Wagemann, 2012).

The only single condition that can be identified as a sufficient condition is M. The factor multilevel governance (M) is a sufficient condition for performance (P or Y=1), because wherever M occurs, P also occurs. Furthermore, no case with condition M is linked to ~Y (~P or Y=0). In case of crisp sets, if the condition is sufficient, then cases may exist only in three out of the four corners of the XY plot: the top left (M fully absent, Y fully present), the bottom left (M and Y fully absent), and the top right (M and Y fully present). Only the bottom right corner cannot contain any cases; if it does, then the condition is not considered sufficient (Schneider & Wagemann, 2012).

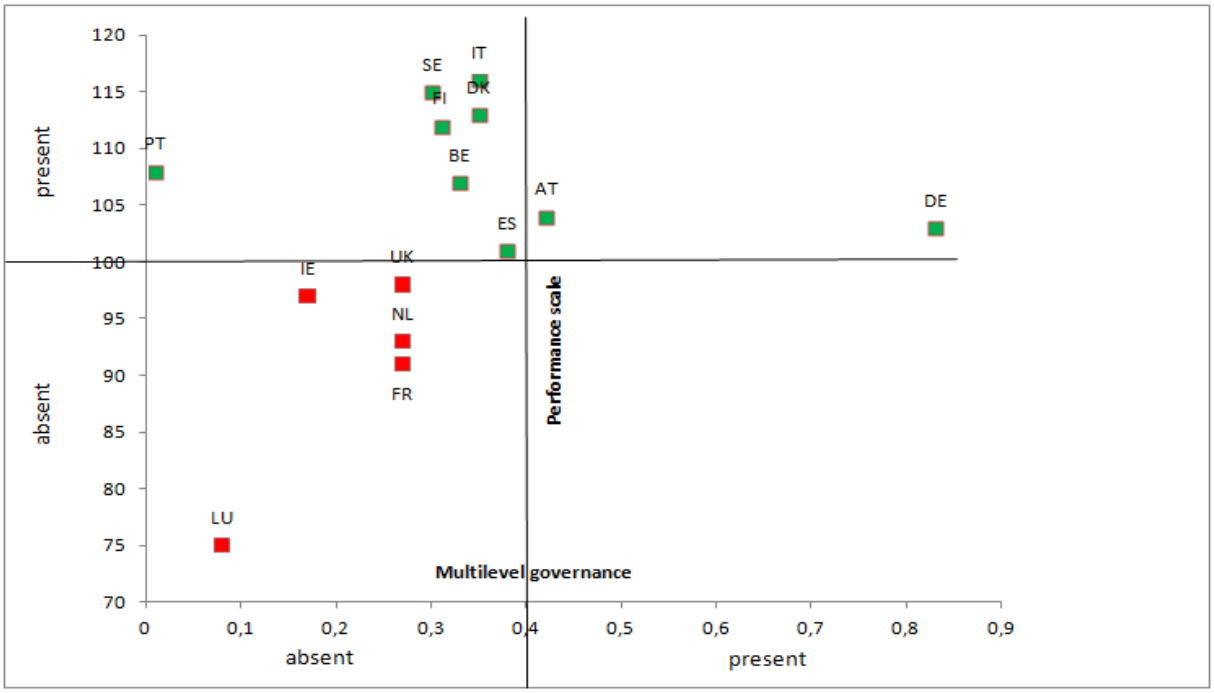

Figure 1.1: XY plots in crisp-set analysis – distribution of cases for sufficient conditions (X-2) *(footnote 4 under table 1 explains why the top right corner shows 2 instead of 4 cases)

When we look at the XY plots for the other independent variables X-1, X-3, X-4, and X-5, we can see that a blank bottom right corner does not reoccur. This indicates that these conditions are not sufficient conditions for performance (P=1).

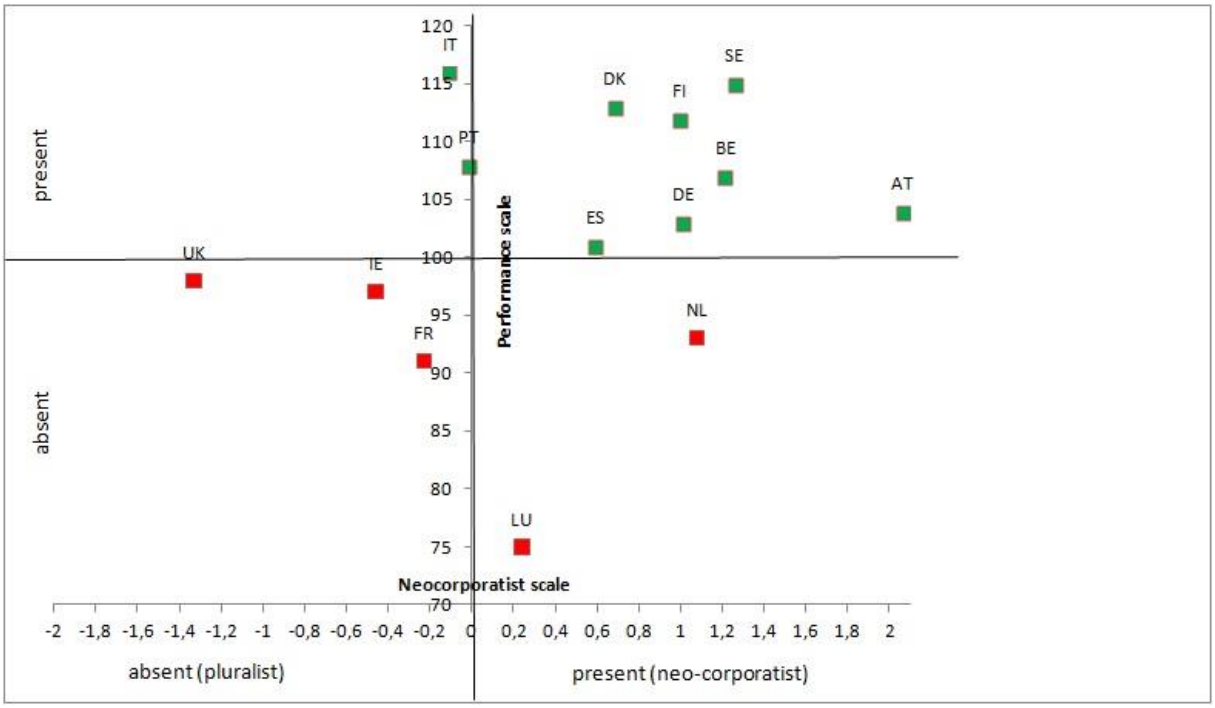

Figure 1.2: XY plots in crisp-set analysis – distribution of cases for sufficient conditions (X-1)

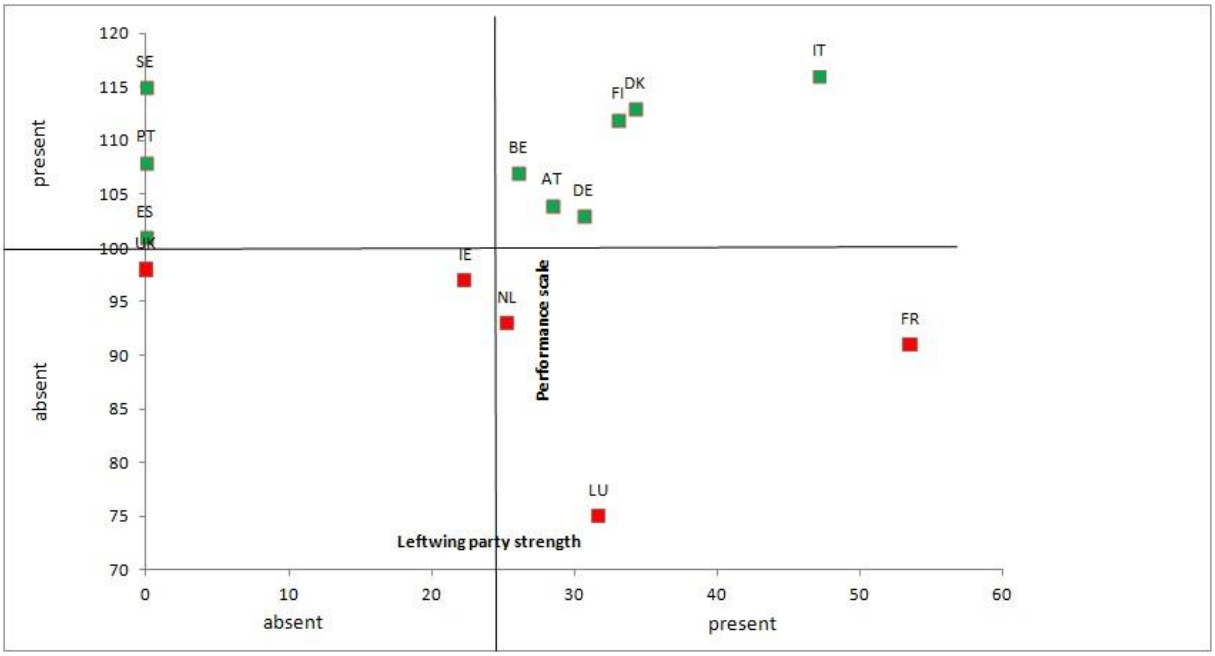

Figure 1.3: XY plots in crisp-set analysis – distribution of cases for sufficient conditions (X-3)

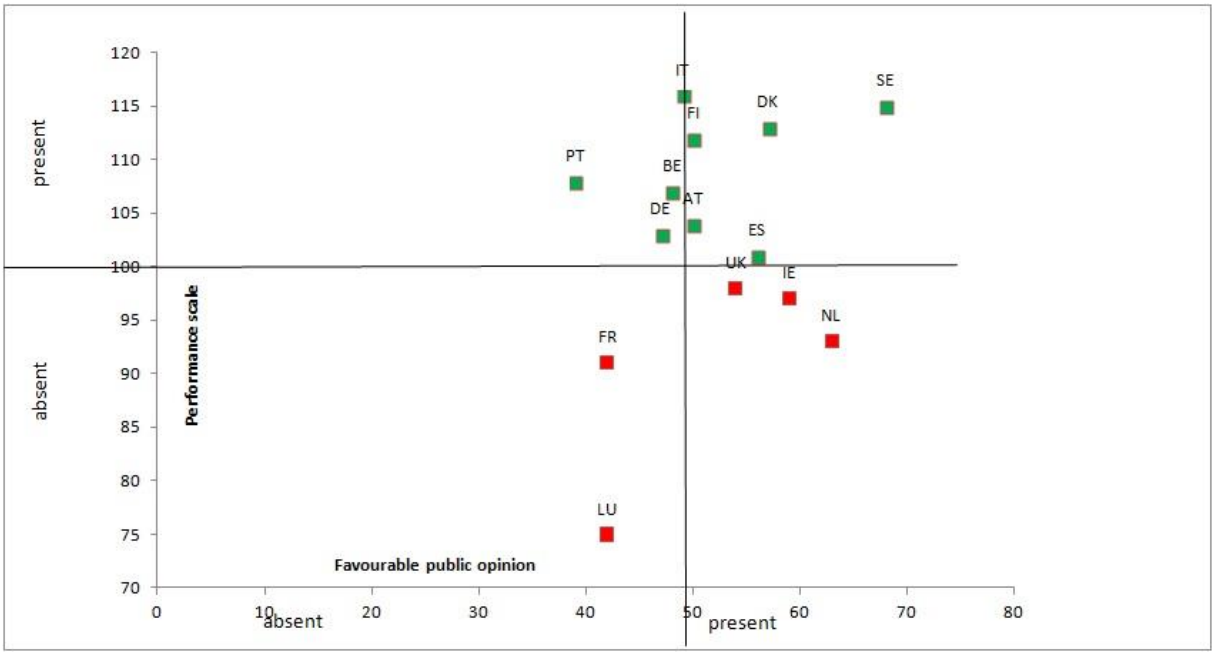

Figure 1.4 XY plots in crisp-set analysis – distribution of cases for sufficient conditions (X-4)

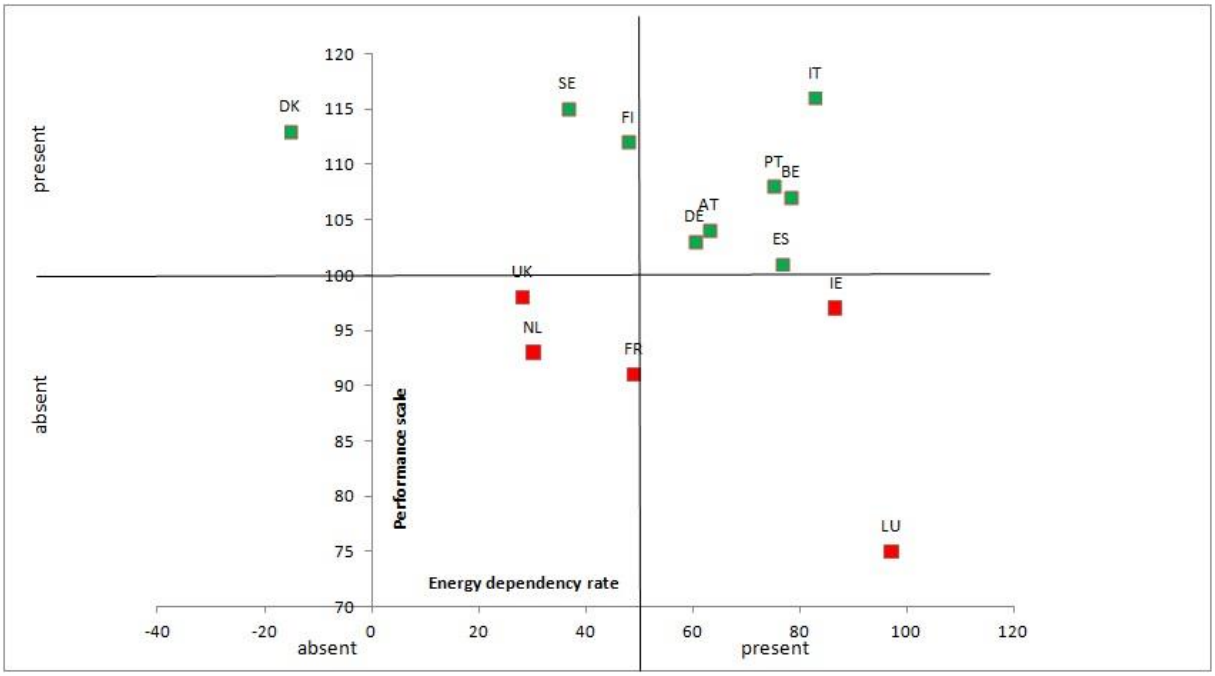

Figure 1.5: XY plots in crisp-set analysis – distribution of cases for sufficient conditions (X-5)

The importance of multilevel governance as a sufficient condition for Y

It is important to assess the relevance of a sufficient condition. As regards condition 'M' in relation to cases that display the presence of performance (i.e. Y or P), the presence of multilevel governance does not account for all cases that are members of Y=1 (P). In only 4 out of 9 cases that perform well, M (multilevel governance) is present. Condition M has a consistency of 0.44 (4/9) which is too low to confidently establish a causal relationship. This means that M is a sufficient but non-necessary condition. While its coverage is 1.00, with such a low consistency it has little meaning. In fact, it is pointless to consider the coverage of a cause or combination of causes that do not - in the first place - show a consistency of at least 0.75 (Ragin, 2006).

The existence of a sufficient but non-necessary condition automatically implies equifinality,[16] because this means that there are cases in the data that achieve the outcome without the sufficient condition. Thus, at least one other sufficient condition for the same outcome must exist. The existence of a necessary but non-sufficient condition also automatically implies conjunctural causation[17], since this necessary condition must be combined with another condition (or the union thereof) in order to imply the outcome. An analysis of the truth table (QCA) produces results that reveal these aspects of causal complexity (Schneider & Wagemann, 2012).

An application of the cs-QCA (and the ensuing solution formulas) show the independent variables that are causally relevant or not. Because of limited diversity, the standard analysis[18] based on a same truth table can yield different solution formulas[19] depending on the assumptions about logical remainders. In general three solutions can be produced: the complex solution, the most parsimonious solution, and the intermediate solution. Good QCA practice demands that all three solution formulas are shown (Yanwei Li, 2016). None of these solutions ever contradict the evidence at hand.

[16] Equifinality, i.e. a scenario in which alternative factors can produce the same outcome.
[17] Conjunctural causation: a combination of various factors (conditions) lead to a certain outcome.
[18] Standard analysis is the currently predominant procedure in applied QCA for making plausible assumptions about logical remainders and to produce the most parsimonious solution the intermediate solution, and the conservative solution (Yanwei Li, 2016, p. 184).
[19] Solution formulas are the results of truth table analysis QCA (Yanwei Li, 2016, p. 184).

The complex solution term (also referred to as the conservative solution term) is the result when no assumptions about any logical remainders is made, thus is exclusively guided by the empirical information at hand (Schneider & Wagemann, 2012).

The most complex solution for explaining the occurrence of performance:

(n*~m*~l*f) + (n*m*l*~e) + (m*l*f*~e) + (~n*~m*~l*~f*~e) + (n*~m*f*~e) + (n*l*f*~e) → Y

The several *combinations* of conditions -stipulated between brackets- all constitute sufficient (but non-necessary) conditions (or 'paths') that lead to outcome Y. The *single* conditions stipulated between the brackets are called 'INUS conditions'. 'INUS' stands for a condition that is an "insufficient but necessary part of a condition which is itself unnecessary but sufficient for the result." Such a result displays all three aspects of causal complexity. It is equifinal, as indicated by logical OR operators.[20] More than one path can lead to the same outcome. It is conjunctural, as indicated by the presence of logical AND operators. Single conditions play a causal role only in the context of other factors. And it is asymmetric as you will see later on, because the solution formulas for Y and ~Y are neither identical nor logical mirror images of one another (Schneider & Wagemann, 2012).

However, it is also important to assess the relative strengths of different effects or combinations of effects. The obvious measure of relative importance is to count how often each path is taken (i.e. coverage). Again, coverage is a direct indicator of the empirical importance of a causal combination. A causal combination that covers or accounts for only a small proportion of the instances of an outcome is clearly not as empirically important as one that covers a large proportion. When there are many different paths (causal combinations) to the same outcome, it is very important to calculate both the raw and unique coverage of each causal combination. These calculations often reveal that there are only a few high-coverage causal combinations. Although it is useful to know all the different causal combinations linked to an outcome, it is also important to have an assessment of their relative empirical weight. Calculations of raw and unique coverage provide these assessments directly (Ragin, 2006). The raw coverage shows how much of the outcome is covered by each of these paths. Yet, the empirical importance expressed by coverage is not the same as the theoretical relevance of a sufficient condition. Thus, low-coverage paths might still be of great theoretical interest. Unlike the case with consistency, there is no lower threshold for coverage (Schneider & Wagemann, 2012)

[20] Boolean algebra denotes the logical OR by using a "plus" sign ("+"). This means that readers must not read the Boolean "+" as an "and" in the conventional sense. Also, the logical operator OR is an inclusive (and not an exclusive) "or" and allows for both alternatives to be present at the same time. Boolean algebra denotes the logical AND by using a dot or atterisk (*) The order in which two or more elements are connected through AND and OR is irrelevant (Schneider & Wagemann, 2012, p. 46).

The most complex solution formula set (or path) with the highest parameters of fit (i.e. raw and unique coverage) is:

n*m*l*~e → Y

This conjunction formula-set should be read in the following way: the combination of the presence of neo-corporatism, multilevel governance, left-wing party strength, and the absence of low energy independency (i.e. the presence of high energy dependency) leads to performance. Still, the raw and unique coverage is low, respectively 0.333333 and 0.222222 (see appendix D) and therefore also of little empirical and practical value; meaning that this kind of solution formula is of little use for explaining performance.

The conservative solution set in its entirety is a very complex statement; interpreting it in a theoretically meaningful manner is almost next to impossible. There is much heterogeneity among the cases that are members of the outcome Y. This is why they fall into very different truth table rows and why very little logical minimization is possible. Also, complex set-theoretic arguments involving the intersection of many sets can achieve remarkable consistency but low coverage. Consistency can be increased by adding single conditions through logical AND. The more conditions are combined, the more difficult membership in it becomes. This makes a set ever smaller, and thus makes it more likely to be a consistent subset of the outcome. At the same time, however, long conjunctions cover less and less of the outcome simply because so few cases are members of this conjunction (Schneider & Wagemann, 2012). From a practical viewpoint, therefore, the complex formula may not be compelling. Therefore, one should consider the most parsimonious solution term, this formula represents the shortest way of expressing the empirical evidence on the sufficient conditions for Y.

The most parsimonious solution term:

m + (~l*~f) + (n*~l) + (n*f*~e) + (l*f*~e) → Y

The path of the parsimonious solution set explaining the occurrence of Y (performance), and that has a relatively high raw and unique coverage (0.4444 and 0.2222) is:

m → Y

Then, there is also an intermediate solution term which is based on two principles. First, no single condition can be dropped from any sufficient path of the most parsimonious solution term, because the most parsimonious solution term would otherwise not be a superset of the intermediate solution. This principle can be restated as follows: only those single conditions can be dropped from sufficient paths in the conservative solution that do not appear in the most parsimonious solution term. Second, only those conditions that are in line with the

directional expectations[21] can be dropped from the conservative solution term (Schneider & Wagemann, 2012). The directional expectations are in line with the statistical findings presented in chapter 1: the presence of each single condition (N, M, L, F, E) is expected to contribute to the outcome Y (P=1).

The intermediate solution is – by definition – a subset of the most parsimonious solution and a superset of the conservative solution. The intermediate solution term is also in between the conservative and the most parsimonious solution in terms of complexity. The rationale for creating intermediate solution terms is that, on the one hand, the conservative solution often tends to be too complex to be interpreted in a theoretically meaningful or plausible manner and that, on the other hand, the most parsimonious solution may be unrealistically simple or contradictory to our directional expectations. Intermediate solution terms therefore aim at striking a balance between complexity and parsimony (Schneider & Wagemann, 2012).

The intermediate solution is as follows:

(~f*~l) + (~l*n) + (m*n) + (~e*f*n) + (f*l*m) → Y

And the path of the intermediate solution set explaining the occurrence of Y (performance), and that has a relatively high raw and unique coverage (0.3333 and 0.2222) is:

m*n → Y

[21] Directional expectations are theory-guided hunches about the relationships between the conditions and the outcomes of interest (Yanwei Li, 2016, p. 184). Remember that statistical research has found that greater energy dependency is *negatively* correlated with renewable energy deployment. So, the hypothesis is that the presence of neo-corporatism, multilevel governance, green/left-wing party strength, public support, and a *low* energy dependency rate is conducive to high performance, whereas the absence of these five factors would lead to a lacking performance.

5.2.2 Explaining the lack of performance

In terms of explaining the lack of performance, I followed the same procedures of analysis as in subsection 5.2.1 The consistency and coverage of the necessary conditions were first tested and the results are presented in table 5.

Necessary conditions:

Table 5: Analysis of necessary conditions for the lack of performance

Conditions	Consistency	Coverage
NEO-CORPORATISM	0.40	0.22
neo-corporatism	0.60	0.60
MULTILEVEL GOVERNANCE	0.00	0.00
multilevel governance	1.00	0.50
LEFT-WING PARTY STRENGTH	0.60	0.33
left-wing party strength	0.40	0.40
FAVOURABLE PUBLIC OPINION	0.60	0.33
favourable public opinion	0.40	0.40
LOW ENERGY DEPENDENCY	0.40	0.50
Low energy dependency	0.60	0.30

Note: the presence of a factor is expressed by putting capitals and the absence by small letters.

The results of the analysis depicted in table 5 show that the absence of multilevel governance has a consistency of 1.00, implying that it is a necessary condition for the lack of performance. This implies that countries that fail to meet their targets never show intensive forms of multilevel governance structures/practices. When assessing consistency, it is important to consider the number of cases. Perfect consistency does not guarantee that a meaningful causal relationship exists, because an observed consistency of 1 for a small number of cases might well be coincidence (Ragin, 2006). For a number of five cases perfect consistency could be coincidence, but it is not likely to be a coincidence.

Given the low coverage of this condition (50%), the absence of multilevel governance, it is not established as a highly relevant necessary condition, but neither a trivial necessary condition. Braumoeller and Goertz define a trivial necessary condition as being one that is present in all cases in the universe of analysis, both when the dependent variable is present and absent (Goertz, 2006). Alternatively, a maximally important, relevant, necessary condition is also a sufficient condition. In general a necessary condition is more important the more sufficient it is. ~M is a necessary but not sufficient condition for underperformance (~P / Y = 0) because ~M does not always lead to ~P; there are many countries that show performance (P) while these countries are conditioned by a lack of multilevel governance (~M).

Sufficient conditions:

On their own none of the single conditions are sufficient to produce the outcome ~Y. But the cs-QCA software yields the following results - combinations of conditions that are sufficient to produce ~Y.

- The most complex solution for explaining lack of performance:

(~m*l*~f*~e) + (~n*~m*~l*f) → ~Y

Both sets (paths) have a raw and unique coverage of 0.4000

- The parsimonious solution:

(~m*l*~f) + (~n*~l*f) + (~n*~m*f) → ~Y

The set (path) with the highest parameters of fit is (~m*l*~f) with a raw and unique coverage of 0.4000.

- The intermediate solution:

(f*~l*~m*~n) + (~e*~f*l*~m) → ~Y

The set (or path) with the highest parameters of fit is (f*~l*~m*~n) with a raw and unique coverage of 0.4000.

5.2.3 Discussion of findings

The cs-QCA analysis has identified three relevant factors for RET-performance. Neo-corporatism and high energy dependency are highly consistent (i.e. they correlate) with performance; multilevel governance is highly consistent with lack of performance - but has lower coverage, hence less empirical importance. Nonetheless, factors with low coverage may still be of great theoretical interest. The computer software also produced solution formulas - showing combinations of conditions (paths) sufficient to lead to a particular outcome. Unfortunately, these solution formulas are not very helpful. Even the parsimonious solution formulas are still too complex to make better sense of reality. Moreover, the individual paths leading to a certain outcome have all low coverage. This implies that the reality of RET is very complex and does not allow to be described by simple formulas.

§5.3 Comparative case study

The previous medium-N research strategy does not explain why or how certain factors matter for performance. Calculations of consistency and coverage do and should provide guidance, but the ultimate ‘‘test’’ of the results of a QCA analysis is not their consistency or coverage but how well they help researchers make sense of their cases. In other words, do the results resonate with what is known about processes and mechanisms operating at the case level? (Ragin, 2006). In the context of this research, the aim is to find out whether the earlier described theoretical mechanisms related to concepts like neo-corporatism and multilevel governance function as they are expected to function, or whether they work out differently in the cases under study.

A small-N research, focusing on two cases, is suggested to be a sensible approach to further examine and explain variance in RET performance. The truth table showed that the Netherlands and Denmark are contrasting cases. This means that they are similar regarding the independent variables of interest, yet they differ in outcome. Both countries are strongly neo-corporatist; they have weak multilevel governance; and both have a low energy dependency rate, despite these commonalities, the Netherlands is a low-performing country and Denmark a high-performing country when it comes to RET.

The Netherlands National Energy Outlook 2014 revealed that the renewable energy goals cannot yet be achieved. Although the development of renewable energy is surrounded by many uncertainties, the share in 2020 is projected to increase to well over 12%. This is less that the 14% agreed within the EU ('Visible energy transition,' 2015). Denmark is obligated to reach a 30% renewable energy share of its final energy consumption in 2020. With a renewable share of slightly more than 40% by 2020, this target will be exceeded by a large margin. Annual targets up to 2020 have also been reached by a large margin (Danish Energy Agency, 2015). Thus, the Netherlands and Denmark make an interesting comparative case study. However, this does not necessarily remove other countries from consideration and sometimes other cases are cited to illustrate and reinforce particular findings and arguments.

I used multiple methods to gather data about the cases. I relied mostly on academic literature review and document analysis (e.g. administrative documents, evaluation reports). This is complemented with interviews conducted with persons that are familiar with or expert in one or more of the cases. I considered the results of the COV-analysis while conducting the interviews; although I did not foreclose any new insights that (partly) explain the different levels of national performance. So, the comparative case study has an explanatory as well as an exploratory character.

The comparative case study will first concentrate on the variables with the highest correlation to see if they can sufficiently explain the different levels of performance of the two countries. Then, the case study turns attention to additional explanations derived from academic literature, policy documents, and expert interviews.

5.3.1 The role of neo-corporatism

As outlined in chapter 2, neo-corporatism is characterised by high level policy concertation and interest aggregation/representation along functional lines. Neo-corporatism entails a limited number of 'dominant peak associations' that have access to the political and policy processes. Pluralism, on the other hand, is characterised by much more limited policy concertation and competitive interest representation/aggregation (Scruggs, 1995, p.3). Scruggs (1999) explains two principal mechanisms through which neo-corporatism should enhance environmental performance: producer group encompassingness and consensual policy-making. Neo-corporatism enables actors to overcome collective action problem; it reduces policy paralysis (p. 14). Corporatist systems have two main advantages in overcoming collective-action problems compared to more pluralist systems. First, the power of national peak associations over local units facilitates the pursuit of national rather than particularistic interests. And because peak organizations ‘encompass’ a broader national constituency, they will be more likely to consider diffuse environmental benefits compared to individual firms or unions. Secondly, corporatist arrangements are associated with effective schemes to compensate losers in economic adjustment. Scruggs (1999) also mentions that the threat of strict regulation provides an incentive for business and governments to pursue flexible and co-operative steps and that monitoring and enforcement of environmental regulation is easier when there is a history of producer-government trust (p. 5).

In accordance with the provisions of the 2009 Renewable Energy Directive each Member State devised and submitted a national renewable energy action plan to the European Commission. These plans are merely technical roadmaps describing how each Member State expects to reach its legally binding 2020 target; but they say little about the way the energy transition is governed. For the Netherlands, the 'energieakkoord voor duurzame groei' ('energy agreement for sustainable growth') of 2013, hereafter named SER-akkoord, is leading for the implementation of the EU 2020 goals (interview 3). 'SER' is an abbreviation for the Sociaal-Economische Raad (Social-Economic Council) which served as a platform for intense negotiations over a span of a half-year (Van Est & Van Waes, 2016). De Vries also confirms

that it was only after the conclusion of the SER-akkoord that a concrete policy regarding the EU 2020 renewable energy targets was established (interview 2).

The goal of the SER-akkoord was to develop concrete plans and actions to enhance the sustainability of the Dutch society and economy; the renewable energy transition is an indispensable part of this process (SER Energieakkoord 2013). The SER-akkoord is conform with the Renewable Energy Directive of 2009 as it reaffirms the goal to increase the share of renewable energy to 14 percent in 2020 (SER Energieakkoord, 2013). At the start there were in total 80 discussion partners (Van Est & Van Waes, 2016). In the end, the SER-akkoord bridges the divergent interests and connects more than 40 organisations, among others employers' and workers' organisations, environmental organisations, social organisations and financial institutions. But, also many scientists, entrepreneurs, politicians, and other involved citizens have contributed to the agreement. This was done through organizing (expert) meetings and brainstorms through online-consultations (SER-akkoord 2013). It was agreed that the safeguard and implementation of the agreement is a shared responsibility. Parties are responsible for the implementation of the elements that were assigned to them. The parties established a special committee that monitors, encourages or adjusts the progress if necessary. This committee consists of all the representatives of the involved parties and accords full participation to all signatories, including the government (SER energieakkoord, 2013). Thus, the role of the 49 signatories was not limited to consultation and formulation of policy; they take part in the implementation process as well.

The SER-akkoord is the product of a negotiation process aimed at finding consensus between the parties. Although, the SER-akkoord represents some sort of covenant between the government and the private sector, the 49 parties involved constitute a fairly broad representation of the Dutch society (interview 3). This is not really typical for neo-corporatist structures that would only include a very limited number of peak organizations/association. It is important to note that the SER-model is a neo-corporatist model based on the notion that a limited number of participants should be able to represent relevant diverse interests. The SER usually facilitates negotiations only between large labour unions and employers' associations (Van Est & Van Waes, 2016) This SER-akkoord is an exception to that and is in fact more in line with pluralist consultation. Consequently, the potential advantages of neo-corporatism for environmental policy performance as described by Scruggs (1999) were eliminated. With so many parties involved, monitoring and enforcement is difficult.

It is also important to note that the Dutch government itself is not bound by the SER-akkoord of 2013 (Van Est & Van Waes, 2016). In fact, the government and the parliament did not adopt the SER-akkoord straightaway. Certain elements were heavily debated and finally rejected by members of parliament, thereby risking to delay the energy transition and the realization of the objectives (Van Est & Van Waes, 2016). It is also possible for individual provinces and municipalities to divert from this agreement, as is for all other organisations that signed the agreement (interview 3). In short, the SER-akkoord is a soft agreement, based on voluntary participation. The fact that the SER-akkoord was signed by their respective umbrella organisations, the 'Interprovinciaal Overleg' (IPO), and the 'Vereniging van

Nederlandse Gemeenten' (VNG) does not change that. So, Scruggs' (1999) notion about the power of national peak associations to bind their members (local units) to the agreement does not fully apply in this case.

In the case of Denmark one should focus on the Energy Agreement of March 22, 2012 (Energiaftale 2012); the Danish equivalent of the Dutch SER-akkoord. The Energiaftale 2012 secured broad political commitment to an ambitious green transition plan that focuses on energy savings throughout society, and promotion of renewable energy through more wind turbines, more biogas, and more biomass. The agreement includes a series of energy policy initiatives for the period 2012-2020 (Ministry of Foreign Affairs Denmark, 2012). The parties behind the agreement represent 171 seats out of 179 in the parliament. The Energiaftale 2012 is a purely political agreement. Unlike the SER-akkoord, the Energiaftale 2012 is not a result of a negotiation process or forum in which by-the-government-selected actors participated. The energiaftale 2012 did not entail any exclusive negotiations between government and employers' organisations and labour unions. This does not mean that in the lead-up to the energiaftale, actors from Danish society were not involved. Businesses and other societal actors had open access to government through lobby venues, but had at most a counselling role. Thus, the Danish adopted an informal consultation process; representative organisations were not formally involved in the policy formulation and implementation process. The government writes the rules in line with the view of the ministers, who are influenced by lobby groups. It is important to note that the Danish RET is not only pushed by government, but also by private actors. Big energy companies like DONG have actively developed strategies to move away from fossil fuels. Overall, the energy transition is desired by Danish industry and perceived as an economic opportunity (interview 6).

So, the Danish Energy Agreement differs from the Dutch Energy Agreement in that it is purely a political agreement to bind political parties and Danish subjects on the long-term in regarding to the RET. Unlike the SER-akkoord, the Energiaftale is not a cooperation instrument, but more a steering instrument. Another difference is that the SER-akkoord was afterwards subject to political debate. If the Danish energy agreement was concluded (and implemented) via neo-corporatist accommodation structures, then this would have confirmed the importance of neo-corporatism in regards to RET-performance. However, in both countries, the processes around these agreements do not fit with the neo-corporatist model. This implies that neo-corporatism, in itself, does not determine the level of performance.

5.3.2 The role of multilevel governance

Walti (2004) found that in national systems that are not characterised by multilevel governance, corporatist accommodation structures seem to have no positive effect on environmental policy performance (p. 621). The degree of multilevel governance depends on the degree of autonomy (i.e. self-rule) and the extent of intergovernmental coupling (i.e. shared rule). Another distinction may be made between 'the right to decide' and 'the right to act.' In essence, these two dimensions cover, respectively, policymaking and policy implementation. So, a country with a high level of multilevel governance refers to a country where sub-national authorities have a high degree of autonomy in the decision-making process as well as the implementation process, where sub-national units can to a large extent co-decide in national decision-making and have the fiscal resources to implement decisions. Walti (2004) argues, while assuming that corporatist arrangements provide access to both economic and environmental interests, the outcome of her research suggests that environmental groups are able to outweigh economic interests more easily in multilevel systems. Because multilevel structures offer pro-environmental venues. Also, multilevel governance may make advocacy groups more responsive to local, and hence green, concerns. In contrast, one-tier systems seem to provide easier access to economic interests (p. 621).

In Denmark, at regional and local levels, much of the administrative responsibility has been delegated to municipalities (IEA, Denmark 2011 review); and as a general rule, the municipalities are responsible for the planning of on-shore wind turbines. This is very similar to the Netherlands, where decentralized government authorities are also responsible for issuing permits (Klimaat-energieakkoord tussen rijk en provincies, 2009), and where the provinces sit down with municipalities to assign suitable locations for on-shore wind. So, in Denmark as well as in the Netherlands, decentralized governments do have a certain and similar degree of autonomy when it comes to the renewable energy transition - and notably with regard to spatial planning and permitting of on-shore wind turbines. Off-shore wind planning, on the other hand, is in both countries in the hands of the national government.

The Dutch central government and provinces agreed to realise 6000 MegaWatt (54 PJ) operational on-shore wind capacity in 2020. The provinces are responsible for attaining this objective as it is tightly connected to their prerogative in spatial planning. However, it is clear that the provinces will not reach this goal (interview 2, 5). In 2013, the Netherlands started out with 2000 MW on-shore wind capacity and in four years time only a 1000 MW has been added (interview 5). According to Schouffoer the process of building wind parks is cumbersome and takes many years. Local authorities consult with local inhabitants but still many plans for on-shore wind development have been cancelled (interview 3). It seems that especially in the Netherlands there are many local resistance movements against wind energy projects. So, Walti's (2004) argument that multilevel government make advocacy groups more responsive to green concerns is incorrect in this case and provides instead more leverage for the veto-player theory.

Still, multilevel governance as a concept somewhat different from the one used by Walti (2004) does seem to matter for RET-performance and by that I am referring to the decentralization of the energy supply and local ownership i.e. the participation of citizens in the energy transition. The dominant technological paradigm is focused centralized energy generation through power plants. This is completely at odds with the recent development of decentralized renewable energy generation (Rotmans, 2011). Effective governance in the field of RET requires that governments provide or adapt energy structures to enable the provision of decentralised, locally sourced renewable energy. This is essential for a broad and rapid energy transition, away from fossil-fuel generated energy supplied by a relatively small number of big energy companies (Allagapin, Karepin & Woo, 2011). Unlike countries like the United Kingdom, France, and the Netherlands - Germany did not nationalize and centralize its energy system the post-WWII period, and because of that the electricity grid was more municipal based and supportive of the distributed energy revolution. Denmark also has a more decentralized energy system where municipalities (partly) control the local energy infrastructure. This has resulted in more capacity at the regional and local levels to support and enable local ownership in renewable energy production (Kuzemko, Lockwood, Mitchell, & Hoggett, 2016). As regards the Netherlands, the decentralization of the energy system is one of the clearest challenges that came back in almost all interviews concerning the Dutch energy transition conducted and reported by Bosman, Loorbach, Frantzeskaki, and Pistorius (2014). In the Netherlands, renewable energy production is mainly in the hands of large corporations. This is beginning to change as we are seeing a growing number of local cooperatives focussing on the development of collective solar and wind projects. But in 2015, the contribution made by these cooperatives was still modest: 1 percent of the total peak power of all solar panels in the Netherlands and 3 percent of the total capacity of on-shore wind energy came from these cooperatives (National energy outlook, 2016). This stands in sharp contrast with Denmark, where three quarters of the deployed wind turbines are owned by citizens (Greenpeace, 2014). And this is also true for Germany where in 2012 only 12 percent of the renewable energy capacity was owned by the utility companies (Notenboom & Boot, 2016). This shows that German and Danish citizens play an important role in that energy transition process (National energy outlook, 2016).

The cs-QCA analysis has shown that public opinion did not matter for performance. A unfavourable and favourable public opinion was not consistent with a respectively low and high performance. One may doubt whether the selected Eurobarometer poll is an adequate measure for public support. In that regard it is interesting to note that Hampton, Cruz and Huenteler (2017) have made similar findings. These authors also hypothesized that the speed of the Danish and German energy transition and the broad political consensus around it is underpinned by major public support. Instead of Eurobarometer polls they examined a number of international opinion polls on the subject of climate change and they demonstrate that the public opinions are rather similar across the four countries under study (Germany, Denmark, the United Kingdom, and the USA). They also provide evidence showing that support for renewable energy is very high in all countries. So, despite the fact that opinion polls show a very positive attitude and support of renewables by the general public, this attitude seems to have a strong NIMBY (‘‘Not-In-My-Back-Yard’’) component and this is

confirmed by the expert interviews. This NIMBY effect is more likely to occur in densely populated areas. It is oftentimes argued that population density is one of the reasons why the Netherlands is lagging behind in renewable energy deployment (interview 1, 2, 3). Because while the surface of Denmark and the Netherlands is about the same size, the Danish population size is only one-third in comparison to the Dutch population size; also the Danish demand for energy is only one-fifth compared to the Dutch demand; this is because Denmark has a much less energy-intensive industry. These conditions make the transition in Denmark easier (interview 5). Still, there are ways to mitigate public resistance or increase public support. The so-called 'co-operative model' that encompasses financial participation ensured local buy-in and a high degree of public acceptance in countries like Denmark and Germany. In those countries, we see high levels of community ownership of renewables where wind power is seen as an investment opportunity for residents (Hampton, Cruz & Huenteler, 2017). In Denmark there is a law that ensures that local communities profit from the deployment of windmills (SER-energieakkoord, 2013). This is the Danish Renewable Energy Act, which was first adopted in 2009. Regulations contained in the Renewable Energy Act aim at ensuring consumer participation and compensation regarding wind projects. One of these regulations is the option-to-purchase-scheme which allows local citizens to purchase a minimum of 20 % of the wind project (A Snapshot of the Danish Energy Transition, 2015). The Dutch SER-akkoord mentions that a better allocation of the benefits and burdens (through compensation and participation) between developers and the community is essential for increasing public acceptance. The SER-akkoord refers to a new law ('omgevingswet') which foresees that decentralized government authorities can impose local requirements like shares, bonds or other forms of co-ownerhsip in order to increase public acceptance (SER energieakkoord). It is expected that this new law enters into force in 2019 (Omgevingswetloket, n.d). Also in the UK for example, although there is support for community energy projects; a strong, supportive policy framework remains absent (Hampton, Cruz & Huenteler, 2017).

Yet, it would be an overstatement to say that the issue of decentralization is decisive for attaining the RES targets, because renewable energies can also be harvested and run in a more centralized manner by using big solar farms and huge (off shore) wind parks, administered by the established big energy providers (Fuchs & Hinderer, 2014). Nevertheless, the fact remains that decentralized forms of energy supply make an important contribution to achieving the RET-goals. In high-performing countries, community energy makes an important contribution to sustainable energy generation (Markantoni, 2016). Low-performing countries like the Netherlands, the UK, and France are known for having a very centralized energy market; where community renewables remain weakly developed (Markantoni, 2016). As an example, France's present energy structure is strongly adapted to nuclear power and this does not fit at all with renewable energy generation. It is impossible to repeatedly tune those nuclear facilities in harmonization with renewable energy production. In other words, the grids were not designed to take decentrally produced electricity but mainly designed to distribute centrally produced electricity. This constitutes a very important obstacle (Reiche, Bechberger, 2004).

Of course, Walti's (2004) multilevel government index rates countries on federalist and unitary scales; it does not take account of national energy structures. But, it is not unlikely that the level of multilevel governance has had an historic influence on the level of centralization or decentralization of the energy system. Federalist states are more likely have a more decentralized energy system, but this is merely intuitive thinking and should be investigated more thoroughly.

5.3.3 The role of energy dependency

The cs-QCA analysis has found a sufficient consistency between high energy dependency and performance to infer a possible relationship. A high energy dependency rate can motivate a country to (quicker) embark on the path to renewable energy. Denmark's and Germany's green industry policy was partly motivated by the wish to diversify their energy supply to become less energy dependent. Denmark's energy transition can be traced back to the oil crisis of 1973 when the country was for 90 percent dependent on foreign energy imports (Hampton, Cruz & Huenteler, 2017). In the decades that followed, Denmark started to extract gas and oil from the North Sea to eventually become a net exporter of energy. Still, Denmark's fossil-fuel industry is comparatively small. A country like Portugal also has a high share of renewables, because it totally depends on the external supply of fossil energy resources. Another advantage for Portugal is that there are no old fossil fuel and uranium-based energy companies that are resisting renewable energy development - something which will be elaborated in section 5.3.4 (Reiche & Bechberger, 2004). Some EU Member States like the Netherlands and the UK have access to gas and oil in their own country. If these resources run out and renewables become cheaper the incentive to increase the share of renewable energies will grow (Reiche & Bechberger, 2004). The fact that the Netherlands is fitted with natural gas - which is a relatively clean fossil fuel - made that there was less felt urgency to realise the energy transition. And this is also true for France; low-carbon nuclear was a reason for not investing in renewables for a long time (interview 2). Stapersma also emphasizes the missing sense of urgency to change the current system, which has brought so much welfare to this nation (interview 5). So, the comparative case study shows that energy dependency rate does influence the context and conditions that affect even short-term performance, i.e. from 2010 to today.

5.3.4 Other explanations

Scholarly literature focusing on the Dutch energy system often claims that the main factor for underperformance is a strong fossil fuel regime in which incumbents play a dominant role (Kern and Smith, 2008; Van der Loo and Loorbach, 2012). This is not surprising as the gas and oil regime is firmly rooted in Dutch society. When a large gas field was discovered in Slochteren in 1959, exploiting it became a political priority since it would form an important source of income. For decades the Netherlands has invested in the gas and oil infrastructure. Consequently, the Netherlands is facing a so-called 'fossil-fuel complex' (interview 1).

Furthermore, the Netherlands has not developed a significant green industry that balances those vested interests. Energy dependency and vested interests are often linked. A low energy dependency rate implies that there is some form of an indigenous energy resource complex which often leads to what van der Vleuten and Hogselius call 'historical legacies of sluggishness', 'path-dependency' and 'lock-in' on conventional key technologies and vested interests (Verbong & Loorbach, 2012). Bosman and Rotmans (2016) affirm that the far-reaching elements were taken out of the Dutch transition project, mainly because the whole project became a serious threat to the regime. This perceived threat is reasonable. In the case of Germany, solar power can already provide up to 50 percent of Germany's power demand for a few hours on sunny days of low power consumption. In July 2015, the electricity production from PV was, for the first time, higher than from nuclear power. Solar power drives down wholesale power rates, making backup power plants increasingly unprofitable (Morris & Pehnt, 2012).

Several studies point to the effects of vested interest structures (coal, oil, gas) and nuclear energy (which is in line with lower RES-deployment), as well as the importance of institutions and politics through which these vested interests are transmitted (Marques & Fuinhas, 2011; Moe & Midford, 2014; Cadoret & Padovano , 2016; Van der Vleuten & Högselius, 2012). In the case of France for example, which is also a low-performing country, the nuclear lobby is dominant. Nuclear energy is generated by a state-owned company and has permeated French politics as many state officials rotate between this company and the government (interview 2). Thanks to low production costs, such a lobby dominates electricity supply as well as the whole French energy market (Poupeau, 2014). And although Denmark produces gas and oil, these numbers are low compared to the Netherlands. The Danish oil and gas industry does not inhibit the energy transition; they have a limited role in the Danish energy sector (interview 6). Appendix E depicts the relative economic importance of the fossil fuel industry and the green industry for the countries Denmark, Germany, the Netherlands, and the United Kingdom. One way of measuring the importance of vested interests is to look at public revenue derived from the fossil fuel industry. Appendix E shows that the public revenue that derives from the fossil fuel extraction in the two low-performing countries (NL and UK) was three to four times higher than in the two high performing countries (Denmark and Germany).

The Dutch state is shareholder of fossil fuel companies which means that it has a sufficient say in the business to force a quicker transition. However, this would be a bold political choice, especially for the Netherlands which tries to rely as much as possible on the invisible hand while eschewing state intervention. Consequently, the initiative rests mainly in the hands of the private sector. The Dutch government is very cautious to intervene in the market, because it fearful of repelling companies and weakening its international competitive position (interview 3). In countries like Germany, Sweden, Finland, and Denmark governments have a more prescriptive or co-ordinated relationships with the private sector, this means that state bodies can engage directly and on an ongoing basis in shaping the economy (Kuzemko, Lockwood, Mitchell, & Hoggett, 2016). Furthermore, if a governments' willingness to steer the economy also entails an industry policy to develop a new green industry, thereby creating

new jobs and income sources, then this industry may counterbalance any actors that lobby against a transition. From an early time on, Denmark has perceived the energy transition as an opportunity to develop a green industry that would be able to export its products and technology. Industry policy aimed at innovation and international expansion of clean technology industries increased Denmark's economic opportunities and competitiveness. In 2010, the green economy was responsible for a turnover of 33.5 billion euros in Denmark (about 14% of GDP). Of this, 10.7 billion euros was exported, representing 10.4% of total Danish export (PBL 2014). Denmark's story is very similar to that of Germany in this regard. According to estimates made by the German Ministry of the Environment, Germany currently holds a global market share of about 15% (about 290 billion euros) in green technologies – representing about 11% of GDP (PBL, 2014). This share could increase to 14% by 2020 (OECD economic survey, 2012). This new rising green industry promotes the RET and counterbalances opposing forces. While Denmark and Germany have deliberately and actively supported the development of new green industries, in the Netherlands industry-policy was taboo or did not even exist, the Dutch government depended entirely on the liberal economic market and privatisation and never considered to actively support the development of a new green energy industry (interview 2).

Of course, the influence of vested interests on the pace of the RET is not confirmed by official policy documents. According to the Energy report 2011 by the Dutch Ministry of Economic Affairs, the development of renewable energy depends mainly on four factors:

• the trend in prices of fossil fuels and carbon emissions;

• reductions in the costs of renewable energy technology;

• cost reductions in alternative technology such as carbon capture and storage (CCS).

• the incentive policies pursued.

High costs of fossil fuels and carbon emissions will make investment in renewable energy cost-effective more quickly, as renewable energy will then offer a cheaper alternative to fossil fuels, making it attractive for market players to invest in alternative technologies. However, the trend in prices of fossil fuels and carbon emissions are not likely to account for the divergent national performances; fossil fuel price trends are mainly determined by world market prices by which EU Member States are equally affected. This is also true for the price of carbon emissions as all EU Member States fall under the same European Emission Trading Scheme. It is true that technological advances are expected to lead to a gradual fall in renewable energy costs over the coming decades. However, this is also unlikely to account for the divergent national performances as technological innovations tend to trickle quickly to other countries. Moreover, whether it is Germany or China that induces lower cost prices for solar panels for example, the common market ensures similar prices for all EU-Member States as internal trade tariffs have been removed while at the same time a common external trade tariff has been put in place. So there remains one plausible factor for the variance in performance, the incentive policies pursued. As mentioned earlier, the 2009 Renewable Energy Directive provides Member States freedom of choice to develop national instruments

to promote deployment of renewable energy. This has resulted in a patchwork of not harmonized national remuneration schemes and support mechanisms across the EU-28 (Notenboom & Boot, 2011). Reiche & Blechberger (2004) maintain that the deployed instruments for the promotion of renewable energies play a crucial role. Veum also affirmed that some national support schemes are more stable and attractive for private investors than others (interview 1). It may therefore be appropriate at this stage to examine policy performance by adopting a policy instruments perspective. It is not unusual for analysts in the field of comparative performance assessment to focus on specific policies and instruments. This means taking into account the national renewable energy action plans.[22] These national action plans list the adopted policy measures to realise the renewable energy target. However, a policy instruments perspective can only be applied on surface as delving deeper to examine the effectiveness or efficiency of the chosen policy instruments would render this research too technical. Moreover, one may assume that policy experts have the competence to devise a plan that enables the government to reach its target. Therefore, I will rely on more general findings of previous studies. The IMF has tested the impact of four policy support variables. Renewable portfolio standards and biofuel mandates do not seem to affect green investment. The Feed-In-Tariff (FIT) has a statistically significant effect as has carbon-pricing (Eyraud, Wane, Zhang, & Clements, 2011). The latter can be discounted as EU Member States are subject to the same European Emission Trading Scheme. Also Allagapan, Oran, & Woo (2011) revealed a winning formula for promoting renewable energy: high Feed-In-Tariff prices, easy transmission access and low transmission charges.

Policy instruments perspective

The countries that have rapidly deployed RES have in common that they all introduced high feed-in tariffs. Feed-in tariffs establish a fixed price for each RE-unit produced and thus provide price certainty for investors. Germany and southern EU countries like Italy and Spain handled high feed-in tariffs for a long period of time. This was financially very attractive for private investors and as a consequence the share of renewable energy increased rapidly. However, these countries were forced to abandon or reform that system; it was unsustainable due to rising costs (interview 2). The UK's system for the development of RES, on the other hand, used to be purely driven by liberal market ideals and this approach - a quota system combined with trade-able green certificates - has clearly failed. The volatility of the certificate prices led to investment risk. So, the challenge is to find the right balance between efficacy (induced by public support/subsidies) and cost-efficiency (induced by market forces) (interview 2).

The Dutch system is quite cost-efficient. It relies on a feed-in premium system (called the SDE+) and tender processes (auctions). A feed-in premium system - in contrast to a feed-in tariff system - does not provide a fixed price for each unit of RE generated, instead it provides a fixed subsidy on top of the market prices. This provides less certainty for private investors as market prices fluctuate. Veum claims that the SDE+ is overall well-devised and should

[22] The national renewable action plans were drafted in response to the Renewable Energy Directive of 2009 and elaborate how the national renewable target ought to be achieved.

therefore not be considered as a cause for the lagging performance of the Netherlands (interview 1). In fact, many countries have started to follow the Dutch example, replicating the feed-in premium system in combination with tender processes (interview 2). However, a problem that the Netherlands experienced after the introduction of the tender processes was that 30 percent of the private investors decided later to pull back as they perceived the profit margin too small and the risk too great, or they found out that the project was not feasible at all for the price for which they had bid. Consequently, 30 percent of the budget intended for those projects flowed back to the national treasury. This is partly reason why the Netherlands has been lagging behind in the RET for so long. However, the commitment of private investors vis-à-vis their won tender(s) has improved since the Dutch government introduced a fine for withdrawal and moderately increased the profit margins for private companies (interview 2). Countries that just introduced tender processes are likely to experience similar teething problems.

In Denmark, the production of electricity from renewable resources is supported by a combination of price premiums and fixed feed- in tariffs. Historically, the level of support has changed many times, but it is a general rule that the support scheme, which was in place when a production unit was connected to the grid, applies for the lifetime of the production unit. As a result, there is a high level of certainty about future support at the time of investment (IEA, review 2011, p. 82). Since 2008, Denmark supports generation of electricity from renewable sources through a premium tariff system based on bonus payments, which is paid on top of the market price (European Environment Agency, 2014). Special renewable energy technologies such as wave power, solar PV, fuel cells running on renewable fuels receive a fixed feed- in tariff of DKK 0.60 per kWh for 10 years and DKK 0.40 per kWh for the following 10 years (IEA, Denmark 2011 review, p. 82).

Many academics point to the importance of government providing a long-term and reliable support programme to incentivize private actors to invest in RES. Germany for example has had a very stable support scheme (Notenboom & Boot, 2016). Germany's support programme for RES known as the Renewable Energy Sources Act (EEG) was not fundamentally changed until very recently. The EEG ensured preferential access to the grid for renewable energy and provided a feed-in tariff (a fixed fee) that way providing price certainty for a period of 20 years. So, if you include the predecessor of the EEG, Germany has had a fairly stable support programme for RES since 1990. As a consequence, the share of RES in the total energy mix has increased rapidly (Nationale energieverkenning, 2014). Dutch policy has been widely criticised for having been too unstable to provide sufficient incentives for investments into renewable energy technologies. Renewable energy policy was hamstrung by funding limitations rather than long-term ambitions. The Dutch government introduced feed-in tariffs providing a fixed subsidy per kWh for domestically produced renewable electricity in 2003 (the so-called MEP scheme, but this scheme was stopped again in 2006 (Kern & Smith 2008). The latest drastic changes made to the subsidy programme for RES date back to 2011 (the creation of the SDE+). Since then, the Netherlands has maintained a pretty stable support scheme for RES. But it is possible that the inconstancy of the Dutch government in prior years has had repercussions for the speed of the RET later on.

A stable direction is of course much dependent on broad political agreement (like those forged in Germany and Denmark). A broad political agreement can ensure continuous political engagement as regards the RET. The following passage illustrates this. In 2010, the Dutch energy transition project, dating back to 2001, was largely rolled back by cabinet Rutte-I. Rutte-I was a minority coalition government consisting of the VVD, a rightwing party, and the CDA, a central party, with tolerated support by the PVV of Geert Wilders, a rightwing populist party. In April 2011, two members of parliament, Samson of the PVDA, a left-wing party, and Verburg (CDA) filed a motion in which they asked the government to work on a long-term energy agreement by means of negotiations to align opposing interests. Their motion received the support of most political parties, except from the VVD and PVV. The idea of an energy agreement to realise a fully renewable energy future was finally accepted as part of the government coalition agreement of cabinet Rutte-II consisting of the PVDA and the VVD (Van Est & Van Waes, 2016). In the case of Denmark, from 2002 to 2008, a right-wing government, led by Prime Minister Anders Fogh Rasmussen (AFR), removed financial support for RES and replaced the former innovative democratic policy with a neo-liberalistic energy policy, relying predominantly upon "market tools." This resulted in a very slow expansion of renewable energy sources. After six years, AFR made a political U-turn in 2008 and admitted that his policy had been erroneous. The AFR announced that it had suddenly incorporated a 100 percent renewable energy policy goal. Until 2011 this political goal was only pursued by an active policy to a very modest degree and the policy was still neo-liberalistic and relying heavily on market tools. In 2011 a new center-left Government came into power. They introduced a set of clear renewable energy policy goals, like a share of 35% renewable energy in 2020 (that is 5 percentage points higher than required by the 2009 Renewable Energy Directive); and 50% wind energy in Danish electricity consumption in 2020 (Hvelplund, 2014). The Energy Agreement 2012 (Energiaftale 2012) followed up on these ambitious targets set forth by the Social Democratic-Radikale Venstre-Socialistisk Folkeparti coalition government and subsidies for RES were increased again (A Snapshot of the Danish Energy Transition, 2015). Hvelplund (2014) uses this example to underline that 'market conditions' are political constructs. Moreover, it shows that political engagement in the area of renewable energy sources is not a matter of course; in both countries action in the area of RET was incited by left-wing political parties. So, political parties do matter.

A crucial question is whether governments are prepared to increase taxations, since the advanced energy transitions in Denmark and Germany have been supported by high levels of taxation imposed on domestic consumers (Hampton, Cruz & Huenteler, 2017). The wide acceptance of high levels of taxation in countries like Denmark and Germany means that the public has tolerated the high electricity prices which have enabled their world-leading energy transitions (Hampton, Cruz & Huenteler, 2017). Dutch policy documents, in contrast, often emphasize the importance of cost-efficiency, economic rationality, and warn about the negative effects on the position of the Dutch consumer. Energy price is also pertinent political issue in the UK, as affordability is one of the government's stated priorities (Hampton, Cruz, Huenteler, 2017). The more liberal-economic countries have tended to assign important roles to incumbent energy companies and centralized energy supply over emergent niches and decentralized energy supply (Kuzemko, Lockwood, Mitchell, & Hoggett, 2016). Centralized

energy supply is often regarded as more efficient than decentralized energy supply. The countries' different outlook on the relation between the state and the market is also reflected in the amount of public funds invested in the transition. It is estimated that the Netherlands invests annually 1 to 2 billion euros in the energy transition (Energy report 2011) which is not much compared to countries like Germany (42 billion in 2010) and Italy (17 billion in 2010) (Rotmans, 2011).

To sum up, some governments that are more willing to actively intervene in the market are better situated to provide effective policy responses and drive wider system transformations and this mainly depends on the dominant political economy paradigm.

5.3.5 Discussion of findings

The interviews learned that each case (country) has certain particularities that have an influence on RET-performance. All cases should therefore be examined separately. It turns out that there is no single or structural factor that on its own can explain low or high performance in the area of RET. Nonetheless, the comparative case study has identified similarities and differences in the transition process and governance strategies of successful and failing countries.

Nor in the Netherlands nor in Denmark, the national energy agreement was concluded in accordance with the neo-corporatist model. So, whether RET-agreements are formed through neo-corporatist accommodation structures or not does not seem to make a difference. What is more important is that such an agreement is backed up by broad political support. Naturally, an energy transition entails winners and losers. If a grand majority of the businesses and trade unions feel very much threatened by the energy transition, then the outcome and implementation of the energy agreement is likely to be suboptimal for realizing the energy transition goals. A more decentralized energy system seems to increase local ownership of RES and citizen participation in the RET. This accelerates the RET. States with multilevel institutions may in some way be more endowed to promote local, decentralized renewable energy. The energy dependency rate is important for RET-performance; it creates certain conditions and (dis)incentives. The energy dependency rate is linked to vested interests which influence political willingness to promote the transition. A high energy dependency rate correlates with performance, because a high energy dependency implies an absence of a native energy resource and affiliated vested interests that may hamper the energy transition while it increases the urge to deploy renewable energy sources as a way to enhance national energy security. The policy instruments perspective shows that the choice of policy instruments and measures have an impact on the share of RES. High feed-in tariffs are very effective for increasing the share of RES but they are very costly. From these findings one can deduce that, in order to achieve high performance, the state is required to intervene in the market. Liberal governments who put their trust in the free market are doing worse in the area of RET than more interventionist states. This is understandable because in terms of prices RES are not yet able to compete with traditional energy sources.

Conclusion

This conclusion provides an answer to the main research question that was first presented in the introduction:

What explains the different levels of performance among EU-Member States with respect to renewable energy transition?

The sub-questions were:

Do institutional factors (i.e. neo-corporatism, multilevel governance, and energy dependency) matter for performance in the field of renewable energy transition?

Do political factors (i.e. political parties, public opinion) matter for performance in the field of renewable energy transition?

The mixed systems strategy identified all selected independent variables as potentially relevant factors for explaining the variation in performance, so none of these variables was excluded from further analysis. Subsequently, cs-QCA had shown that three factors - neo-corporatism, multilevel governance, and energy dependency rate - have a sufficient consistency with RET-performance to infer a possible causal relationship. The successive comparative case study analysis enabled to delve deeper into the subject and provides clearer insights on how these and other factors matter.

It turned out that nor in the Netherlands nor in Denmark, the national energy agreement was concluded in accordance with the neo-corporatist model. So, whether national plans or agreements concerning the renewable energy transition are formed through neo-corporatist accommodation structures or not does not seem to make a difference. More important is that such agreements are backed up by broad political support.

As the Netherlands shows, multilevel governance does not necessarily provide more pro-environmental venues and an increased sensitivity for green concerns. Opponents like local wind turbine resistance groups can also effectively exploit these venues as the Dutch case shows. Local ownership (in combination with sufficient financial return or compensation) enhanced public support for on-shore wind. Of course, the likelihood that protest (the NIMBY-effect) occurs is greater in a densely populated country like the Netherlands. The analysis has also shown that favourable public opinion regarding RES is not equivalent to public support. Though, multilevel governance, within the meaning of decentralization of the energy system, is important for the speed of the transitioning away from fossil fuel or nuclear generated energy supplied by a relatively small number of big energy companies.

The empirical analysis has also shown that a high energy dependency rate correlates with high performance. Conversely, a low energy dependency rate correlates with low performance. The negative correlation between high energy dependency rate and the deployment of RES found by previous statistical studies does not apply to western EU Member States. First,

countries with a high energy dependency rate are more inclined to increase their RE-share in order to become less dependent on energy imports. Second, a high energy dependency rate implies that there are no significant indigenous energy resources and associated vested interests. This is favourable for RET-performance as national governments that have large stakes in an incumbent energy supply system, financially as well as politically, have less incentive to push for a transition.

The policy instruments perspective offered additional insight. It shows that governance and policy decision-making matters to the success of renewable energy transitions. There is a need for stable and firm political intervention especially in the first phase of the energy transition. This can be in the form of long-term and high fixed feed-in tariffs and through industry policy. However, if governance is dominated by narratives of liberal markets, affordability, and competition, then effective government intervention to stimulate the RET is less likely. In those cases, there usually exists more investment risk for developers and insufficient financial incentive to overcome the NIMBY-effect and encourage broad citizen participation. In short, RET-performance partly depends on whether countries are led by an ideological commitment to place markets rather than government at the centre of delivering policy objectives. The dominant political economy paradigm of a country has an effect on the nature of the policies chosen by government and in that regard there is a tension between efficacy and cost-efficiency. What is also important to note is that there is trade-off between time and cost and governments are aware of that. The political economy paradigm is determined by culture and historical legacy but also by the political party in power. The comparative case study showed that when right-wing parties were in power the renewable energy transition was impeded, and when in those countries left-wing parties gained political weight there was more stimulus for concrete action concerning RET; think of the creation of the national energy agreements.

It is difficult to answer which factor is most important in explaining the divergent national performances with regard to the RET. It turns out that there is no single, structural factor that on its own can explain low or high performance concerning RET; combinations of institutional and political factors play out in such a way as to contribute to low or high performance. Although, the political economy paradigm by itself seems to have much influence on RET-performance.

Final remarks

In the last section of this thesis I would like to bring some nuance to this research and make recommendations for future research.

First, the outcome of the cs-QCA-analysis is very much depended on the type of data selected and the way this data is dichotomized. Some of the data may be poor proxies for what is meant to be measured. Researchers that apply cs-QCA go back and forth between ideas and evidence and repeatedly re-collect data and re-specify concepts. This process requires a lot of time. If public support for RES would be integrated in future research, one should not measure public support by means of public opinion polls, but one should try to capture this concept otherwise. Furthermore, conditions like political economy paradigm, population density, and the power of vested interests should be integrated in a new QCA to determine to what extent these factors correlate with performance (i.e. consistency) and to gauge their empirical relevance (coverage). More precise calibrations and new independent variables with high consistency and coverage may generate more useful solution formulas. Also, during future research one may adopt fuzzy-set QCA rather than crisp-set QCA. Fuzzy-set QCA allows for degrees of membership, thus differentiating between different levels of belonging anchored by two extreme membership scores at 1 and 0. Fuzzy-set QCA is more complex but this method is more desirable when concepts do not present themselves as pure dichotomies. It renders the empirical analysis less black-white and the results more reliable.

Second, although the quota-formula - allocating RES-share targets to the individual Member States - took account of a country's potential to develop renewable energy sources, the targets are not considered fair by all Member States (which was put forward during interview 1 and 2). Apparently, politics and lobby activities around the Renewable Energy Directive may have influenced the quota-allocation.

A third point concerns the selection of respondents, which was largely dependent on availability and willingness of actors to participate. In the end, the respondents covered a range of relevant institutional backgrounds, including research institutes and civil servants (see appendix C). However, some actors active in the energy transition refused to participate e.g. the Ministry of Economic Affairs (EZ), which bears the ultimate responsibility for the energy transition. However, this is standard for EZ due to the high number of interview requests by students and limited amount of resources. Obtaining information from Danish institutions and researchers was far more difficult than expected. Consequently, the number of interviews conducted with Dutch experts and Danish experts is not proportionate.

Finally, according to Duit (2014) there are two contrasting theoretical perspectives that can complement each other during case study research: a structural approach by looking at institutional constraints - as used for this thesis - and a process approach. Future research that would build further on this thesis may adopt the latter approach, using concepts such as policy framing, path dependency, and advocacy coalitions. It is always worth to explore determinants of environmental policy performance in different ways.

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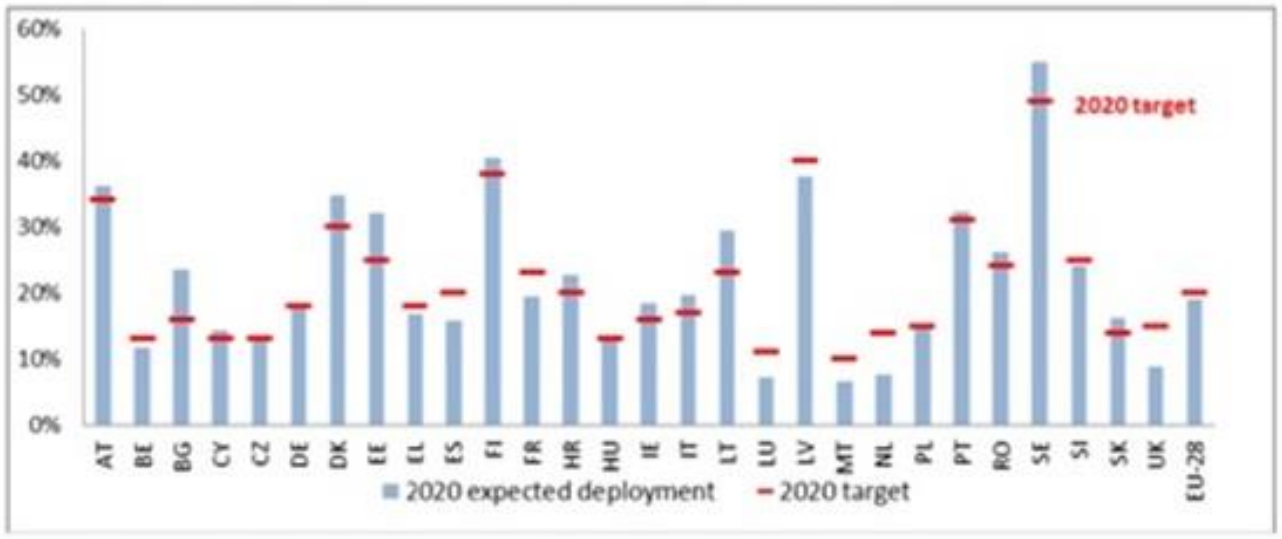
Appendices

Appendix A. Data collection on the dependent variable

Figure 2: Expected RES deployment in Member States and 2020 RES targets



Source: Commission renewable energy progress report 2015

Table 6: Overview of Member States' progress towards 2020 targets in renewable energy

	RES-all								Transport (with multipl. Counting)	
Member State	RES Share 2013	Average RES Share 2013/2014	RED indicative trajectory (2013/2014)	RES Share 2014	RES Share 2015 (proxy)	RED indicative trajectory (2015/2016)	projected RES Share 2020 (PRIMES Ref 2016)	RES 2020 target	RES-T shares 2014	RES-T shares 2015 (proxy)
	% final consumption								% final consumption	
AT	32.3%	32.7%	26.5%	33.1%	33.6%	28.1%	35.2%	34.0%	8.9%	8.3%
BE	7.5%	7.8%	5.4%	8.0%	7.3%	7.1%	13.9%	13.0%	4.9%	3.3%
BG	19.0%	18.5%	11.4%	18.0%	18.4%	12.4%	20.9%	16.0%	5.3%	5.3%
CY	8.1%	8.5%	5.9%	9.0%	9.1%	7.4%	14.8%	13.0%	2.7%	2.2%
CZ	12.4%	12.9%	8.2%	13.4%	13.6%	9.2%	13.5%	13.0%	6.1%	6.0%
DE	12.4%	13.1%	9.5%	13.8%	14.5%	11.3%	18.5%	18.0%	6.6%	6.4%
DK	27.3%	28.2%	20.9%	29.2%	30.6%	22.9%	33.8%	30.0%	5.8%	5.3%
EE	25.6%	26.0%	20.1%	26.5%	27.9%	21.2%	25.7%	25.0%	0.2%	0.2%
EL	15.0%	15.2%	10.2%	15.3%	15.5%	11.9%	18.4%	18.0%	1.4%	1.4%
ES	15.3%	15.8%	12.1%	16.2%	15.6%	13.8%	20.9%	20.0%	0.5%	0.5%
FR	14.0%	14.2%	14.1%	14.3%	14.5%	16.0%	23.5%	23.0%	7.8%	7.8%
FI	36.7%	37.7%	31.4%	38.7%	39.5%	32.8%	42.4%	38.0%	21.6%	22.0%
HR	28.1%	28.0%	14.8%	27.9%	27.5%	15.9%	21.1%	20.0%	2.1%	2.1%
HU	9.5%	9.5%	6.9%	9.5%	9.4%	8.2%	13.0%	13.0%	6.9%	6.7%
IE	7.7%	8.2%	7.0%	8.6%	9.0%	8.9%	15.5%	16.0%	5.2%	5.9%
IT	16.7%	16.9%	8.7%	17.1%	17.1%	10.5%	19.8%	17.0%	4.5%	4.7%
LT	23.0%	23.4%	17.4%	23.9%	24.3%	18.6%	24.0%	23.0%	4.2%	4.3%
LU	3.6%	4.1%	3.9%	4.5%	5.0%	5.4%	8.3%	11.0%	5.2%	5.9%
LV	37.1%	37.9%	34.8%	38.7%	39.2%	35.9%	40.3%	40.0%	3.2%	3.3%
MT	3.7%	4.2%	3.0%	4.7%	5.3%	4.5%	11.8%	10.0%	4.7%	5.0%
NL	4.8%	5.2%	5.9%	5.5%	6.0%	7.6%	13.0%	14.0%	5.7%	5.6%
PL	11.3%	11.4%	9.5%	11.4%	11.8%	10.7%	15.1%	15.0%	5.7%	5.9%
PT	25.7%	26.3%	23.7%	27.0%	27.8%	25.2%	33.4%	31.0%	3.4%	6.7%
RO	23.9%	24.4%	19.7%	24.9%	24.7%	20.6%	26.0%	24.0%	3.8%	3.9%
SE	52.0%	52.3%	42.6%	52.6%	54.1%	43.9%	56.2%	49.0%	19.2%	24.2%
SI	22.5%	22.2%	18.7%	21.9%	21.8%	20.1%	25.0%	25.0%	2.6%	2.6%
SK	10.1%	10.9%	8.9%	11.6%	11.9%	10.0%	14.3%	14.0%	6.9%	6.5%
UK	5.6%	6.3%	5.4%	7.0%	8.2%	7.5%	14.8%	15.0%	4.9%	4.2%
EU-28	15.0%	15.5%	12.1%	16.0%	16.4%	13.8%	21.0%	20.0%	5.9%	6.0%

Source: Commission renewable energy progress report 2017

Appendix B. Data collection on the independent variables

Table 7: Corporatist ranking by Siaroff

	Mean	Standard deviation	(N)	Lijphart/Crepaz score
Nations considered to be strongly corporatist:				
Austria	5.000	0.000	(23)	+1.600
Norway	4.864	0.351	(22)	+1.531
Sweden	4.674	0.556	(23)	+1.396
Nations considered to be moderately-to-strongly corporatist:				
Netherlands	4.000	0.989	(23)	+1.006
Denmark	3.545	0.999	(22)	+0.518
Germany (West)	3.543	0.940	(23)	+0.480
Nations considered to be moderately corporatist:				
Finland	3.295	1.043	(22)	+0.427
Belgium	2.841	0.793	(22)	+0.258
Nations considered to be weakly or only somewhat corporatist:				
Ireland	2.000	1.015	(18)	−0.528
New Zealand	1.955	0.907	(11)	−1.106
Australia	1.688	0.873	(16)	−1.025
UK	1.652	0.818	(23)	−0.862
Italy	1.477	0.748	(22)	−0.851
Nations considered to be not at all corporatist, but rather pluralist:				
Canada	1.150	0.489	(20)	−1.335
USA	1.150	0.489	(20)	−1.341
Nations classified too infrequently for an agreed placement:				
Luxembourg	3.000	0.000	(1)	n.d.
Iceland	3.000	0.000	(1)	n.d.
Israel	3.000	0.000	(1)	n.d.
Portugal	1.500	1.000	(4)	n.d.
Spain	1.250	0.500	(4)	n.d.
Greece	1.000	0.000	(2)	n.d.
Nations without agreement on placement or even on conceptualization:				
Switzerland	3.375	1.286	(20)	+0.505
Japan	2.912	1.603	(17)	+0.053
France	1.674	0.792	(23)	−0.725

Source: Siaroff (1999), p. 187[23]

[23] Although France is listed under the heading 'nations without agreement on placement or even on conceptualisation,' Siaroff (1999) mentions in his article that France is in fact not all that controversial: 'it has ... certain areas of sectoral corporatism (above all in agriculture); however, it is essentially pluralist' (p.183).

Table 8: Corporatist ranking by Liefferink, Arts, Kamstra & Ooijevaar

	Culture (dominant religion)		*Institutional structure*		
	Protestant	*Other*	*Neo-corporatist*	*Liberal-pluralist*	*Statist*
Austria		+	+		
Belgium		+	+		
Bulgaria		+			+
Denmark	+		+		
Finland	+		+		
France		+			+
Germany	+		+		
Greece		+			+
Hungary		+			+
Ireland		+		+	
Italy		+			+
Japan		+	+		
Mexico		+			+
Netherlands	+		+		
Norway	+		+		
Poland		+			+
Portugal		+			+
Romania		+			+
Slovakia		+			+
Spain		+			+
Sweden	+		+		
Switzerland	+		+		
UK	+			+	
USA	+			+	

Source: Liefferink, Arts, Kamstra & Ooijevaar (2009), p. 684

Table 9: Corporatist ranking by Jahn

Rank	Country	Mean	Minimum	Maximum	Standard deviation	Years covered	Number of years
1	Austria	2.06	1.61	2.38	0.20	1960–2010	51
2	Sweden	1.26	0.72	1.56	0.27	1960–2010	51
3	Belgium	1.21	0.72	1.57	0.20	1960–2010	51
4	Netherlands	1.08	0.58	1.65	0.30	1960–2010	51
5	Norway	1.03	0.37	1.92	0.34	1960–2010	51
6	Germany	1.01	0.91	1.25	0.11	1960–2010	51
7	Finland	0.99	−0.79	1.70	0.85	1960–2010	51
8	Slovenia	0.96	−0.07	1.61	0.63	1990–2010	21
9	South Africa	0.96	0.90	0.97	0.02	1994–2010	17
10	Denmark	0.68	0.08	0.99	0.23	1960–2010	51
11	Spain	0.59	0.06	1.08	0.32	1978–2010	33
12	Singapore	0.56	−0.08	0.92	0.35	1960–2010	51
13	Greece	0.43	0.09	0.61	0.15	1974–2010	37
14	Luxembourg	0.24	−0.44	0.73	0.46	1960–2010	51
15	Chile	0.13	−0.16	0.32	0.21	1989–2010	22
16	Israel	0.09	−0.81	2.05	0.92	1960–2010	51
17	Portugal	−0.02	−0.63	0.57	0.41	1976–2010	35
18	Slovakia	−0.09	−0.64	0.35	0.28	1990–2010	21
19	Italy	−0.11	−0.68	0.52	0.46	1960–2010	51
20	Switzerland	−0.20	−0.45	−0.04	0.17	1960–2010	51
21	Australia	−0.22	−1.21	1.02	0.64	1960–2010	51
22	France	−0.23	−0.42	−0.09	0.08	1960–2010	51
23	South Korea	−0.27	−0.59	0.33	0.28	1987–2010	24
24	India	−0.43	−0.51	−0.39	0.05	1960–2010	51
25	Ireland	−0.46	−1.57	0.99	0.91	1960–2010	51
26	Cyprus	−0.52	−0.57	−0.28	0.09	1990–2010	21
27	Brazil	−0.55	−0.55	−0.55	0.00	2000–2010	11
28	New Zealand	−0.55	−1.31	−0.06	0.41	1960–2010	51
29	Czech Rep.	−0.59	−0.95	−0.28	0.19	1990–2010	21
30	Bulgaria	−0.73	−0.97	−0.29	0.24	1992–2010	19
31	Romania	−0.76	−1.05	−0.16	0.29	1993–2010	18
32	Latvia	−0.80	−1.01	−0.25	0.24	1993–2010	18
33	Lithuania	−0.90	−1.31	−0.60	0.23	1993–2010	18
34	Mexico	−0.91	−0.91	−0.91	0.00	1997–2010	14
35	Hungary	−0.93	−1.61	−0.40	0.36	1990–2010	21
36	Japan	−1.03	−1.10	−0.90	0.05	1960–2010	51
37	Poland	−1.03	−1.31	−0.66	0.16	1990–2010	21
38	Estonia	−1.13	−1.65	−0.50	0.46	1991–2010	20
39	Malta	−1.21	−1.27	−1.20	0.02	1990–2010	21
40	U. Kingdom	−1.33	−1.80	−0.07	0.49	1960–2010	51
41	Canada	−1.55	−1.62	−1.41	0.06	1960–2010	51
42	United States	−1.65	−1.77	−1.50	0.10	1960–2010	51
	Total	0.00	−1.80	2.38	1.00	–	1555

Source: Jahn, D. (2010), p. 59

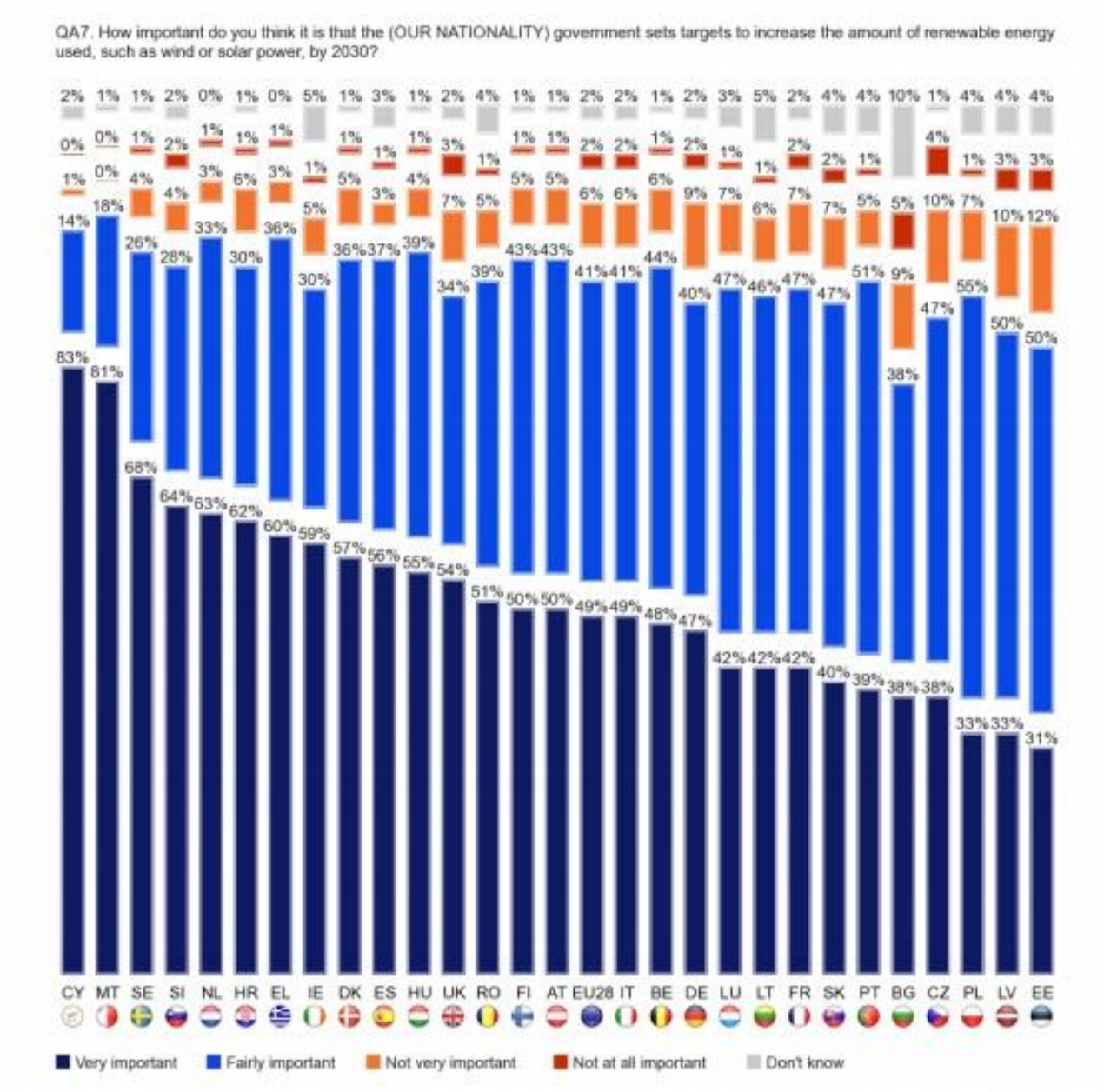
Table 10: Walti's multilevel governance index

Country	Percentage SO_x change 1985–1995	Percentage NO_x change 1985–1995	Federalism scale	Bicameralism scale	Fiscal decentralization	Fiscal interlocking	MLG index
Australia		–0.2	0.74	4.0	19.3	43	0.68
Austria	–5.9	–1.8	0.45	2.0	31.8	30	0.42
Belgium	–3.6	0.2	0.53	3.0	7.2	12	0.33
Canada	–1.3	–0.1	0.85	3.0	49.7	57	0.83
Denmark	–5.8	–1.4	0.28	1.0	29.8	44	0.35
Finland	–6.6	–0.2	0.23	1.0	29.0	40	0.31
France	–3.2	1.9	0.10	3.0	14.2	18	0.27
Germany	–8.3	–4.1	0.84	4.0	48.9	41	0.83
Greece	–0.1	1.1	0.13	1.0	3.4		0.01
Iceland	1.2	3.3	0.13	1.4	18.7	21	0.18
Ireland	1.4	3.8	0.10	2.0	5.7	23	0.17
Italy	–3.1	1.0	0.47	3.0	2.6	23	0.35
Japan	1.4	0.9	0.22	3.0	36.7		0.35
Luxembourg	–5.4	–0.8	0.13	1.0	9.2	17	0.08
Netherlands	–4.3	–2.0	0.17	3.0	3.2	25	0.27
Norway	–5.8	0.5	0.23	1.5	26.8	32	0.30
New Zealand	0.3	3.2	0.13	1.0	7.1	9	0.03
Portugal	0.9	4.1	0.13	1.0	2.4	8	0.01
Spain	–2.5	3.1	0.26	3.0	13.6	31	0.38
Sweden	–4.7	–1.9	0.13	1.0	36.1	37	0.30
Switzerland	–4.8	–2.3	0.97	4.0	59.6	50	0.96
United Kingdom	–4.2	–1.3	0.15	2.5	13.1	25	0.27
United States	–1.0	0.0	0.97	4.0	43.4	44	0.86
Mean	–3.0	0.3	0.36	2.3	22.2	30	0.37
Standard deviation	2.9	2.2	0.30	1.1	17.3	14	0.28
N	22	23	23	23	23	21	23

Note: sources and computation are reported throughout the text.

Source: Walti (2004), p. 29

Figure 3: Public opinion on renewable energy targets



Source: Special Eurobarometer Survey 409 (published March 2014, fieldwork November-December 2013)

Appendix C. Overview of interviews conducted

Interview 1: Karina Veum,[24]ECN (Energieonderzoek Centrum Nederland), May 2, 2017.

Interview 2: Laurens de Vries,[25] TU Delft, May 3, 2017.

Interview 3: Hans Schouffoer,[26] Provincie Zuid-Holland, May 17, 2017.

Interview 4: Julian Blohmke,[27] former researcher at ICIS, May 18, 2017

[24] Karina Veum works as Senior Researcher at ECN Policy Studies. She holds a MSc in Economics from the University of Oslo. She has over ten years experience in developing renewable energy policy and measures both at EU level and for the Norwegian government. Her work at ECN mainly focuses on renewable energy policy issues. She specializes in renewable energy support schemes, off-shore wind energy development as well as issues related to large scale integration of renewable energy into the electricity market (http:// northseagrid.info/team/karina-veum).

[25] Laurens de Vries is an Associate Professor at the Faculty of Technology, Policy and Management of Delft University of Technology. He performs research and teaches in the field of electricity market design, analyzing the mutual relationships between the physical infrastructure and its (economic) organization and regulation. He focuses on the relationships between regulation and investment, in particular on how the various policy instruments for CO2 emission reduction, renewable energy, security of supply and network congestion management affect the transition path to a low-carbon energy system. Dr. De Vries has a M.Sc. in Mechanical Engineering from Delft University of Technology and an M.A. in Environmental Studies from The Evergreen State College and he obtained his Ph.D. Degree from the Faculty of Technology, Policy and Management of Delft University of Technology (http://www.tbm.tudelft.nl/index.php?id=31992&L=0).

[26] Hans Schouffoer is a strategic advisor concerning renewable energy transition for the provincial government Zuid-Holland. Since April 2016 he and his team strive to realise a clean, affordable and durable energy supply in the province of Zuid-Holland (https:// nl.linkedin.com/in/hansschouffoer).

[27] Julian Blohmke is a trained economist and has worked as a researcher at the International Centre for Integrated assessment and Sustainable development (ICIS) in Maastricht. His research interests are transition theory, green growth and social institutions. He is currently involved in renewable energy infrastructure projects; notably the Desertec Industrial Initiative.

Interview 5: Pier Stapersma,[28] Clingendael International Energy Programme, May 26, 2017.

Interview 6: Carsten Chachah[29], Dansk Energi, June 13, 2017

[28] Pier Stapersma is a senior researcher at the Clingendael International Energy Programme (CIEP). The objective of the CIEP to gather and develop information and knowledge about international political and economic developments in the energy sector on the basis of research as well as to serve as an independent forum for governments, non-governmental organisations and the business community (http://www.clingendaelenergy.com/about_us/staff/member/pier-stapersma).

[29] Carsten Chachah is a senior consultant for Energi Dansk, a non commercial lobby organisation for Danish energy companies (http://www.danishenergyassociation.com).

Appendix D: cs-QCA results

Explaining the occurrence of Y

The cs-QCA software yields the the following results:

****

TRUTH TABLE ANALYSIS

****

File: F:/IMP BLOCK 2/fsQCA/uitkomst QCA.dat

Model: p = f(n, m, l, f, e)

Rows: 12

Algorithm: Quine-McCluskey

True: 1

--- COMPLEX SOLUTION ---

frequency cutoff: 1.000000

consistency cutoff: 1.000000

	raw coverage	unique coverage	consistency
n*~m*~l*f	0.222222	0.111111	1.000000
n*m*l*~e	0.333333	0.222222	1.000000
m*l*f*~e	0.222222	0.111111	1.000000
~n*~m*~l*~f*~e	0.111111	0.111111	1.000000

n*~m*f*~e 0.222222 0.000000 1.000000

n*l*f*~e 0.222222 0.000000 1.000000

solution coverage: 0.888889

solution consistency: 1.000000

****

TRUTH TABLE ANALYSIS

****

File: F:/IMP BLOCK 2/fsQCA/uitkomst QCA.dat

Model: p = f(n, m, l, f, e)

Rows: 12

Algorithm: Quine-McCluskey

True: 1-L

--- PARSIMONIOUS SOLUTION ---

frequency cutoff: 1.000000

consistency cutoff: 1.000000

	raw coverage	unique coverage	consistency
m	0.444444	0.222222	1.000000
~l*~f	0.111111	0.111111	1.000000
n*~l	0.222222	0.111111	1.000000
n*f*~e	0.333333	0.000000	1.000000
l*f*~e	0.333333	0.000000	1.000000

solution coverage: 0.888889

solution consistency: 1.000000

****

TRUTH TABLE ANALYSIS

****

File: F:/IMP BLOCK 2/fsQCA/uitkomst QCA.dat

Model: p = f(e, f, l, m, n)

Rows: 30

Algorithm: Quine-McCluskey

True: 1

0 Matrix: 0L

Don't Care: -

--- INTERMEDIATE SOLUTION ---

frequency cutoff: 1.000000

consistency cutoff: 1.000000

Assumptions:

e (present)

f (present)

l (present)

m (present)

n (present)

	raw coverage	unique coverage	consistency
~f*~l	0.111111	0.111111	1.000000
~l*n	0.222222	0.111111	1.000000

m*n 0.333333 0.222222 1.000000

~e*f*n 0.333333 0.111111 1.000000

f*l*m 0.222222 0.111111 1.000000

solution coverage: 0.888889

solution consistency: 1.000000

Explaining the lack (absence) of performance

****

TRUTH TABLE ANALYSIS

****

File: F:/IMP BLOCK 2/fsQCA/tabel 14 cases.dat

Model: ~p = f(n, m, l, f, e)

Rows: 12

Algorithm: Quine-McCluskey

True: 1

--- COMPLEX SOLUTION ---

frequency cutoff: 1.000000

consistency cutoff: 1.000000

	raw coverage	unique coverage	consistency
~m*l*~f*~e	0.400000	0.400000	1.000000
~n*~m*~l*f	0.400000	0.400000	1.000000

solution coverage: 0.800000

solution consistency: 1.000000

****

TRUTH TABLE ANALYSIS

****

File: F:/IMP BLOCK 2/fsQCA/tabel 14 cases.dat

Model: ~p = f(n, m, l, f, e)

Rows: 12

Algorithm: Quine-McCluskey

True: 1-L

--- PARSIMONIOUS SOLUTION ---

frequency cutoff: 1.000000

consistency cutoff: 1.000000

	raw coverage	unique coverage	consistency
~m*l*~f	0.400000	0.400000	1.000000
~n*~l*f	0.400000	0.000000	1.000000
~n*~m*f	0.400000	0.000000	1.000000

solution coverage: 0.800000

solution consistency: 1.000000

****

TRUTH TABLE ANALYSIS

****

File: F:/IMP BLOCK 2/fsQCA/tabel 14 cases.dat

Model: ~p = f(e, f, l, m, n)

Rows: 6

Algorithm: Quine-McCluskey

True: 1

0 Matrix: 0L

Don't Care: -

--- INTERMEDIATE SOLUTION ---

frequency cutoff: 1.000000

consistency cutoff: 1.000000

Assumptions:

~e (absent)

~f (absent)

~l (absent)

~m (absent)

~n (absent)

	raw coverage	unique coverage	consistency
f*~l*~m*~n	0.400000	0.400000	1.000000
~e*~f*l*~m	0.400000	0.400000	1.000000

solution coverage: 0.800000

solution consistency: 1.000000

Appendix E: The relative importance of vested interests

the Netherlands:

The Dutch government earns revenues from gas extraction via royalties and licence fees paid in return for concession rights, as well as corporation tax. In addition, the state-owned company EBN maintains a stake in all extraction activities. The government therefore also receives revenues from dividend payments made by EBN.) In 2011 the government received €8 billion in revenue from 'income from land and subsoil assets' (which correspond to royalties and licence fees), €1.6 billion from corporation taxes and just over €2 billion from dividend payments. Total annual revenues were slightly less than €12 billion (NERA, 2014, p. 68).

Denmark:

In the case of Denmark, in 2011 total government revenues from oil and gas extraction were €4 billion, split between corporation tax (€1.3 billion), hydrocarbon tax (€1.3 billion), royalties (€0.1 million), Oil Pipeline Tariff (€0.3 billion); and profit sharing (€1.2 billion). These data were collected from annual publications on the sector by the Danish Energy Ministry (NERA, 2014, p. 69).

United Kingdom:

In 2011 government revenues from the Petroleum Revenue Tax were €2.3 billion, and revenues from corporation taxes were €10.6 billion, resulting in total UK government revenues of almost €13 billion (NERA, 2014, p. 67).

Germany:

NERA estimates a €3.2 billion in government revenue to Germany that arises from oil and gas production. Germany is also the largest coal producer in Europe. However, according to the OECD inventory, hard coal production in Germany is "uneconomic" and the costs of producing coal are well above the price of imports. As such the ownership of hard coal mines has been transferred to a holding company which is heavily supported by the state. Given that hard coal is loss-making, it is assumed that there are no government revenues from this activity in Germany in the form of corporation tax, royalties or licence fees for extraction (NERA, 2014, p. 70)

*Of course, apart from the revenue that stem from these fossil fuel endowments, there are also many jobs (in)directly connected to the fossil fuel industry. However, it is difficult to find accurate data on this.