Local ownership: Does It Matter?

A Cross-Case Institutional Analysis of 14 Onshore Wind Farms in the Netherlands

MSc SET Thesis

J.S. Brouwer

Delft University of Technology

Local ownership: Does It Matter?

A Cross-Case Institutional Analysis of 14 Onshore Wind Farms in the Netherlands

by

J.S. Brouwer

to obtain the degree of Master of Science
at the Delft University of Technology,
to be defended publicly on **November 7, 2023**

Student number:	4474252	
Project duration:	December, 2022 – November, 2023	
Thesis committee:	Dr. T. Hoppe,	TU Delft, Chair
	Dr. Ir. R. van Bergem,	TU Delft, First Supervisor
	Dr. S. Renes,	TU Delft, Second Supervisor
	Dr. L. Kamp,	TU Delft, Supervisor from Greenlist

Cover: Noordoostpolder-windmolenpark Westermeerdijk 2015 (Photo by A.E. van Kooten)

TU Delft

Executive Summary

Wind energy has gained significant importance in the sustainable energy transition (IRENA, 2021). This is especially evident in the Netherlands, where policies have been incorporated to accelerate its adoption. Commercial Wind Energy Project Developers (CWEPDs), driven by profit, have traditionally contributed to this sector bringing with them professionalism and industry expertise. On the other hand, Local Energy Cooperatives (LECs), often driven by volunteers with the aim to promote local renewable energy initiatives, were established in the 1980s but saw significant growth in the last decade (HIER and Energie Samen, 2023). The Dutch Klimaatakkoord proposed that 50% of renewable electricity production would be community-owned, aiming to enhance collaboration and ensure project success. The proposed model suggests that local communities should ideally own half of renewable projects, giving both residents and businesses a substantial stake. This model is a guideline, but can be adapted to fit the specific needs of each project. Despite these guidelines, the real-world execution of community involvement and local ownership is not well-defined (NP RES, 2021). Questions remain about understanding the influential factors for collaboration and optimal organisational configurations.

Previous studies have utilised the Institutional Analysis and Development (IAD) framework to explore the importance of informal rules in guiding decision-making processes. This framework facilitates the study of institutional conditions, often referred to as ”rules-in-use”, that stakeholders operate within (Graaff, 2018; Klok, Kirkels, & Alkemade, 2023; Lammers & Hoppe, 2019; Nabielek, 2020). However the interplay between organisational structures, like LECs and CWEPDs, and the institutional conditions remains less examined. Particularly in the context of quantitative research, the influence of these factors on project outcomes remained under explored. In examining the dynamics of interactions across multiple cases, we can better understand how norms and informal rules influence stakeholder perceptions, including those of local residents, governmental entities, and project developers. Filling this research gap can streamline future energy projects, ensuring they resonate with all stakeholders' expectations and concerns. This forms the basis for the main research question:

”How do institutional conditions differentiate between LECs and CWEPDs in shaping trajectories and outcomes of selected onshore wind farm projects in the Netherlands?”

To address the research question, a multi-case study design with 14 cases in Dutch onshore wind energy planning and development was employed. The study emphasised differences between organisation forms, specifically CWEPDs and LECs, in terms of institutional conditions and their effects on outcome variables, like project duration and public objections. The IAD framework provided the theoretical backdrop, guiding the individual analysis of each case for two distinct key phases: from project inception to permit application, and from permit application to construction start. Information was sourced from 29 stakeholder interviews and various written sources. Qualitative coding structured the analysis. A scoring system, based on the 'rules-in-use', was designed to enable cross-case examination. Finally, statistical testing and QCA identified correlations and condition combinations affecting outcomes. The integration of quantitative and qualitative data provided a comprehensive understanding of the institutional dynamics. The primary findings of this research were:

1. Comparative Analysis: LECs vs. CWEPDs

- LEC-involved projects completed projects 33.3% faster than CWEPDs and faced fewer views on permit applications. Especially notable were LECs' shorter durations from permit application to construction phase.
- While shorter durations were most common for LECs-involved projects. In certain CWEPDs this was observed as well, albeit substantial less often.
- LECs typically exhibited transparent information sharing, equitable financial distribution, and centralised decision-making.

- A relationship was observed between higher LEC ownership percentages, fewer views on permit applications, and overall shorter development processes.
- LECs consistently engaged stakeholders, ensuring equitable compensation and inclusivity. In contrast, CWEPDs at times showed a lack of transparency and inclusivity.
- Trust played a vital role, with LECs generally building more community trust than CWEPDs.

2. Influence of Individual Institutional Conditions

- Projects that disseminated information transparently were completed faster, encountered fewer views on permit applications and reduced appeals to the council of state.
- Equitable and transparent benefit-cost distributions correlated with faster project completions and fewer appeals to the council of state.
- Projects defined by clear roles were less prone to delays.
- Inclusive and open decision-making typically correlated with shorter project durations.
- Collaborative decision-making projects were completed faster and faced fewer views during permit applications.
- Projects that adhered to flexible decision-making processes often achieved faster completions.
- Projects that allowed flexible outcomes transitioned faster from idea to permit application.

3. Interplay of Organisational Form and Institutional Conditions

- Organisational forms, especially LECs, when combined with transparent information and equitable benefits, lead to diminished project durations in approximately 75% of the examined cases.
- Some CWEPDs showed transparent information dissemination. As a result, they achieved shorter durations, though less frequently than projects involving LECs.
- The importance of transparent information dissemination was evident across all projects.
- Collaborative decision-making lead to shorter overall project durations, especially when complemented by open information dissemination.
- The impact of flexible outcomes was variable when considered with other factors.

While prior research focused on institutional conditions using the IAD framework only, this study introduced a novel scoring system that quantitatively evaluated these factors. This mechanism allowed for systematic comparisons using statistical tests and QCA. Overall, the research offered insights beneficial to policymakers and project developers, emphasizing the influence of institutional conditions on wind energy development and broader spatial planning challenges.

Reflecting on the study, several improvements were recommended. More case studies, including unsuccessful ones, were suggested for a fuller understanding of influential factors. A larger data set was recognised to enhance the credibility of results and allow for more conditions to be tested with QCA. Moreover, the exploration of alternative scoring systems, compared with this study, could validate the findings and suggest refinements.

Preface

Before you lies the thesis titled; Local ownership: Does It Matter? This thesis has been written to fulfil the graduation requirements of the Master's program in Sustainable Energy Technology (SET) at the Delft University of Technology. The research was conducted over a span of ten months, from December 2022 to November 2023, at the Faculty of Technology, Policy, and Management. Specifically, it was undertaken within the Department of Values, Technology, and Innovation, under the section: Economics of Technology and Innovation.

I would like to thank my thesis committee for helping me realise this thesis. A special thank you to my daily supervisor Rutger van Bergem. Your guidance was indispensable throughout this journey. The deep philosophical discussions we had often led to the formation of hypotheses, with a strong desire to understand the underlying causes. Your mix of understanding and expertise shaped our discussions and while they sometimes veered from the main topic, they consistently renewed my enthusiasm for the research. Secondly, I would like to thank Sander Renes for his indispensable feedback and counsel, especially regarding the data-driven facets of this thesis. Your expertise lead to valuable insights, and your straightforward approach ensured constructive advice, minimising needless discussions and maximising productivity. Thirdly, I would like to thank Thomas Hoppe. Your feedback has been a guiding factor and your skills in statistical and comparative analyses provided essential insights. Following our meetings, I consistently had clearer direction, though often more work to tackle. Furthermore, I would like to thank Linda Kamp for providing crucial feedback and advice on this thesis and ensuring adherence to the formal requirements necessary for its completion. I would like to acknowledge the four bachelor students from the TB351D Bachelor Eindproject course for their contributions to this research. Collaborating with them on certain segments and integrating their findings was a fruitful experience.

Lastly, I wish to express my gratitude to all those interviewed for this research. Your generosity in sharing your time and information was pivotal. Without your contributions, this research would not have been possible.

J.S. Brouwer
Delft, October 2023

Contents

List of Figures

List of Tables

Nomenclature

Terminology and Definitions Adopted

Note: The following terms, while not always conventionally translated this way, have been adopted for the purposes of these case studies for clarity and consistency.

English	Dutch	Definition
Administrative Court	Bestuursrechter	A court specialized in handling cases of administrative law where individuals or entities challenge decisions made by governmental bodies.
Advisory Group	Klankbordgroep	A committee or group formed to provide guidance, feedback, or expert advice on specific topics or projects.
Appeal	Beroep	A formal request to a higher court to review and change the decision of a lower court or administrative decision.
Commercial Developers	Commerciële Projectontwikkelaars	In this research report, the term ”commercial developers” refers to private, commercial, non-cooperative wind energy firms.
Community benefit fund	Gebiedsfonds	A community benefit fund, fueled by profits from the wind energy project, is dedicated to supporting energy-saving initiatives and enhancing the quality of life within the surrounding area.
Cooperatives	Coöperaties	In this research report, the term ”cooperatives” refers to collectively owned and democratically controlled enterprises or organizations where members participate in the decision-making process and share the benefits.
Council of State	Raad van State	A key advisory body to the Dutch government and the highest court for administrative law cases in the Netherlands.
Crisis and Recovery Act	Crisis- en Herstelwet	Legislation aimed at accelerating infrastructure projects and promoting economic recovery.
Dutch Climate Agreement	Nederlands Klimaatakkoord	An agreement in the Netherlands outlining measures to combat climate change and achieve sustainability targets.
Electricity Act	Elektriciteitswet	Legislation governing the generation, distribution, and consumption of electricity in the Netherlands.
Energy Agreement for Sustainable Growth	Energieakkoord voor Duurzame Groei	A consensus-based agreement aiming to increase sustainability and ensure long-term energy security in the Netherlands.

Local Energy Cooperative	Energiecoöperatie	A community-led initiative where members collaborate to produce and consume renewable energy, often with the goal of local sustainability and self-reliance.
Environmental Impact Assessments	Milieueffectrapportage (MER)	A process to evaluate the potential environmental impacts of a proposed project.
General Rules on Spatial Planning Decision	Besluit algemene regels ruimtelijke ordening (Barro)	Regulations detailing general rules for spatial planning in the Netherlands.
Local Community	Lokale Gemeenschap	Refers to the inhabitants of a specific locality or region, including citizens, agricultural landowners, businesses, and other organizations.
Local Council	Gemeenteraad	The legislative body representing the residents of a municipality, responsible for making local decisions and policies.
Ministerial Regulation	Rarro	A ministerial regulation specific to the Dutch administrative framework.
Municipality	Gemeente	A city or town with its own local government, or the local government itself.
National Coordination Scheme	Rijkscoördinatieregeling (RCR)	A scheme to coordinate national initiatives and ensure their alignment with strategic objectives.
National Integration Plan	Rijksinpassingsplan	A plan detailing the integration of national-level projects and initiatives.
Objections	Bezwaren	Formal expressions of disagreement or opposition to an administrative decision.
Principle Request	Principeverzoek	A preliminary request or proposal often submitted for early feedback or to gauge feasibility.
Provinces Integration Plan	Provinciaal Inpassingsplan	A strategic plan outlining the integration of various provincial initiatives and projects.
Provincial Executive	Gedeputeerde Staten	The executive branch of a province in the Netherlands, responsible for the daily administration of provincial affairs.
Provincial Spatial Regulations	Provinciale Ruimtelijke Verordening (PRV)	Regulations set by provinces in the Netherlands to manage and regulate spatial developments within their jurisdictions.
Regional Energy Strategy	Regionale Energiestrategie (RES)	A localized strategy outlining energy transition initiatives specific to a particular region in the Netherlands.
Spatial Planning Act	Wet Ruimtelijke Ordening (Wro)	Legislation governing spatial planning and land use in the Netherlands.
Structural Vision	Structuurvisie or Omgevingsvisie	A strategic policy document outlining the spatial planning objectives for a specific region or the entire country.
Structural Vision Wind Energy on Land	Structuurvisie Windenergie op Land (SVWoL)	A strategic policy document detailing the Dutch government's vision for wind energy on land.

Views	Zienswijzen	Opinions or perspectives expressed, especially during the public consultation phase of a project or initiative.
Zoning Plan	Bestemmingsplan	A document detailing the permissible use of land in specific areas of a municipality.

Abbreviations

Abbreviation	Definition
BEP	Bachelors End Project
CBS	Centraal Bureau voor de Statistiek (Statistics Netherlands)
CCUS	Carbon Capture Utilization and Storage
CPR	Common Property Regime
CPT	Causal Process Tracing
CWEPD	Commercial Wind Energy Project Developer
fsQCA	Fuzzy-set Qualitative Comparative Analysis
IAD	Institutional Analysis and Development
LEC	Local Energy Cooperative
LEI	Local Energy Initiatives
NIMBY	Not-In-My-Back-Yard
PIMBY	Please-In-My-Back-Yard
PRISMA	Preferred Reporting Items for Systematic reviews and Meta-Analyses
QCA	Qualitative Comparative Analysis
REScoop	Renewable Energy Sources Cooperative
SES	Social-Ecological Systems
SPSS	Statistical Package for the Social Sciences
STDEV	Standard Deviation

Symbols

Symbol	Definition	Unit
MWh	Mega watt hour	[MWh]
TWh	Terra watt hour	[TWh]
GW	Giga watt	[GW]
MW	Mega watt	[MW]
$p-value$	Probability of observing the given result	[-]

1 Introduction

The global push towards sustainable transitions highlights the need to comprehend the roles, perceptions, and reactions of participants. During the 1970s, wind energy began to gain recognition as a viable renewable energy alternative accelerated by oil shortages and the subsequent global energy crisis. This was further magnified by the Club of Rome's report, which emphasised potential limitations in conventional energy sources (Kamp, 2004). Consequently, the pressing need to identify sustainable alternatives brought wind energy to the forefront. Countries, notably in the Western hemisphere such as the Netherlands, were swift to acknowledge wind energy's potential. By the late 1970s, the Dutch policy landscape began to favor wind energy's growth, positioning it as a promising substitute to traditional energy forms. Internationally, the energy challenges of the 1970s and 1980s catalysed a re-evaluation of fossil fuel reliance (IRENA, 2021).

The following years marked the rise of Local Energy Cooperatives (LECs) in Western-European regions. By the convergence of the 1980s and 1990s, the Netherlands witnessed a considerable growth of such cooperatives, predominantly in the form of wind energy foundations and cooperatives. These organisations, influenced by a blend of anti-nuclear views and environmental awareness, typically managed one or more community-owned wind turbines (Warbroek & Hoppe, 2017). Post this movement, there was an emergence of a newer version of LECs. These organisations expanded their focus on diverse sustainability goals, including local renewable energy initiatives, energy conservation, and the promotion of energy-efficient technologies (Warbroek & Hoppe, 2017). These LECs, primarily driven by community members, including retirees and volunteers, have seen significant growth. Notably, after 2010, LECs witnessed a surge, with the number of energy cooperatives rising from just over 20 in 2011 to 705 by 2022 (HIER and Energie Samen, 2023).

The European-acknowledged term under which LECs fall is REScoop (Renewable Energy Sources Cooperative). Though not necessarily holding a legal cooperative status, REScoops operate based on seven guiding principles outlined by the International Cooperative Alliance (REScoop.eu, 2023). These principles encapsulate various facets such as voluntary membership, democratic control, economic participation, autonomy, education, inter-cooperative cooperation, and community concern. Once part of a REScoop, members typically have access to electricity at reasonable rates and can share in the profits. Moreover, they play an active role in determining the cooperative's investment directions. It is essential to note that while the terms ”REScoop” and ”LEC” can be used interchangeably, this research favors the use of ”LEC” due to its legal statue (REScoop.eu, 2023).

In contrast to LECs, Commercial Wind Energy Project Developers (CWEPDs) operate within the ambit of commercial variant of wind energy development. CWEPDs have traditionally been at the forefront of wind turbine development, often backed by sizeable, sometimes international, investors. Over the years, CWEPDs have worked efficiently to increase the scale of wind energy. However, more recently, some challenges have emerged. One notable area of concern has been around the transparency of their operations (Bohlmeijer, 2022). While financial details might be available from sources like the Chamber of Commerce, the presence of foreign investments in their portfolios can make the full picture more complex to understand. LECs and CWEPDs represent two distinct facets of wind energy development. But as the energy landscape continues to evolve, these developments highlight the importance of understanding all players in the field and the roles they play (Bohlmeijer, 2022).

1.1. Problem Definition

As noted, wind energy has emerged as a viable sustainable energy solution. In 2013, the Netherlands embarked on an ambitious path with the Energy Agreement for Sustainable Growth, targeting 6 GW of onshore wind energy by 2020. However, by the end of 2019, the realised capacity stood at 59% of the target (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013a). Following this, the Dutch Climate Agreement further set the goal of producing 35 terawatt-hours of renewable electricity on land by 2030 (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). Beside the countries' emphasis on wind energy, the public sentiment is also favourable. Approximately 70% of Dutch citizens favor the establishment of new wind turbines in the country, while 14% oppose (Kloosterman et al., 2021). In the backdrop of these targets, an intriguing observation arises: while there appears to be widespread public backing for wind energy, specific projects may face resistance. This situation, often referred to as the NIMBY syndrome (Not-In-My-Back-Yard), presents a nuanced picture of support and resistance (Wolsink, 2000). Further complicating the energy transition landscape is the issue of land acquisition, which has led to activities such as land speculation (Bohlmeijer, 2022). Existing theoretical frameworks, such as game theory and social dilemma theory, have attempted to explain this, but they appear to address only a segment of the issue (Wolsink, 2000).

In light of these complexities and challenges, policy responses have aimed at addressing the core issues and fostering a more inclusive approach. The Dutch Climate Agreement, known as the Klimaatakkoord, accentuates the significance of community participation in renewable energy ventures (HIER, 2019; Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). It introduces an aspiration wherein 50% of the ownership of renewable electricity production on land rests with the local community. This entails that both citizens and local enterprises should ideally hold half the ownership. The underlying rationale of this aspiration is that shared ownership can bolster collaboration, dedication, and a profound interest in the project's success. Such an ownership model also enables the local community to exert influence over the project's direction and its financial undertakings. This equitable distribution is not strictly a regulatory requirement but rather a guiding principle and can be adapted to fit the specific needs of each project. However, despite these guidelines, the real-world execution of community involvement and local ownership is not well-defined (NP RES, 2021). Questions remain about understanding the influential factors for collaboration and optimal organisational configurations.

1.2. Research Gap

Given the multifaceted nature of the energy transition, collaboration among stakeholders becomes essential. However, current frameworks offer limited guidance on the factors driving these collaborations, leaving room for questions about stakeholder intentions, capabilities, and roles (NP RES, 2021). The Institutional Analysis and Development (IAD) framework, offers a lens to explore these dynamics in play. Historically linked to common pool resource governance, its application to the energy sector is gaining traction (A. Koster & Anderies, 2013; Lammers & Hoppe, 2019; Milchram, Märker, Schlör, Künneke, & van de Kaa, 2019; Newell, Sandström, & Söderholm, 2017). Ostrom's insights into 'rules-in-use' emphasise the importance of informal rules in guiding decision-making processes related to common-pool resources (Mcginnis & Ostrom, 2014; McGinnis, 2011; Ostrom, Gardner, & Walker, 1994). In the context of this study, wind energy is perceived as such a resource, where informal norms play crucial roles in its governance and utilisation. While previous research has investigated several aspects of these dynamics, the relationship between organisational structures and institutional dynamics and how they influence project outcomes remains underexplored (Graaff, 2018; Klok et al., 2023; Lammers & Hoppe, 2019; Nabielek, 2020). A deeper understanding of this interplay could hold significant value for the broader energy community. Grasping the influencing factors and the underlying dynamics can offer stakeholders valuable insights. The outcome of this study can potentially streamline future energy projects, ensuring more efficient and community-accepted outcomes.

1.3. Research Scope and Questions

This research employs a methodological approach based on case studies and integrates both qualitative and quantitative methodologies. Fourteen cases are included for examination. First, each case is analysed individually, focusing on their institutional conditions with reference to the IAD framework. Once each case is assessed individually, a comparative analysis follows, aiming to understand patterns, variations, and common themes across the cases. Statistical tests are used to identify correlations and the Qualitative Comparative Analysis (QCA) method is utilised to discern patterns in medium-sized data sets (Ragin, 2008). Given the study's emphasis on within- and cross-case analysis, the integrated use of qualitative and quantitative research methods is expected to provide a comprehensive and detailed evaluation of the selected cases. Central to this research lies the main research question:

"How do institutional rules vary between LECs and CWEPDs in shaping the trajectories and outcomes of wind farm planning and development in selected Dutch onshore wind farm projects?"

To dissect this overarching query, the following sub-questions are posited:

SQ 1. *What are the factors, encompassing biophysical constraints, community attributes, and both formal and informal rules, that delineate the trajectory of wind farm planning and development for LECs and CWEPDs?*

SQ 2. *How do the institutional conditions of LECs and CWEPDs vary in influencing the trajectory of wind farm planning and development in selected Dutch onshore wind farm projects*

SQ 3. *How do the institutional conditions of LECs and CWEPDs vary in influencing the outcome of wind farm planning and development in selected Dutch onshore wind farm projects*

SQ 4. *What combination of institutional conditions coupled with the LEC or CWEPD form contribute to variations in wind farm planning and development in selected Dutch onshore wind farm projects?*

The first research question seeks to delineate the Dutch wind energy environment and emphasises the attributes and operational methods of LECs and CWEPDs. By doing so, this question serves as a foundational element for the following research questions.

The second sub-question delves into individual cases to analyse the institutional variations during planning and development. Grounded in scholarly literature and expert perspectives, this investigation is based on the idea that LECs and CWEPDs have differing informal rule applications. Utilising the IAD framework, this question aims to ascertain how these distinct organisational structures shape the institutional rules under which they operate.

Implementing findings from the second research question, the third research question aims to contrast and compare the results. Its primary objective is to recognise the institutional factors leading to variations in outcomes, notable project duration's and community objection. This question leverages statistical methodologies to evaluate how these institutional elements influence project results.

The fourth question aims to comprehend how specific combinations of institutional conditions, coupled with organisational structures, affect project outcomes. The goal is to provide a comprehensive understanding of the interplay between institutional conditions and organisational forms in shaping wind energy development projects. To achieve this, the Qualitative Comparative Analysis method is employed to discern the causal combinations between institutional and organisational conditions.

1.4. Relation to MSc Sustainable Energy Technology

The Master's program in Sustainable Energy Technology (MSc SET) examines the intersections of technical considerations, socio-technological aspects, and regulatory elements in the development and application of sustainable energy technologies. The master study aims to address the evolving energy requirements of societies while considering the environmental implications associated with greenhouse gas emissions. One significant focus is the movement away from fossil fuels towards more sustainable energy sources, a change that requires adaptation within the prevailing energy infrastructure. This research is positioned to offer insights into certain elements of sustainable energy initiatives, specifically highlighting institutional factors that could play a role in the development of renewable energy projects.

From an academic perspective, this research provides an institutional examination of wind energy projects, guided by the IAD framework and inspired by Ostrom's contributions. The goal is to pinpoint institutional factors influencing variances in project outcomes. Utilising statistical tests and the QCA method, this study seeks to establish correlations and uncover patterns across the selected cases. The findings aim to serve as a valuable asset for diverse stakeholders in the energy sector, providing insights to streamline upcoming wind energy project. In doing so, the research aligns with the objectives of the MSc SET program of understanding and advancing the sustainable energy transition.

1.5. Outline of the Thesis

This study is organised into three phases: initiation, development, and culmination, structured across eight chapters (Arab, 2022). In the "Initiation Phase", Chapters 2 and 3 are presented. Chapter 2 introduces the literature and the theoretical framework. Chapter 3 details the research design and the chosen methods. The "Development Phase" encompasses Chapters 4, 5, 6 and 7. Data is gathered from interviews and sources including academic articles and publicly available documents. Following data collection, qualitative coding and process tracing are applied for analysis. Chapter 4 explores the contextual landscape, aligning with the first sub-question. Chapter 5, utilising the IAD framework, addresses the second sub-question. Chapter 6 provides a quantitative analysis of the data, addressing patterns and contrasts between the two entities, corresponding to the third sub-question. Chapter 7 conducts a comparative analysis addressing the fourth sub-question. The "Culmination Phase" includes Chapters 8. This chapter summarises the research findings and acknowledges the study's limitations while also suggesting future research directions. The Research Flow Diagram, depicted in figure 1.1, offers a visual representation of the study's progression. Supplementary sections provide a bibliography, interview transcripts, and additional materials.

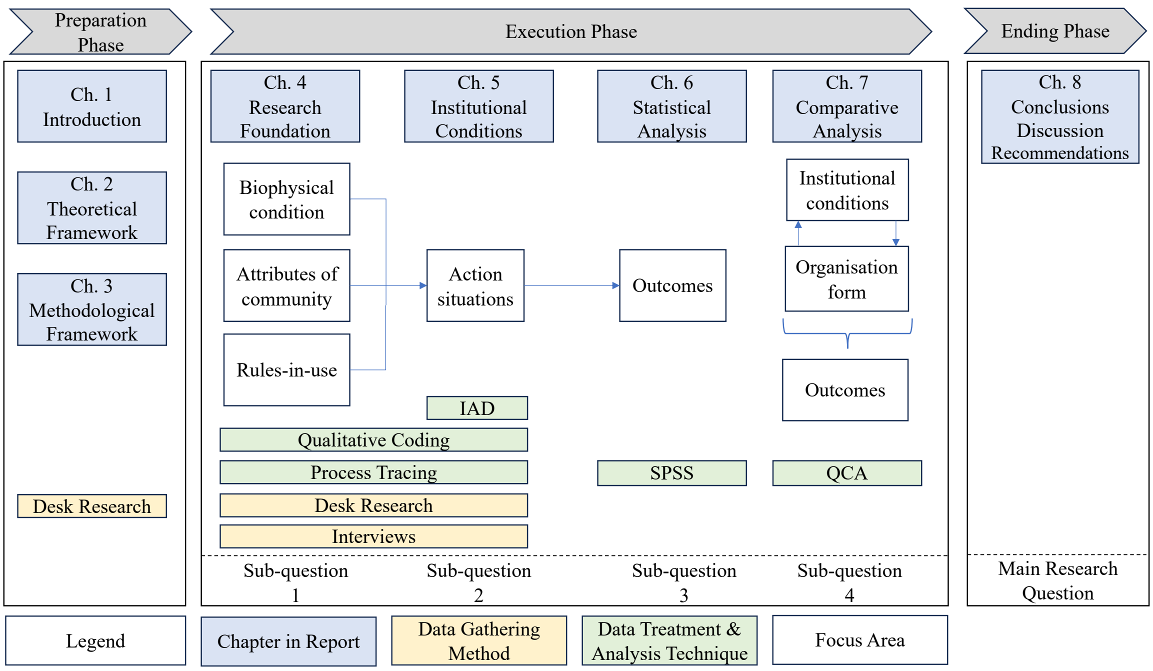


Figure 1.1: Research Flow Fiagram of the study (Arab, 2022)

2 Theoretical Background

This chapter provides the foundational theory for the study. The chapter starts by outlining the literature review methodology in section 2.1. Subsequently, in section 2.2, the theoretical background is introduced. This section begins with an exploration of ”institutions” as they relate to this study in section 2.2.1. The rationale for the IAD framework is detailed in section 2.2.2. An examination of the framework is provided in section 2.2.3, followed by an overview of the 8 design principles in section 2.2.4.

2.1. Literature Review Methodology

This subsection details the approach used for a systematic literature review pertinent to this study's theoretical framework. The review employs a structured methodology, incorporating elements from the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA), including specific inclusion and exclusion criteria as recommended by PRISMA (Page & et al., 2021). The PRISMA flowchart, which visually represents the selection process, is presented in figure A.1.

The literature review primarily focuses on understanding institutions, delving further into the IAD framework and its intersection with energy transition as documented in scholarly literature. The initial step involves sourcing relevant studies from databases like Scopus, Google Scholar, ScienceDirect, and the TU Delft repository. Governmental databases and official websites were used for insights and, in certain contexts, are treated as 'records'. Both English and Dutch studies were included without any specific restrictions on publication dates. The search encompassed diverse research forms, especially those relevant to energy infrastructure projects with potential spatial implications at the municipal level. Several examples of keywords that were used during the search were ”institutions/institutional”, ”Comparative institutional analysis”, ”Wind energy development”, ”Social acceptance”, and ”Netherlands”. After initial retrieval, certain studies were excluded due to duplication. A subsequent screening process was conducted, during which records were excluded based on irrelevant language, non-pertinent title or abstract, or limited relevance in the conclusions. Backward & Forward Reference Searching techniques were applied to key publications, facilitating the tracing of additional relevant sources and gauging their influence. In total, 19 records were identified as primary sources for this study. Details on this process are provided in the Appendix, as shown in figure A.1.”

The literature review emphasises the study of the institutional environment. The approach adopts a theoretical framework based on Williamson's New Institutional Economics theory. This is supplemented by insights from Elinor Ostrom's IAD framework. Records that correspond with the institutional criteria, especially those referencing Dutch case studies on wind energy or institutional analysis within the IAD academic scope, were preferred during the search. Further specifics on these records can be found in tables A.1, A.2 and A.3.

2.2. Conceptual Link

This section aims to explain the theoretical underpinning for the research, specifically focusing on the institutional conditions in wind farm planning and development. The importance of establishing a conceptual link becomes evident as it bridges the broader theoretical landscape to the specialised area of wind development.

2.2.1. The Concepts of Institutions

This research focuses on institutional variation, highlighting the role of institutions in determining decision-making contexts. Institutions provide a framework for stakeholder interaction, defining boundaries for acceptable behaviors (P. J. Klok, Coenen, & Denters, 2006). By understanding these structures, the decision-making processes become clearer, illustrating the influence of organisational entities on wind farm development (Coenen, 2009). Institutions refer to guidelines or rules governing social interactions. They are essential in managing complex socio-technical systems (A. M. Koster & Anderies, 2013). As energy transitions involve social and technological facets, understanding the institutional landscape surrounding wind energy development is crucial. Definitions of institutions vary. North defines them as constraints shaping political, economic, and social interactions (North, 1991). McGinnis sees institutions as human-made constraints or opportunities influencing individual choices and their outcomes (McGinnis, 2011). This study adopts the definition by Polski and Ostrom, who describe an institution as a rule, norm, or strategy influencing behavior in repetitive situations (Polski & Ostrom, 1999). There are two main types of institutions: formal and informal. While formal institutions like laws are documented, informal ones, such as cultural norms and traditions, remain unwritten (Hrelja, Monios, Rye, Isaksson, & Scholten, 2017; North, 1991). Informal institutions often complement formal ones by filling unaddressed areas (Rye, Monios, Hrelja, & Isaksson, 2018). Both types of institutions together shape the behavior of the actors, which in this context refers to individuals or entities involved in the wind farm development process. Often termed as 'rules-in-use', these institutions dictate actor behavior in situations needing group coordination (Milchram et al., 2019). The IAD framework is employed in this research to systematically analyse these institutional conditions.

2.2.2. Rationale for Adopting the IAD Framework

According to Ostrom, the IAD is designed to encompass a broad set of variables that are instrumental in analyzing diverse institutional scenarios, from market exchanges and corporate entities to community bodies and governmental units (Ostrom, 2010). In its core, it offers a meta-theoretical vocabulary, enabling researchers to delve into specific theories or compare multiple theories.

The Institutional Analysis and Development (IAD) framework originally centered on governing common pool resources, such as forests, fisheries, and lands, contextualised primarily by Hardin's 'tragedy of the commons' proposition in 1968 (Hardin, 1968). Through Ostrom's work, it became evident that local communities frequently and effectively govern their resources through effective governance mechanisms. In recent years, the IAD framework has found relevance in energy transition research, including studies focusing on wind energy (A. Koster & Anderies, 2013; Lammers & Hoppe, 2019; Milchram et al., 2019; Newell et al., 2017). This research evaluates wind farms within the ambit of common goods. While drawing inspiration from Ostrom's guidelines for collective resource management, it is recognised that wind farms, given their distinct private ownership structures, do not align completely with the traditional common goods definition. However, wind farms have features similar to common goods, such as challenges associated with land allocation, benefits and detriments extended to non-owners, and their contribution to communal energy consumption. By incorporating the IAD framework, the study seeks a thorough examination of the institutional complexities within wind farm development. The adaptability of the IAD framework is conducive to this exploration, furnishing in-depth perspectives into public institutional frameworks (Mcginnis & Ostrom, 2014; McGinnis, 2011). Significantly, the IAD framework elucidates prevailing institutional norms and their subsequent implications. While its not the primary intent, insights from this study might be instrumental in shaping efficacious policy frameworks for future wind energy initiatives. The ensuing sections will delve further into the applicability and nuances of the IAD approach in this research context.

2.2.3. The IAD Framework and Ostrom's Perspective

This study adopts Ostrom's perspective on institutions and rules, specifically her concept of 'rules-in-use' (Ostrom et al., 1994). Instead of focusing on the written form of rules, it considers their practical application and their role in shaping interactions. Rules are classified as either 'formal', based on official legislation or policy, or 'informal', originating within community traditions or shared practices. Both dimensions are relevant for understanding institutional dynamics and their role in decision-making. The IAD framework provides a methodological approach to examine the institutional context of decision-making, emphasising the interactions between its components. It assists in assessing how these components collectively influence decision-making outcomes (Mcginnis & Ostrom, 2014; McGinnis, 2011).

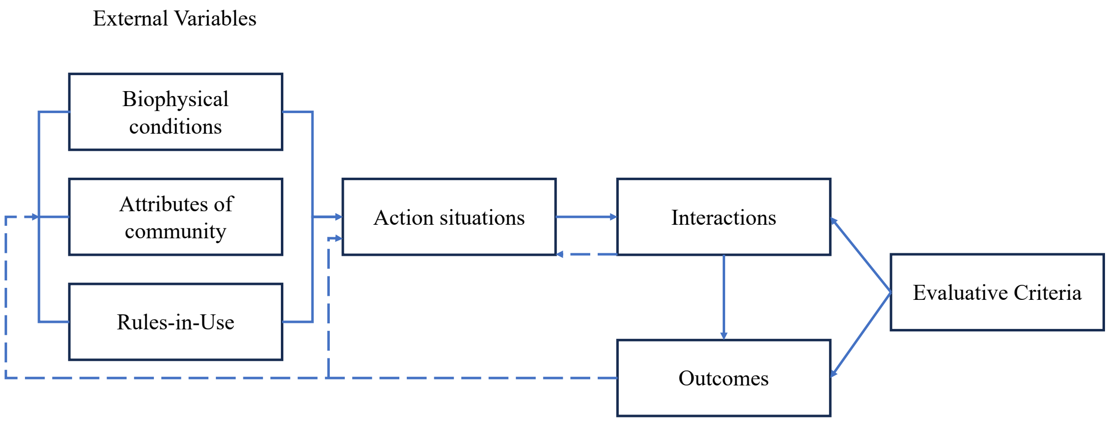


Figure 2.1: The Institutional Analysis and Development Framework (Ostrom, 2002)

As illustrated in Figure 2.1, the IAD Framework comprises five main components: external variables, an action situation, patterns of interactions, outcomes, and evaluative criteria:

1. **External Variables**: These are factors beyond the immediate control of the participants within the institutional arrangement and can be segmented into three categories:

    - **Biophysical Conditions**: The biophysical conditions represent the physical environment or resources relevant to the action situation. This includes the tangible material properties and characteristics of the resource (Ostrom et al., 1994). For wind energy project development, this includes factors like location and topography, prevailing wind patterns, terrain type and current land usage. Ecological considerations, such as the presence of local wildlife, also belong to this. These conditions naturally shape the feasibility and design of wind energy projects.
    - **Community Attributes**: Defined as all relevant aspects of the social and cultural context in which an action situation is located (McGinnis, 2011). Community attributes encapsulate the inherent qualities of the participating or affected community, including trust in the relevant authority, representation by involved stakeholders, the history of prior interactions, the degree of internal uniformity or diversity, and the collective knowledge and social capital. For wind energy projects, this might include the community's prior experience with renewable energy initiatives, public perception of wind energy, and the degree of local expertise in renewable energy technologies.
    - **Rules-in-use**: This represent the prevailing formal and informal norms and regulations that guide behavior and actions (Ostrom, 2011). They affect the whole process and sometimes only smaller parts. There are seven rule types: position rules, boundary rules, choice rules, scope rules, aggregation rules, information rules, and payoff rules (McGinnis, 2011). Figure 2.2 illustrates the seven rules on the action situation (Lammers & Hoppe, 2019):

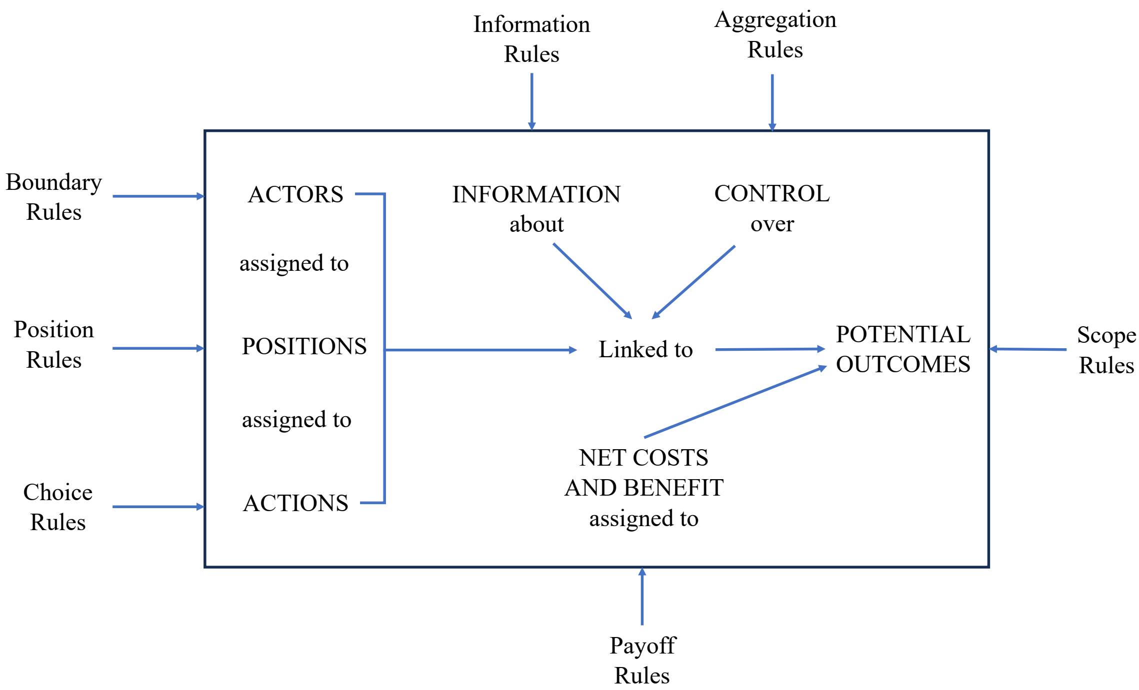


Figure 2.2: The Action Situation and the respective Rules-in-Use (Ostrom, 2002)

- **Boundary Rules**: Define who can participate in the decision-making process, for instance, stipulating which stakeholders or authorities have a vote in wind energy project approvals.
- **Position Rules**: Designate roles and responsibilities within the process. For example, specifying the role of a project leader in a wind energy development project.
- **Choice Rules**: Outline the possible actions stakeholders can take within their roles, such as initiating environmental impact assessments or organising community engagement sessions.
- **Information Rules**: Govern what information is accessible to participants, like wind turbine noise studies or the financial implications of the project. Additionally, it examines how this information is disseminated and used.
- **Aggregation Rules**: Dictate how decisions are arrived at, potentially involving individual decisions, collaborative choices, or coalition-based consensus in the context of a wind energy project.
- **Payoff Rules**: Detail how the benefits and costs of certain actions and outcomes are allocated, including aspects like the distribution of financial gains from a wind energy project among stakeholders or addressing the cost implications of potential environmental impacts.
- **Scope Rules**: Describe the possible outcomes of the decision-making process and their implications, such as the geographical boundaries of a wind farm or the specific type of turbine implemented.

2. **Action Situation**: The action situation is fundamental to the IAD framework, serving as the arena where institutional rules and norms intersect, and outcomes materialize through actor interactions. In this setting, actor behavior can be critically assessed. Additionally, the presence of sub-action situations can introduce varied institutional influences. Collectively, these action situations define the holistic decision-making domain for processes such as project planning and implementation.
3. **Interactions**: The patterns of interaction encompass the modes of engagement between actors, potentially cooperating, negotiating, or even conflicting.
4. **Outcomes**: Represent the tangible results stemming from these interactions. In the context of this study, this could include the duration to establish a wind farm and the extent of objections from the local community.

5. **Evaluative Criteria**: These criteria establish benchmarks to assess the effectiveness of institutional arrangements. They incorporate measures of efficiency, equity, and legitimacy.

In summary, the IAD framework provides a perspective on how established ”rules-in-use” influence actor behaviors within an action situation. These rules, both formal and informal, set the context for interactions among actors and determine subsequent outcomes. The IAD framework aids in evaluating and understanding the influence of these outcomes on institutional structures, highlighting potential shifts in institutional practices (Lammers & Hoppe, 2019; Milchram et al., 2019; Ostrom, 2011). The following section further explores the application of the IAD framework.

2.2.4. The 8 Design Principles

Ostrom’s comprehensive research presents eight guiding principles for the sustainable and equitable governance of common resources. Although this study does not intend to directly extrapolate these principles for wind energy policy-making, they serve as a foundational reference for the culminating discussions. Ostrom’s principles for the governance of commons are as follows (Williams, 2018):

1. **Clearly defined boundaries:** It is essential to delineate who can access specific resources. Without a well-defined beneficiary group, resources risk being over-exploited.
2. **Proportional benefits and costs:** Local conditions and ecological needs should shape the rules, ensuring a balance between benefits received and costs borne.
3. **Collective decision-making:** Effective governance is more likely when stakeholders participate in rule formulation, fostering a sense of ownership and adherence.
4. **Effective monitoring:** To ensure compliance, mechanisms should be in place to monitor adherence to established rules.
5. **Graduated sanctions:** Effective commons governance incorporates a tiered system of penalties for rule violations, from warnings to fines, accompanied by potential reputational consequences within the community.
6. **Accessible conflict resolution:** It is pivotal to have a cost-effective and straightforward mechanism for addressing disputes, allowing members to address grievances without prohibitive costs or barriers.
7. **Right to self-organisation:** For commons rules to be effective, they should be recognised and respected by higher-tier authorities.
8. **Nested enterprises:** Some resource governance aspects might require local management, while others may benefit from broader regional collaboration.

3 Research Methodology

This chapter presents the methodology adopted for this research. The overall research approach is introduced in section 3.1. The context-setting desk research is detailed in section 3.2, while the criteria and process for case selection are discussed in section 3.3. Section 3.4 highlights the specifics of data collection, and the methodology applied for the IAD analysis is found in section 3.5. The rationale and design of the scoring system utilised in the quantitative phase are elaborated in 3.6. Statistical testing procedures are documented in section 3.7, and the methodology for employing the QCA approach in section 3.8. The chapter concludes with a overview of the research design in section 3.9.

3.1. Methodological Research Approach

The research methodology integrated quantitative and qualitative data, harnessing the respective strength of both methods to identify causal effects and to provide a comprehensive understanding of the operational institutional arrangements. This aligns with the perspective that qualitative evidence can significantly complement quantitative research, offering a more holistic understanding beyond numerical data alone (Seawright, 2016; Trampusch & Palier, 2016). The research process compromised the following key stages:

1. Mapping the Dutch wind energy landscape to provide context and understanding.
2. Selection of cases and in-depth case study, based on the principles of the IAD framework.
3. Through a combination of statistical methods and Qualitative Comparative Analysis (QCA), cases were comparatively analysed to identify patterns and differences.

This research involved a collaboration with four Bachelor's end project (BEP) students from TU Delft University, executed within the context of their final year research project. The collaborative approach provided a broader perspective on the research subject, added credibility to the statistical tests, and ensured the necessary number of cases for QCA were attained. The BEP students each contributed by applying the IAD framework to two or three cases each. The final case selection was made by me to ensure the research's direction and coherence. Each student was assigned cases from a specific province, with my role being one of close supervision, guidance, and support. My research provided a foundational framework for the students' work, and their contributions subsequently informed and enriched my broader analysis. While their work was autonomous, their findings have been incorporated as integral components of this study. Complete access to all primary data, including interviews they conducted, was granted to ensure consistency in data interpretation.

3.2. Methodology for Contextual Landscape Analysis

To provide a contextual basis for this study, a systematic literature review was conducted. The structure of this review was based on the PRISMA methodology. The literature selection process is depicted in the PRISMA diagram, as illustrated in figure A.1. During this phase, studies were sourced from databases such as Scopus, Google Scholar, ScienceDirect, and the TU Delft repository. Additionally, valuable insights collected from governmental databases and official websites were deemed insightful and, hence, also classified as a "record."

3.2.1. Analysis of the Dutch Wind Energy Landscape

This part of the research zoomed in on the the wind energy landscape in the Netherlands utilising literature research. Central to this investigation were several factors: geographical considerations, locational dynamics at play, the prevailing public attitudes towards wind energy, the distinct phases each project undergoes, and the overarching regulatory milieu in which these projects operate. The study encompassed an evaluation of current wind turbine regulations, a historical perspective on prior developments, and an outline of anticipated goals. The primary references for this examination originated from reports pertinent to Dutch renewable energy initiatives, with a particular concentration on wind energy. Relevant records are itemised in table A.4 in the appendix.

3.2.2. Evaluation of Wind Energy Business Models in the Netherlands

This part of the study assessed wind energy business models, with a particular focus on the organisational structures and strategic methodologies adopted by different stakeholders. A detailed examination was carried out on the organisational and legal entities of LECs and CWEPDs to discern their characteristics. The evaluation criteria included: General Objective, Profit Distribution, Decision-Making Frameworks, and Legal Form. The research was primarily oriented towards Dutch renewable energy literature, accentuating wind energy. An interview with a industry professional and representatives from the Dutch energy cooperatives sector was also undertaken, offering valuable perspectives. A complete list of these reports and further insights from the interview can be found in table A.5 and chapter B in the appendix.

3.3. Case Selection Methodology

To investigate the role of organisational form in project planning and execution, a methodical case selection approach was utilised. The study primarily aimed to identify variations in institutional processes during decision-making and assess if these differences, shaped by the organisational structure, resulted in diverse outcomes. The aim of the case selection was to select similar cases with the organisational form being different, specifically LECs and CWEPDs.

3.3.1. Criteria for Case Selection: Within-case Analysis

Cases were chosen that demonstrated similar wind farm properties, faced analogous biophysical conditions, community attributes, and regulatory environments. This approach favoured cases within the same province due to presumed shared regulations, community sentiments, and environmental contexts. Yet, given the limited number of wind farms with closely aligned similarities within a single Dutch province, the inclusion was broadened to encompass multiple provinces. This methodology identified suitable cases across five provinces that met the set benchmarks. The process to make comparison possible between these provinces will be explained later.

Achieving complete consistency in wind farm proportions and external variables across cases was complex. Therefore, the methodology emphasised a selection process to approach this as best as possible by selecting cases that were similar in proportions, location, and developed during the same period. The selection hinged on various criteria, some of which might have been dynamic, evolving during the project's timeline. For instance, variables like the wind turbine height might not have been predetermined and could have undergone modifications. In an ideal setup, cases would have retained their initial proportions throughout, with outcome differences emerging solely in terms of process duration and objections faced. However, this perfect alignment remained elusive. To account for the dynamic nature of certain proportional variables, which might also have served as outcome measures, a control test was utilised. This test examined the impact of these components on the outcomes of interest. This ensured that the chosen cases resembled each other as closely as possible. The control test was crucial in discerning potential causal relationships. For example, it verified that the number of wind turbines did not disproportionately influence the process's duration, thereby affecting the primary outcome variables of interest.

Location, Turbine Proportions and Development Period

Location, wind turbine proportions and period of development were selection criteria. In this regard, it was crucial to proceed with caution. The act of selecting based on an outcome variable poses challenges, especially when the focus is on analyzing both the process and its eventual outcome. As a result, the methodology emphasised the selection of cases that bore maximum similarity. Furthermore, a statistical control test was undertaken to guarantee the absence of correlation with the outcome under consideration. Within the context detailed in Chapter 4, the Dutch government had designated specific regions as suitable for wind energy projects. These designated areas highlighted where wind energy projects were situated in ideal situations. These areas also provided an indication of the number of wind turbines that could be installed. While developers possessed flexibility to make adjustments within these zones, the range of modifications was limited. Given these guidelines, using location and turbine size as selection criteria was practical. Additional, the period of development was used for selection criteria. This guideline was adopted to ensure that the majority of cases operated within comparable regulatory and technological contexts, and experienced relatively similar public sentiment. Following the aim of the objective of this research, certain key parameters were identified to ensure consistency and comparability among selected cases:

- **Number of Wind Turbines:** Projects within the provinces' jurisdiction, specifically those with capacities ranging from 5-100 MW, were prioritised. Given that many LEC-developed wind farms typically featured 4-5 turbines, this study primarily focused on cases within this range.
- **Turbine Capacity:** While not a strict selection criterion, the study used a guideline favoring turbines with an average capacity of approximately 4 MW, permitting a deviation of ±1.5 MW. This guideline aimed to ensure that the majority of cases were within a similar performance range, avoiding direct comparisons between modern high-performance turbines and older models.
- **Hub Height:** The study emphasised the inclusion of cases where turbine heights exceeded 85 meters. Such elevations were typically representative of modern designs and the latest technological advancements. While these greater heights were not necessarily associated with increased noise levels—as confirmed by (RIVM, 2023)—they might have influenced visual impacts. Therefore, this criterion ensured a consistent benchmark for these external visual factors across the selected cases.
- **Proximity Parameters:** Distance constraints were set at a maximum of 1 km from the closest residences and 2.5 km from the main residential zone. These boundaries ensured that variances in situational effects due to distance differences were minimised.
- **Repowered Wind Farms:** The research included projects with turbine replacements, commonly termed as 'repowering'. This process denoted the transition from older turbines to models based on newer technologies. While the study would ideally have focused more on non-repowered projects, the scarcity of such cases required the inclusion of repowered projects as well. Later control tests evaluated the potential influence of this variable on the main outcome variables being studied. item **Period of Development:** Though not a rigid selection criterion, the study leaned towards wind farms that had commenced development within the last decade. This guideline was adopted to ensure that the majority of cases operated within comparable regulatory and technological contexts, and experienced relatively similar public sentiment.

Biophysical Conditions

Looking at the biophysical conditions, the sole criterion established is on onshore wind farms. Given the Netherlands' relatively uniform topography, no specific criteria were deemed necessary for altitude. Similarly, no standards were established regarding wind availability, wind speeds, or proximity to protected natural areas.

Attributes of community

Community attributes were an essential parameter in the selection process. Ideally, a consistent level of support or opposition within a community was sought. Additionally, community demographic factors such as age, income, and education were considered ideal metrics for evaluation. Additionally, stakeholder interests, including those of local residents, environmental entities, investors, and local political interests, could be of significant importance in relation to wind turbine placements. However, given the research's timeline and the need for both within-case and cross-case analyses, adhering strictly to all these criteria in detail proved challenging. Cases from the same province were thus selected, operating under the assumption that community attributes were relatively consistent within provincial boundaries. The IAD analysis delved deeper into these community attributes to detect an discrepancies. Any pertinent observations were highlighted accordingly.

Rules-in-use
For the consistency of the study, efforts were made to keep the formal rules consistent across selected cases. Cases predominantly from the same province were chosen to ensure a consistent regulatory environment. Moreover, cases initiated and built within the past decade were prioritised to minimize discrepancies arising from rule changes. The primary focus of this research is on the informal rules, hence no specific selection criteria were applied in this area. A subsequent section, to be discussed later, will elaborate on the steps taken to compare cases from different provinces.

Ownership
A pivotal differentiation in this research was the ownership model between the LECs and CWEPD. Ideally, the study would have assessed an equal number of cases where projects were solely owned by LECs and solely by CWEPDs. Such a clear distinction would have facilitated a straightforward comparison. However, the varied percentage of ownership introduced a unique opportunity: examining potential correlations between the degree of LEC ownership in a project and associated outcomes. The ”percentage cooperation” denoted the proportion of wind turbines owned by LECs, with the remainder typically overseen by CWEPDs.

3.4. Data Collection for In-depth Case Analysis

After the cases were selected, a systematic examination was essential for a comprehensive analysis. This detailed assessment involved two primary steps: an exhaustive literature review and interactions with relevant stakeholders through interviews.

3.4.1. Literature Review

The objective of the literature review was to gather essential information about the selected cases. A range of data sources, including institutional websites, reports, and newspaper articles, was consulted. Given the transparency associated with wind farm projects, numerous governmental documents were accessible. These documents offered insights into aspects like project descriptions, permit applications, and more. Notably, The National Location Platform ('Het Nationale Locatie Platform') provided a comprehensive permit application overview for each case. This covered practical, legal, noise, and environmental facets. This generally served as the initial step to get a comprehensive overview of all factors.

3.4.2. Engaging with Stakeholders through Interviews

To delve deeper into each case, interviews were held with stakeholders associated with the selected cases. These discussions ensured a broad and enriched data capture. The research adopted a semi-structured interview approach, with the questionnaire detailed in Appendix C. The data was organised, transcribed, and categorised in line with Skarbek's guidelines for qualitative institutional analysis (Skarbek, 2020). This methodology underscores the need to integrate diverse perspectives to foster a well-rounded narrative, further informed by the Causal Process Tracing technique, which is elaborated upon in subsequent sections.

Participants in the interviews held diverse roles which provided a multifaceted view of the cases. Their insights often revealed details not found in publicly available documents, bridging knowledge gaps and spotlighting key societal dimensions. Given the intricacy of this research and the variety of stakeholders and projects, it was assumed that a minimum of two interviews per case would be pivotal for a comprehensive IAD analysis. Although more interviews might have enriched the exploration, the chosen number ensured a comprehensive overview aligned with the study's objectives, considering the time constraints of the research. Further discussions on the approach and possible refinements will be presented in the recommendations section. A complete list of interview participants is presented in table 5.2.

Every interview was conducted after obtaining the participants' consent and was subsequently audio-recorded and transcribed. These transcriptions were then analysed using the Atlas.ti software (version 23.1.1). The deductive data analysis approach was utilised to assess the data against well-established concepts (Fereday & Muir-Cochrane, 2006). ATLAS.ti played a pivotal role in this phase as it compared the data with existing theoretical frameworks, identifying alignments and differences, and grounded the analysis in recognised conceptual structures, contrasting findings with established paradigms (Fereday & Muir-Cochrane, 2006). The coding scheme drew from the IAD framework elements, further enriched by inductively obtained codes and insights from Lammers & Hoppe (Lammers & Hoppe, 2019). The detailed coding framework can be found in table D.1 in Appendix D.

3.5. Application of IAD Framework using Causal Process Tracing

The research employed the IAD framework to examine cases. In this endeavor, Causal Process Tracing (CPT) was utilised for its systematic approach to investigate complex processes, focusing on the impact of institutional conditions over time (Blatter & Haverland, 2012). This methodology was adopted to elucidate the interrelations between institutional structures and decision-making sequences when viewed through the IAD lens. By segmenting these sequences into 'action situations', the study aimed to discern the specific influence of institutions at distinct stages.

The analysis followed three main steps: developing case narratives, identifying significant moments, and evaluations of the motivations and actions of primary participants (Blatter & Haverland, 2012). Initially, each case was systematically documented. Key events were identified and chronologically plotted to form a coherent narrative and timeline. The intent of the IAD framework was to provide a comprehensive analysis of individual cases, emphasising moments that potentially shifted the trajectory and outcome of the process. According to Lamers & Hoppe, these instances are treated as distinct temporal markers, each influenced by the prevailing institutional conditions (Lammers & Hoppe, 2019). Such moments became vital because of their capability to redefine the institutional landscape. While an exhaustive analysis would ideally encompass every significant event in each case, this research adopted a focused approach.

The scope was narrowed to two universally occurring action situations. The first action situation began with a project's inception and concluded at its permit application submission, while the second spanned the time from permit application to the beginning of the project's construction. The endpoints of these situations were clear. Defining the starting point of the initial action situation presented a challenge. For clarity and accuracy, the beginning was identified where concrete steps towards the wind farm's planning were observed. Merely preliminary talks were not deemed as the inception. Rather, significant indicators like a municipality's official declaration, a public website announcement, or a community presentation determined the project's commencement. The decision to divide the process into two phases was based on the following considerations:

- **Consistency**: The two phases were evident in all the cases evaluated.
- **Time-efficiency**: Given the time constraints of this study, this ensured manageability and ensured to complete the study within the given time.
- **Phase Comparison**: Each phase had distinct institutional challenges. This segmentation allowed for understanding how initial condition might influence the subsequent phase.

For every case, both phases were examined by utilising the IAD framework.

3.6. Dataset Formulation for Cross-Case Examination

The in-depth analysis of individual cases provided insights into the distinct institutional conditions of each. However, a cross-case comparison methodology was used to derive further insights into comparisons. Cases were selected based on multiple criteria, including their specific province. To facilitate comparisons across provinces, a follow-up process was employed. This ensured that cases from different provinces could be compared against their institutional characteristics. Additionally, the study investigated the effects of these conditions on critical outcome variables, specifically the duration from project initiation to the start of the construction, and the number of views and objections. To enable a comparison of institutional conditions across cases and to determine their impacts on outcomes, a structured scoring mechanism was formulated, drawing from Ostrom's 'rules-in-use'. This approach refined the seven rules, facilitating the assignment of a score to each rule for every case. The IAD framework was instrumental in isolating these rules, as each case had undergone a detailed individual analysis. This scoring method ensured a uniform assessment of cases based on the seven rules. Consequently, it enabled the systematic comparison of cases, revealing potential disparities in institutional conditions influenced by organisational structures and their likely outcomes.

A scoring system as presented in chapter 5 was designed. The institutional conditions of each selected case was then scored based on system, paving the way for a subsequent quantitative assessment. I would like to emphasise that this scoring approach is a new initiative within this research domain. The scoring system have been designed by myself and reviewed with academic oversight of my supervisors. This systematic comparison introduces the possibility of integrating quantitative research methods to qualitative findings. By harmonising qualitative and quantitative information, the research methodology leverages the merits of both paradigms. Such an integrated approach deepens the understanding of institutional operational modalities and underscores the collaborative power of qualitative and quantitative research in offering a more nuanced understanding than solely numerical representation (Seawright, 2016; Trampusch & Palier, 2016). Subsequent sections delve into the specifics of the scoring system employed.

3.6.1. Translating the Rules-in-Use into Quantifiable Metrics

he scoring system facilitated the conversion of IAD insights into measurable metrics, where each score denoted the extent to which a particular rule-in-use was manifested. For instance, the ”Information Rules” elucidated the type and accessibility of information available to participants. Each rule was generalised, allowing the transformation of qualitative observations into quantitative research components. Key points regarding the scoring system included:

- Efforts had been made to represent the rules as quantitative as feasible. For instance, the payoff rule was straightforward to score: every additional measure could earn a higher score. The same applied for the aggregation rule, though some rules presented more challenges. Ultimately, every institutional condition or rule received a score indicating its degree of incorporation.
- The development of this scoring system was new. It was formulated by me, with guidance and constructive input from advisors. Ideally, such a system would have been embedded within an institutional institute with iterative feedback loops. However, given the constraints of this study, this method did have inherent limitations which will be further discussed in the discussions chapter.

The shift to a quantifiable method draws inspiration from the works of Fiss and Ragin (P. C. Fiss, 2011; Ragin, 2008). Their research advocates for a scoring gradient of 0:1:0.2 (0, 0.2, 0.4, 0.6, 0.8, 1), to be both methodologically sound and functionally appropriate. The reasoning behind this scoring spectrum is further detailed in section 3.8.2.

3.6.2. Cross-case Examination of Outcomes

This study investigated the connection between institutional conditions and outcomes. Within the data set, some outcome variables also doubled as selection criteria. Using these as selection standards could introduce bias. To mitigate this, it was essential to differentiate between primary outcome variables and those for control. Control tests were conducted to ensure that outcome variables, such as the number of wind turbines, did not influence the primary outcomes, e.g., appeals to the council of state. By confirming this, it was then possible to focus on key factors, like whether enhancing the payoff rule shortened project durations.

Outcome Variables of Interest

The variables under this category captures the outcome of the two phases and include the following:

1. **Total Duration**: : Represents the period from the conception to the onset of construction, providing a perspective on process duration.
2. **Duration Phase 1**: Spanning the period from project’s inception to permit application.
3. **Duration Phase 2**: Spanning the period from permit application to the the start of construction.
4. **Number of Views**: The number of views during the permit application stage.
5. **Number of appeals to the Council of State**: Reflects the count of invoked formal legal processes.

Controlling for Potential Confounding Outcome Variables

In the case selection, a consistent approach was adopted. However, it was essential to ensure these factors did not influence the primary outcome variables. A control analysis detailing the potential impact of these factors is provided in chapter 6. The potential influence of the following outcome variables was controlled for:

1. **Turbine-specific Factors (Number, Height, Capacity)**
2. **Distance to First Houses and Residential Areas**
3. **Repowered wind farms**

After structuring the data set, statistical procedures were applied and comparative case evaluations were conducted via the QCA method, as detailed in the subsequent sections.

3.7. Statistical Analysis Methodology

The collected data was processed and analysed using a series of statistical tests. The purpose of these tests is to transform raw data into actionable insights. This analysis was facilitated using the Statistical Package for the Social Sciences (SPSS) Version 29. The data set for this study includes the following attributes:

1. **Controlled Outcome Variables:** Including the turbine-specific factors, distance to the first houses and residential area, and repowered wind farms.
2. **Organisation Form (Continuous):** Exploring the correlation between the percentage of ownership and outcomes.
3. **Organisation Form (Nominal):** Differentiating between LECs and CWEPDs, irrespective of the LECs ownership percentage.
4. **Scores:** Rules-in-use, graded on a scale of 0 to 1 in 0.2 increments.
5. **Outcome Variables:** Duration, views, and objections.

For the continuous linear data, the one-sided Spearman-rho correlation test was used. This test was chosen because of its ability to handle limited sample sizes, such as the 14 cases presented in this study (Soetewey, 2021). Additionally, the test's one-sided nature aligned with the predetermined direction of interest. The relationship between organisation form and the scores, given the data's categorical nature, necessitated the use of the Fisher's Exact Test. For comparisons between organisation form and non-normally distributed time variables across two distinct groups, the Mann-Whitney U test was used (Soetewey, 2021). The research incorporated the following six tests:

1. **Control Outcome Variables vs. Outcome Variables of Interest:**
   - Employed the Spearman's rho due to the continuous nature of variables.
   - *Goal:* Verified whether the outcome variables, presumed non-influential, did not impact the outcomes of interest, allowing for subsequent comparative analyses.
2. **Nominal Organisation Form vs. Scores:**
   - Used the Fisher's Exact Test for its capability in assessing association between one nominal and one ordinal variable.
   - *Goal:* Identified trends in scores across organisation forms.
3. **Continuous Organisation Form vs. Scores:**
   - Employed the Spearman's rho due to the continuous nature of variables.
   - *Goal:* Revealed if increased LECs ownership percentages related to variations in scores.
4. **Nominal Organisation Form vs. Outcome Variables of Interest:**
   - Applied the Mann-Whitney U test to discern variations in outcome between two organisation forms.
   - *Goal:* Examined if one organisation form had differing durations or varied objections and views compared to the other.

5. **Continuous Organisation Form vs. Outcome Variables of Interest:**
    - Used the Spearman's rho due to the continuous nature of variables.
    - *Goal:* Determined if there was any correlation between the outcome variables and organisational form percentage.
6. **Outcome Variables of Interest vs. Scores:**
    - Utilised the Spearman's rho, given the continuous nature of the variables.
    - *Goal:* Determined the interplay between scores and outcomes, elucidating the effect of institutional conditions on outcome variables.

Significance Levels

Commonly, significance levels of $p < 0.01$ and $p < 0.05$ are adhered to in research. However, this study considered a threshold of $p < 0.10$ due to the limited sample size. This threshold ensured that potential findings were not overlooked due to the sample constraints (Andrade, 2019; Cleophas & Zwinderman, 2010).

3.8. Employing QCA for Cross-case Analysis

For this study, Qualitative Comparative Analysis (QCA) was adopted to discern patterns across the selected cases. This method, discovered by Charles C. Ragin in 1987, uniquely combines qualitative and quantitative research techniques, leveraging Boolean algebra to decipher complex causal dynamics (Ragin, 1987). One of its main advantages is the ability to identify causal patterns which may not be evident with conventional methods (Parente & Federo, 2019). The core of QCA lies in its capacity to recognize and analyse configurations of conditions tied to specific outcomes within the selected cases. It can differentiate between the conditions that bring about an outcome and those that might prevent it, considering the principle of causal asymmetry (Pappas & Woodside, 2021). This study employed QCA to analyse 14 selected cases, aiming to identify key causal elements affecting process outcomes. The methodology enabled a detailed examination of rule-based contexts (P. Fiss, Marx, & Cambré, 2013). Given the sample size and scope, QCA was deemed apt, delivering insights that transcended individual case analyses.

3.8.1. Choice of QCA Type

QCA is categorised in three main variants: Crisp Set QCA (csQCA), Fuzzy Set QCA (fsQCA), and Multi-Value QCA (mvQCA). FsQCA provides a gradation, allowing conditions to have membership values that range from 0.0 to 1.0. This granularity turns qualitative gradations into quantifiable metrics (Ragin, 2008; Vink & Vliet, 2009). For this data set, fsQCA was the most appropriate choice, granting the precision to explore continuous values and capture a fuller picture of causal configurations.

3.8.2. Methodology

For QCA, the process followed the methodology as outlined by Parente (Parente & Federo, 2019):

1. **Model Design**: The initial stage involved the identification of conditions that could influence the target outcome. These conditions were set at the beginning of this study and came forth from the overall research approach.
2. **Data Collection**: This phase entailed the careful selection of cases and the aggregation of data for determinative factors pertinent to the outcome. This was done in the data collection part of the study.
3. **Data Calibration and Analysis**:
    - *Calibration*: The calibration strategy transformed the data into set memberships using a clearly defined cross-over point. This classified the data into nuanced degrees of membership. Grounded in theoretical and empirical benchmarks, this approach reinforced both validity and reproducibility (Misangyi et al., 2016; Schneider & Wagemann, 2012). For this, the scoring system introduced in section 3.6.1 was used. This quantification approach was

consistent with prior QCA research, such as those by Fiss and Ragin (P. C. Fiss, 2011; Ragin, 2008), which employed scores of 0, 0.2, 0.4, 0.6, 0.8, and 1, justified by the following considerations:

- Calibration Accuracy: Excess 0.5 scores could signal calibration challenges, so its absence assures distinct qualitative delineation.
- Procedural Streamlining: To foster efficient analysis, Ragin suggests steering clear of values approximating 0.5 (Ragin, 2008).
- Data Nuances: Values such as 0.2 and 0.8 offer granularity, enriching the analytical process.

Organisation forms were assigned a score of 1 if cases had any form of LECs ownership. Cases solely owned by CWEPDs received a score of 0. Further details about this data treatment were provided in 7.2.

- *Analysis Using fsQCA*: After calibration, the data was processed using the fsQCA software (version 4.1) for MAC (Ragin & Davey, 2023).
- *Configuration Selection*: This study followed the logic of necessity, which mandated a singular conditions to have a consistency score of at least 0.90 (Ragin, 2008). For sufficiency, conditions had to achieve a consistency score of at least 0.80. In situations with fewer cases, a consistency score as low as 0.75 was deemed acceptable and was thus used in this study (Roig-Tierno, González-Cruz, & Llopis-Martinez, 2017)..
- *Robustness Checks*: After obtaining the results, robustness checks were performed to validate the integrity of the findings. These checks included adjustments to model conditions, recalibration of thresholds, and exploration of various consistency benchmarks (Ragin, 2008).

4. **Results Presentation and Interpretation**:

- *Truth Table Solutions*: The study presented outcomes from the truth table in two categories, intermediate and parsimonious solutions (Ragin, 2008).
- *Metrics Emphasis*: Both the consistency and coverages metrics were used. The latter is further dissected into raw and unique coverage. The differentials between raw and unique coverages are visually elucidated in Figure 3.1.

  (a) Consistency: Consistency measured the proportion of cases with a particular configuration that also displayed the outcome of interest. A consistency score close to 1 (or 100%) suggested that nearly all cases with that configuration shows the outcome, indicating a reliable relationship. Conversely, a consistency score much below 1 suggests variability, meaning that the configuration not always leads to the expected outcome (Ragin, 2008).

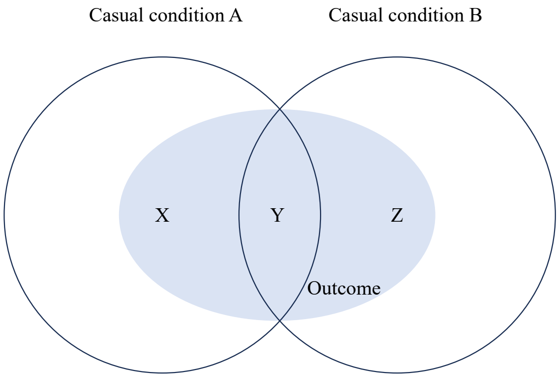
  (b) Coverage:

    i. Raw coverage: Raw coverage measures the proportion of all instances of the outcome that a specific configuration (or pathway) can account for.

    ii. Unique coverage: Unique coverage gauges the proportion of instances of the outcome that are explained only by a specific configuration and not by any other configuration in the solution.

  The key difference between raw and unique coverage lies in their focus. While raw coverage looks at the total proportion of the outcome that a configuration can account for (including overlaps with other configurations), unique coverage isolates the proportion of the outcome explained only by that particular configuration (Ragin, 2008). A visual representation of this concept can be found in figure 3.1.

- *Solution Representation*: Researchers often present solutions using either the Boolean formula or the Configuration table. The former uses terms like “NOT”, “AND”, and “OR”, while the latter displays conditions in a matrix format with symbols indicating presence, absence, or indifference. Filled circles signify condition presence, unfilled ones for absence, and circled crosses for indifferent conditions (Parente & Federo, 2019).



Unique Pathways		
Pathway	Sufficiency	Condition
1	A~B	Only Condition A
2	A*B	Combination of Condition A & Condition B
3	~A B	Only Condition B

Percentage of outcome	
Area X	40%
Area Y	20%
Area Z	40%

Coverages		
	Unique Coverage	Raw Coverage
Pathway 1 (X+Y)	0.40	0.60
Pathway 2 (Y)	0.20	0.20
Pathway 3 (Y+Z)	0.40	0.60

Figure 3.1: QCA pathways and coverage visualisation

3.9. Synthesis of Research Design and Methodological Progression

The research process is illustrated in figure 3.2. Chapter 4 touched upon the data collection, laying the groundwork for the study. Chapter 5 builds upon this foundation by employing the IAD framework. Through causal process tracing and qualitative coding, the action situations were consistently analysed and the data processed. Chapter 5 introduces the scoring system that was used in chapter 6 for case comparison, focusing on institutional conditions and outcomes like duration and objection. Statistical testing was used to investigate the correlations between singular conditions and the organisational distinctions between LECs and CWEPDs. Following, Chapter 7 employed the QCA method, studying factor combinations related to outcomes.

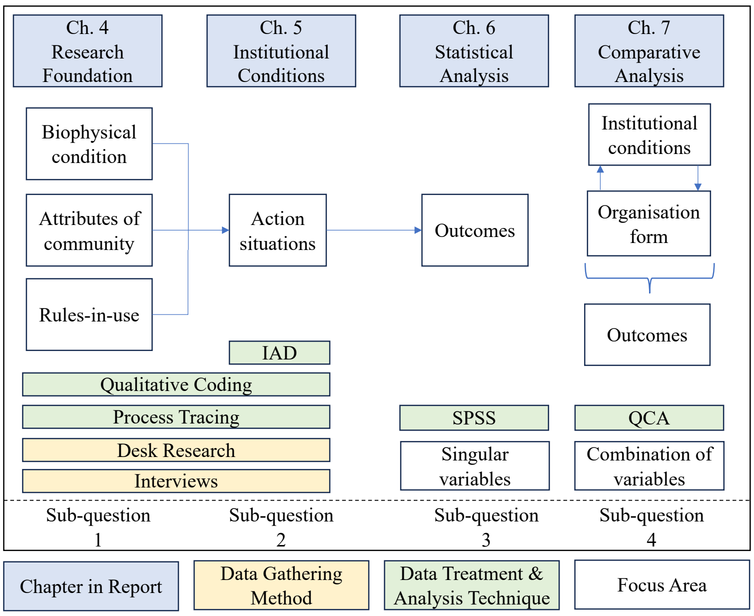


Figure 3.2: Methodological Flow Diagram of the underlying study

4

Contextual Analysis of the Dutch Onshore Wind Energy Landscape

Building upon the methodological foundation, this chapter introduces the primary findings related to the first research question on the Dutch wind energy sector. The structure of this chapter is as follows: Section 4.1 provides an overview of the biophysical conditions of onshore wind energy in the Netherlands. Section 4.2 explores Dutch viewpoints on sustainable transitions and clarifies the roles of CWEDPs and LECs in the development landscape. Sections 4.3 and 4.4 describes the formal policies and outline the development stages of wind energy projects, respectively. The characteristics associated with CWEDPs and LECs, encompassing both formal and informal, are discussed in sections 4.5 and 4.6. A comparative analysis between CWEDPs and LECs is presented in section 4.7. Section 4.8 concludes with summarising key findings and addressing the first research question.

4.1. Biophysical Conditions for Dutch Onshore Wind Development

The Netherlands has a favorable wind climate suitable for energy generation. Coastal areas experience consistent wind patterns, enabling turbines in these regions to achieve higher electrical outputs. On the other hand, while the eastern parts have lower wind intensities, by using taller turbines to capitalize on higher altitudes, even inland installations can potentially produce between 15 to 30 TWh annually. Such potential is determined through meticulous wind measurements during planning stages for new turbine projects (Pure Energie, 2022).

Despite the favorable conditions, the integration of wind energy in the Netherlands presents challenges. Optimal turbine placement aims to harness renewable energy while preserving ecological, cultural, and urban heritages. Regulations permit wind turbines to be installed close to residential areas without a set minimum distance, although 400 meters is an indicative distance. Instead, the focus is on ensuring noise levels remain below specified limits (Witte & Kuijers, 2023). Measures to address noise pollution specify that turbine noise should not surpass 47 decibels in the day and 41 decibels at night. Moreover, shadow flicker is regulated to ensure no residence experiences it for more than 17 days annually and for over 20 minutes daily, excluding overcast days (Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer, 2010). Advances in turbine design have made modern units quieter, permitting closer residential placement even if they are larger. The aforementioned 400 meters serves as a guideline, but final placements depend on comprehensive, site-specific evaluations (Pure Energie, 2022). Additionally, other infrastructural elements like pipelines, power lines, and transportation routes, as well as low-flying aviation paths and conservation areas, impose restrictions. Preliminary guidelines offer initial feasibility insights, but detailed assessments ultimately dictate turbine placement suitability (Pure Energie, 2022).

4.2. Attributes of Community: Dutch Sentiment Towards Wind Energy and Developer Classifications

The transition to sustainable energy emerges as a contemporary policy focal point due to the recognised environmental consequences of fossil fuels. By 2050, the Netherlands aspires to achieve a primarily sustainable and carbon-neutral energy system. Public support plays a pivotal role in this ambition. This section analyses Dutch attitudes towards various energy sources, with an emphasis on sentiments about wind turbines, drawing extensively from research by Centraal Bureau voor de Statistiek (CBS) (Kloosterman et al., 2021).

Public Opinion on Diverse Energy Sources in the Netherlands

A significant portion of the populace favors reducing fossil fuel dependence. In 2021, 48% expressed the view that oil and natural gas usage should decrease, with 13% advocating for a complete cessation of oil and 9% for halting natural gas. Concerning coal, a third supported a reduction in its consumption, while 44% favored complete discontinuation (Kloosterman et al., 2021). Renewable energy sources receive widespread endorsement. Solar energy enjoys 83% support, whereas wind energy garners 72%. Demographic differences manifest in energy preferences: individuals with higher education, females, younger age groups, and urban residents typically show an inclination towards renewables. These demographics often express a preference for renewable energy even if alternative options are economically more attractive (Kloosterman et al., 2021).

The Dutch Perspective on Wind Turbines

Approximately 70% of Dutch citizens favor the establishment of new wind turbines in the country, while 14% oppose, as illustrated in figure 4.1. The primary reservations stem from aesthetic concerns and potential ecological impacts, such as avian, aquatic, and insect fatalities (Kloosterman et al., 2021). Some individuals critique the turbines for perceived economic inefficiencies and assert that their energy output does not justify the financial support they receive. Younger and more educated respondents, as well as urban dwellers, generally display a more positive perception of wind turbines. In contrast, the sentiment among those aged 75 and above tends to be less favorable or neutral. CBS research indicates that 56% of respondents believe turbines should be placed on both land and sea. Regarding proximity to living areas, sentiments vary, with a discernible trend towards positioning turbines away from residential zones, suggesting industrial areas, open fields, or outskirts as preferable locations (Kloosterman et al., 2021).

Classification of Wind Energy Developers in the Netherlands

The Dutch wind energy sector exhibits diversity in terms of development entities. The following four categories can be identified (Strachan, Lal, & Toke, 2009):

1. **Small private investors, primarily farmers**: Wind energy offers these individuals an auxiliary revenue source, while primary business endeavors lie outside the energy domain.
2. **Electricity sector, or energy distributors**: For these entities, wind energy is an expanding segment, with main operations encompassing a broad spectrum of energy sources, including renewables.
3. **Independent wind energy producers**: These enterprises regard wind energy as integral to core operations, predominantly aligned with the broader renewable energy sector.
4. **Wind cooperatives**: These groups prioritize social and environmental goals over profitability, leveraging wind energy to further these objectives.

Although the above provides a detailed classification, the study at hand adopts a dual approach, distinguishing between CWEPDs and LECs:

- **CWEPD**: Defined by a professional approach and a profitability-driven strategy, these entities have the expertise to navigate the regulatory landscape. They regard wind energy as integral to their core operations, predominantly aligned with the broader renewable energy sector.
- **LEC**: With a focus on community welfare, these entities emphasize local participation and sustainability. Their commitment to local concerns is pronounced. Rather than prioritising profitability,

they place higher importance on social and environmental goals, using wind energy as a means to further these objectives.

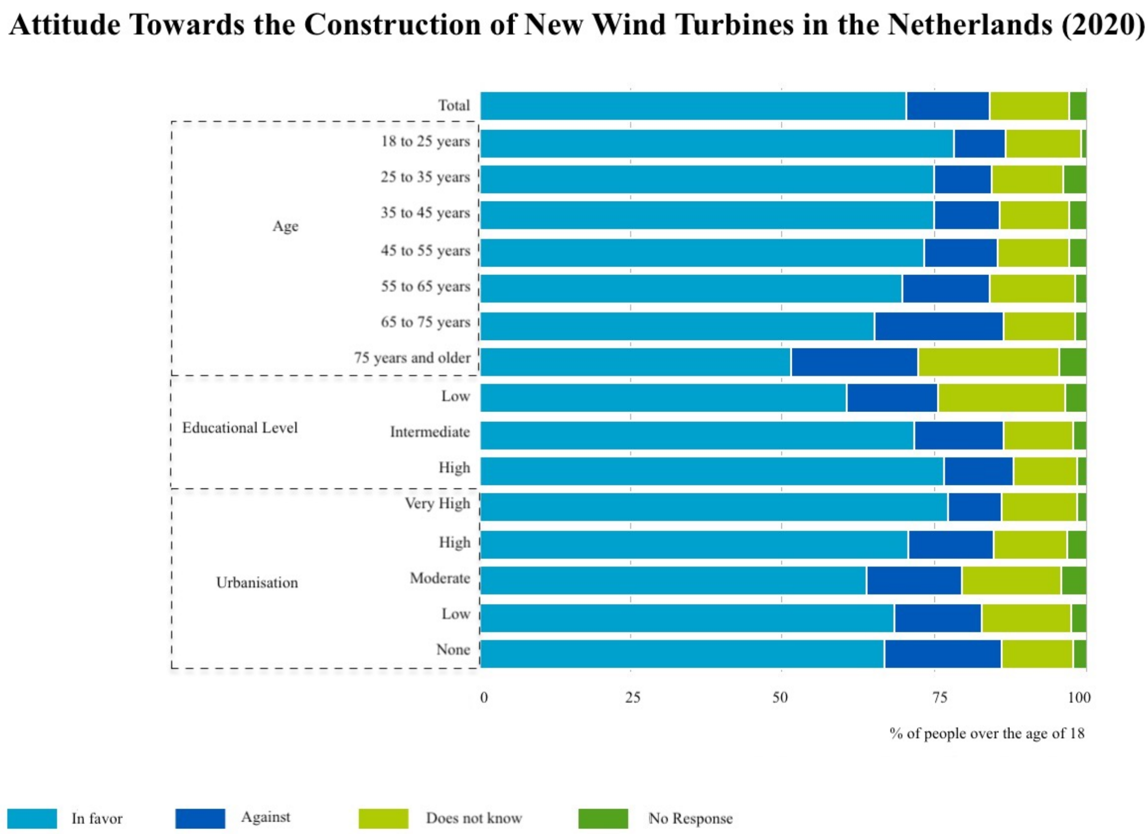


Figure 4.1: Attitude towards the construction of new wind turbines in the Netherlands, *2020* (Kloosterman et al., 2021)

4.3. Overview of Renewable Energy Policy in the Netherlands

Wind energy is identified as an aspect of the Netherlands' approach to a reduced-emission economy (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). Analysis of policies at the national, provincial, and municipal governance levels provides insight into the objectives, regulations, and methods related to wind turbine development. Interaction among governmental tiers indicates a mixed implementation approach. Local entities manage region-specific considerations, while upper-level tiers follow established strategies (Koelman, Hartmann, & Spit, 2022; Verbong & Geels, 2007). Observations of policy objectives contribute to understanding the progression of wind energy in the Netherlands.

National Policy Overview

The Dutch Climate Agreement, also referred to as "Klimaatakkoord," sets a goal of generating 35 terawatt-hours (TWh) of land-based renewable electricity by 2030, combining wind and solar energy sources (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). The Energy Agreement, or "Energieakkoord," outlines a collective target among provinces to reach a wind energy capacity of 6,000 MW (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013a). These policy directives indicate the role of wind energy in the Netherlands' renewable energy approach for 2030.

By the end of 2022, the Netherlands reported a 6,045 MW of onshore wind energy capacity, aligning with the Energy Agreement's 6,000 MW target. A growth of 759 MW was observed in 2022. Based on planned projects, capacity is forecasted to increase to 6,880 MW by the end of 2023 (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013a). While challenges, such as project delays, impacted the achievement of the 2020 target, post-2020 projections suggest an increase in wind farm capacities. This progression aligns with the 2030 target of producing 35 TWh of land-based renewable electricity (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2022).

Provincial Policy Overview

The Provincial Environmental Vision documents, known as ”Provinciale Omgevingsvisie,” designate areas for potential wind energy development within provinces. These documents establish long-term goals and policy directions, while associated environmental guidelines offer the framework for wind farm developments within provincial limits (Informatiepunt Leefomgeving, 2023). Provinces also contribute to their respective Regional Energy Strategy (RES) (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). Recent analysis shows that while the national 6,000 MW wind energy target was met, several provinces did not achieve their specific targets (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2022). Diverse approaches are evident across provinces, highlighting the varied nature of wind energy development in different regions (van Aalderen & Horlings, 2020).

Municipal Policy Overview

Municipalities are instrumental in promoting renewable energy projects, integrating local policies, community involvement, and renewable energy initiatives. In alignment with the Climate Agreement's 35 TWh land-based renewable energy target for 2030, municipalities participate in the RES process (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). Collaborating with local communities and stakeholders, they determine potential areas and select project locations after a thorough review of regional considerations. By the end of 2022, completed wind projects were forecasted to produce 17.9 TWh annually in a typical wind year. This shows that wind energy will potentially contribute more than 50% to the national RES target of 35 TWh of renewable energy production on land by 2030.

Dutch Climate Agreement's Approach to Local Ownership

The Dutch Climate Agreement, known as the Klimaatakkoord, accentuates the significance of community participation in renewable energy ventures (HIER, 2019; Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). It introduces an aspiration wherein 50% of the ownership of renewable electricity production on land rests with the local community. This entails that both citizens and local enterprises should ideally hold half the ownership. The underpinning rationale of this aspiration is the notion that shared ownership can bolster collaboration, dedication, and a profound interest in the project's success. Such an ownership model also enables the local community to exert influence over the project's direction and its financial undertakings. This equitable distribution is not strictly a regulatory requirement but rather a guiding principle articulated in the Klimaatakkoord. While a 50-50 ownership paradigm is the benchmark, the actual ownership distribution can adapt based on the unique conditions of individual projects. Cases where collaboration between local residents and agricultural landowners leads to 100% local ownership are conceivable. However, ownership is accompanied by obligations. A community with ownership would need to embrace entrepreneurial duties and shoulder associated risks. Even though the Klimaatakkoord advances the 50% ownership model as an aspiration, it acknowledges alternative forms of community participation, including financial contributions or environmental funds. Initiators of energy projects undergo a structured process to discern the optimal and viable participation model. The pertinent authority ensures that market entities and the local community engage in meaningful dialogue. Their collective decisions get formalised in an ”omgevingsovereenkomst”, translated as an environment agreement. This document serves as a foundational blueprint, detailing the participatory framework within the project. It is pertinent to note that the term ”local community” lacks a standardised national definition. Instead, its interpretation hinges on the context of a specific project and its geographical locale, encompassing citizens, businesses, agricultural landowners, and other pertinent entities. Municipalities, while potential project owners, are distinct from the local community. Should a municipality spearhead a project, it assumes the role of the project initiator (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b).

4.4. Developmental Stages of Wind Energy Projects

The Netherlands undertakes wind energy projects through a sequence of defined stages. These stages adhere to a detailed set of guidelines and directives, primarily established by the Netherlands Enterprise Agency (RvO Nederland, 2023b). For analytical purposes within this research, this sequence has been organised into seven distinct stages. A representation of these stages is provided in figure 4.2. In the context of this research, Phase 1 includes all stages leading up to the permit application, culminating in stage 5. Phase 2 comprises the final two stages: 'Plan and Project Decision' and 'Implementation and Construction'.

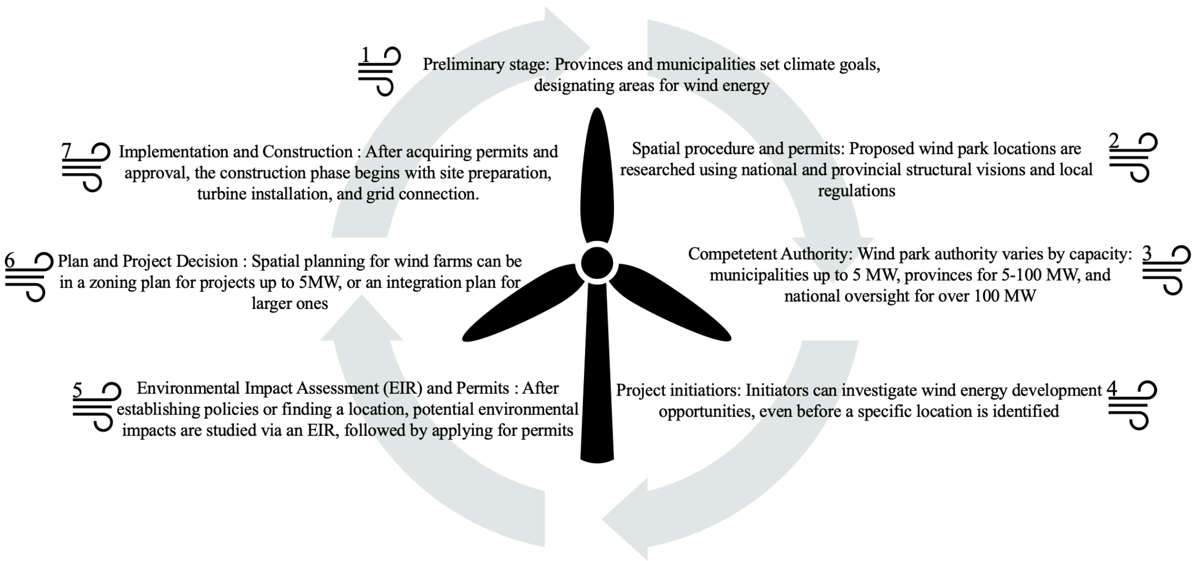


Figure 4.2: Schematic overview of the wind energy development phases in the Netherlands: Phase 1 (Stages 1-5) leads to permit application, while Phase 2 encompasses 'Plan and Project Decision' and 'Implementation and Construction'.

1. Preliminary Stage

The inception of a wind energy initiative involves crafting a detailed wind plan. This plan integrates into the broader design blueprint of the concerned region. It entails collaboration with diverse stakeholders including residents and property owners. Importantly, in the Netherlands, both provinces and municipalities retain the autonomy to design climate and energy policies without being tied to specific wind energy projects (RvO Nederland, 2023b). Interested parties, such as advocacy groups and developers, can offer insights into these policies or assess the viability of the wind energy proposal during its foundational stages.

2. Spatial Procedure

The selection process for a wind farm site adheres to the spatial policy framework, delineated by national and provincial visions. Nationally, this framework is captured by the Spatial Planning Act, the Structural Vision Wind Energy on Land, the General Rules on Spatial Planning Decision, and the corresponding Ministerial Regulation. Conversely, provinces configure their spatial frameworks using a Structural Vision and the Provincial Spatial Regulations. At a more detailed level, municipalities can craft an exhaustive structural vision or a specialised one focusing on wind energy (RvO Nederland, 2023b).

3. Competent Authority

Understanding the role of the competent authority provides insight into its significance in wind farm projects. Municipalities serve as the authoritative entity for wind farms or turbines with a capacity below 5 MW. The province stands as the competent authority for the environmental permit for wind farms with capacities between 5 and 100 MW. For larger wind farms, provinces, based on the Electricity Act, can delegate authority to the municipality. Both municipal zoning plans and provincial integration plans possess the capability to spatially incorporate a wind farm. Moreover, provinces are mandated to intervene if a proposal is declined by a municipality, provided that the province perceives the spatial arrangement as apt, as mandated by the Spatial Planning Act. Turbines with a capacity exceeding 100 MW fall under the National Coordination Scheme, with the national government preparing a National Integration Plan, and the Minister of Economic Affairs serving as the central coordinating authority (RvO Nederland, 2023b).

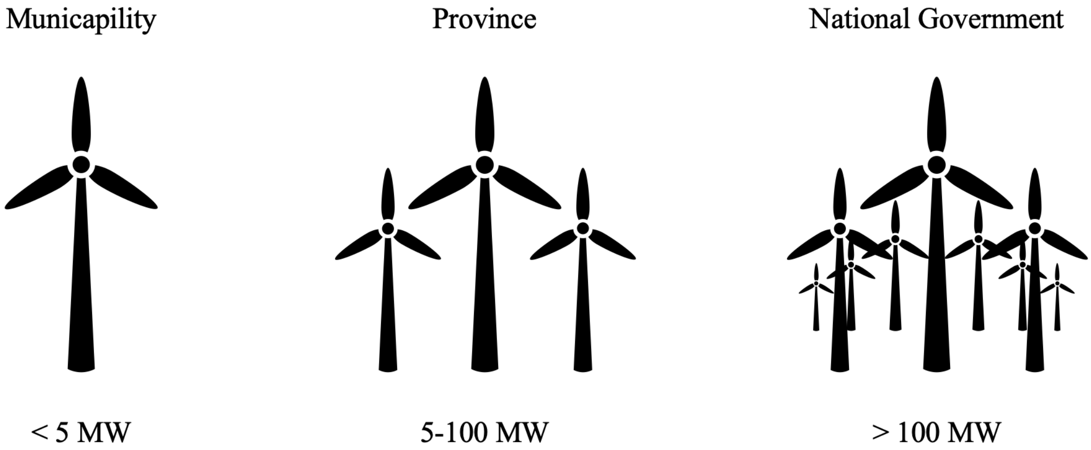


Figure 4.3: Illustration of competent authority based on the capacity of the wind farm

4. Project Initiators

Prior to selecting a definitive location, potential initiators or landowners evaluate opportunities for wind energy expansion. This phase entails a rapid assessment to pinpoint potential challenges, compliance checks with policies, evaluation of community interest, and understanding landowner participation willingness. Typically, an initiator solicits municipal support for the wind farm through a principle request, even if this concept is external to the Spatial Planning Act (RvO Nederland, 2023b).

5. Environmental Impact Assessment and Permits

Post the establishment of climate policies or the discovery of a suitable wind park location, environmental impact assessments are conducted. This assessment discerns the potential environmental implications of the proposed wind park. Subsequent to the assessment, permit application processes commence. Depending on the turbine variant, the permit type varies. There might be a requirement for additional permits, especially if the assessment indicates a need (RvO Nederland, 2023b).

A zoning plan outlines permissible activities in a municipality's spatial context. The formulation of these plans follows a structured protocol, granting citizens opportunities for influence. Any discrepancies with a zoning plan can be challenged at the Administrative Jurisdiction Division of the Council of State (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2023). The procedural steps are:

1. **Announcement of Zoning Plan:** Municipalities provide prior notification of a zoning plan encompassing spatial developments. This could be communicated through resident letters, local periodicals, or the municipality's website.
2. **Draft Zoning Plan:** The municipality formulates a draft zoning plan, which is available for public scrutiny for 6 weeks. The draft can be accessed at municipal buildings, on the municipal website, or via websites such as ruimtelijkeplannen.nl. During these 6 weeks, individuals can present their 'views' (zienswijze) to the city council. If this step is overlooked and the zoning plan is formally approved, individuals lose the right to file an appeal or request a provisional provision.
3. **Zoning Plan Ratification and Announcement:** Post the 6-week public consultation, the city council has 12 weeks to formally approve the zoning plan. Following this, a 2-week window is available for announcing the decision. In specific circumstances, the announcement period might extend to 6 or 7 weeks. This happens when national or provincial authorities provide a reactive

directive on aspects of a zoning plan, especially if those facets clash with provincial or national interests. With such a directive, the related parts of the zoning plan do not get implemented.

4. **Lodging an Appeal:** Disagreements with the city council's decision can be appealed at the Administrative Jurisdiction Division of the Council of State. The municipality indicates when appeals can be made in its announcement of the zoning plan's ratification – the timeframe always being 6 weeks. Following this, the zoning plan becomes operational, allowing the municipality to start implementing parts or the entirety of it. To lodge an appeal, it is essential to have shared your views during the zoning plan's draft phase. If this was skipped, appeals can only be made against changes that the city council made compared to the draft zoning plan.
   Important Note: As per a court ruling on 14 April 2021, it is no longer mandatory to have provided a 'view' to lodge an appeal against environmental law decisions, which include procedures for zoning plans and environmental permits. As a result, even without presenting a 'view', it is easier to appeal environmental law decisions to the administrative court (van Staten afdeling Bestuursrechtspraak, 2023). However, it is pertinent to note that the majority of cases examined in this research adhered to regulations preceding this decision and necessitated the submission of views prior to lodging an appeal.

6. Plan and Project Decision

A spatial planning decision for a wind farm can be incorporated in a zoning plan for projects up to 5 MW, or an integration plan (inpassingsplan) for larger projects. If the province decides to devolve its powers, a municipality may also establish an integration plan. For projects above 100 MW, the national government takes responsibility with a 'Project Decision' (Rijksinpassingsplan or Projectbesluit), which outlines the location and size of the turbines (RvO Nederland, 2023b).

7. Implementation and Construction

Following successful acquisition of permits and planning approval, the construction phase begins. This involves site preparation, installation of the turbines, and connection to the national grid. The construction process is typically subject to numerous regulations and standards to ensure safety and minimal environmental impact (RvO Nederland, 2023b).

4.5. The Role of LECs in Dutch Wind Energy Development

The Dutch Climate Agreement advocates for 50% local ownership of renewable energy projects, emphasising the significance of LECs in the country's wind energy landscape (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). Such LECs facilitate collective ownership of renewable energy infrastructure by local entities, ensuring an equitable distribution of benefits derived from renewable energy. Moreover, these LECs introduce a novel method for weaving community advantages into renewable energy projects through partial ownership of wind turbines. Although there has been an overall expansion in wind energy capacity, the proportion of projects undertaken as LECs remains fairly consistent, as illustrated in table 4.1. An increasing absolute count of cooperative projects suggests a trend toward cooperative organisational structures in wind energy ventures.

Year	Total LECs Wind Capacity (MW)	Annual Increase (%)	Total Wind Capacity (GW)	LECs Share (%)
2017	113	•	3.25	3.5%
2018	159	+40%	3.44	4.6%
2019	182	+14%	3.53	5.1%
2020	219	+20%	4.16	5.3%
2021	295	+35%	5.26	5.6%
2022	316	+7%	6.25	5.0%

Table 4.1: Annual growth of LEC on land wind capacity in the Netherlands (Lokale Energie Monitor 2022, 2022)

Studies have identified a trend toward more professionally structured LECs and a consistent growth in membership. Consequently, LECs are engaging in increasingly diverse and larger-scale projects (HIER en Bureau 7TIEN, 2023). These cooperatives face challenges in organisational, financial, municipal collaboration, and societal realms (HIER en Bureau 7TIEN, 2023). Researchers highlight the essential role of influential individuals in communities where cooperative initiatives are nascent (Ghorbani, Nascimento, & Filatova, 2020). Policies that target potential leaders within these smaller groups may foster the initiation of more projects, amplifying community benefits. Such insights can guide strategies to amplify the contribution of LECs to wind energy development in the Netherlands.

Fundamentals of LECs

LECs originated from various drivers. The first significant emergence was in the 1980s, propelled by anti-nuclear sentiment and church communities advocating sustainable energy. The post-2008 financial crisis era saw a renewed interest in such cooperatives, especially as solar panel profitability grew. The historical context is elaborated upon in a discussion with a industry professional and representative from the Dutch energy cooperative sector, as found in Appendix B[1]. LECs can be interpreted both as legal entities and operational methodologies. The subsequent sections delve deeper into these perspectives.

Understanding LECS Legally

A cooperative is a unique legal entity formed via a notarial deed, possessing specific rights and duties. In the context of energy cooperatives, members can embody multiple roles, functioning as producers, consumers, and investors simultaneously (Rijpens, Riutort, & Huybrechts, 2013). The Dutch Civil Code, Book 2, Article 53, describes a cooperative enterprise as follows:

1. It is fundamentally an association.
2. This association conducts business activities.
3. These activities address the 'material needs' of its members.
4. There exists an agreement between the cooperative and its members to cater to these needs.

'Material needs' refer to economic products or services delineated in the cooperative's statutes, meeting specific member requirements. Thus, members engage with their cooperative as distinct entities. The flexibility inherent in the cooperative's legal form is notable, as the law does not restrict possible objectives, enabling varied cooperative types to arise, from consumer to entrepreneur cooperatives.

Cooperative Principles

Beyond the legal framework, LECs may be examined through operational principles that promote the collective realisation of mutual goals. This methodology becomes clearer when considering the seven cooperative principles as delineated by the International Co-operative Alliance (ICA). Numerous organisations incorporating the cooperative legal structure have integrated these principles that serve as foundation directives(ICA, 1995, 2021):

Principle 1: Voluntary and Open Membership Cooperatives ensure open and voluntary membership to individuals, regardless of differing backgrounds, who are willing to accept the responsibilities associated with membership.

Principle 2: Democratic Member Control Members actively govern cooperatives through democratic processes. Leadership roles remain accountable to the entire membership, with a typical structure of one member, one vote.

Principle 3: Members' Economic Participation Members contribute capital in an equitable manner and maintain democratic oversight. Surpluses are utilised for development, dividends, or other member-approved purposes.

Principle 4: Autonomy and Independence When engaging with external organisations or capital, cooperatives retain their autonomy and ensure democratic control by members.

Principle 5: Education, Training, and Information Education is pivotal. Cooperatives ensure that members, staff, and the broader public receive adequate training and information about the advantages and operations of cooperatives.

[1] The interviewee's prominence in the energy cooperative sector and frequent mentions in media discussions contribute to their perceived value in this study.

Principle 6: Cooperation among Cooperatives Promoting inter-cooperative collaborations at multiple scales, cooperatives aim to bolster the overall cooperative movement and enrich the services provided to members.

Principle 7: Concern for Community Cooperatives pledge to champion sustainable socio-economic development, in alignment with the aspirations of their membership.

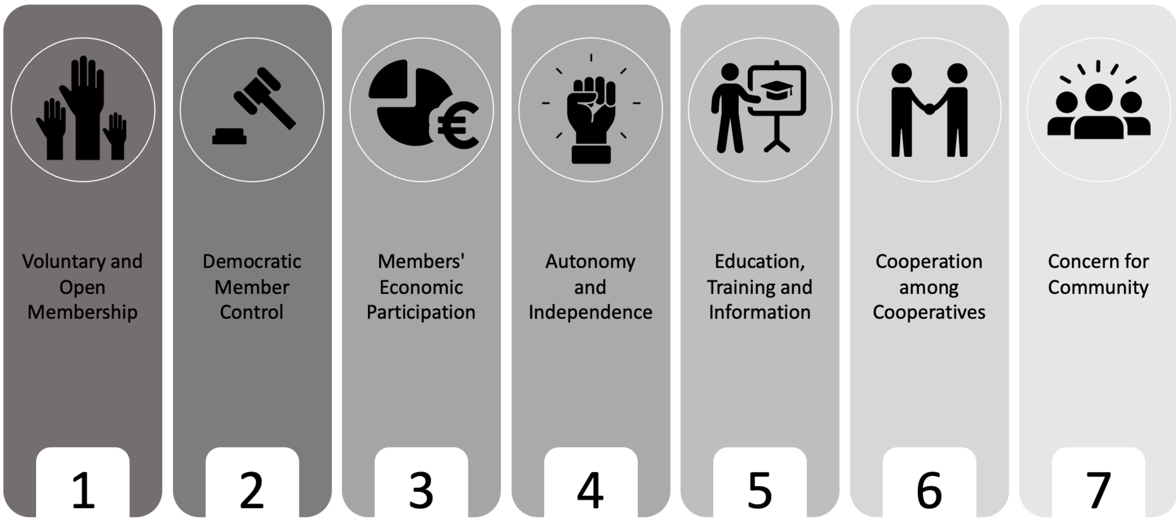


Figure 4.4: The 7 ICA principles (ICA, 2021).

LECs Identity

The subsequent analysis combines insights from detailed desk research and an interview with an industry professional. The full interview is available in Appendix B.

Dutch LECs demonstrate a nuanced interpretation of the cooperative definition, merging economic incentives with environmental advocacy (Hoppe, van Bueren, & Sanders, 2016; Klok et al., 2023). The predominant focus of these cooperatives is sustainability over profit generation. These cooperatives consistently engage in discussions and decisions with an emphasis on collaboration. Central to their operations are established environmental values. Their ambitions include mitigating greenhouse gas emissions, promoting renewable energy systems, and minimising dependence on established fossil fuel infrastructures (Ghorbani et al., 2020). LECs have evolved over generations, with different driving motivations. First-generation LECs primarily focused on local and idealistic goals, while second-generation ones tend to operate on a larger scale as general energy providers. Many were established in reaction to perceived inaction from major energy companies in supporting sustainable transitions. The interview indicated that newer LEC members vary in their levels of engagement, from active participation to more passive roles, and often have entrepreneurial leanings. These members are mostly well-educated men, though there is a noticeable trend towards greater inclusivity, with increasing female participation, especially as the focus shifts to local community settings.

Characterised as citizen-led organisations, Dutch LECs unite citizens with a shared interest in producing and marketing wind energy in the electricity market. These organisations generally exhibit the following characteristics (Strachan et al., 2009):

1. They are grounded in strong idealistic ethos, with ideological incentives fueling their activities.
2. They operate with a local or regional focus.
3. Their members, who often lack professional associations with the electricity sector, contribute to the social support and initial financing of the organisation.
4. They are are largely volunteer-driven, although some enlist the assistance of paid staff.
5. Among LECs, a somewhat closed collaborative approach prevails.

Challenges Faced by LECs

LECs experience several challenges. The interview highlighted several challenges faced by energy cooperatives, including limited entrepreneurial capacity, opposition from local municipalities, financial constraints, as well as technical and legal barriers. Complementing this, a study from HIER, a prominent energy cooperative foundation, pinpointed a shortage of manpower and the intricacies of collaborating with municipalities as primary obstacles for Dutch LECs (HIER en Bureau 7TIEN, 2023). Manpower remains a significant concern, as LECs grapple with recruitment and retention issues. The intensity of managerial responsibilities and the magnitude of projects exacerbate these challenges (Breukers & Wolsink, 2007; Mors & Leeuwen, 2023). Interactions with municipalities introduce another layer of complexity. Mistrust can arise, particularly in LECs that heavily rely on volunteers (HIER en Bureau 7TIEN, 2023). For successful collaboration, it is vital to have well-documented agreements and invest in relationship-building. Offering only superficial involvement can lead to negative outcomes, whereas genuinely involving them often yields positive results (Mors & Leeuwen, 2023).

4.6. Role of CWEPDs in Wind Energy Development

Within the current Dutch wind energy context, CWEPDs occupy an essential position. Their combination of specialised expertise, in-depth technical knowledge, and ample financial backing enables CWEPDs to oversee projects that might exceed the capabilities of community-based endeavors (NP RES, 2021). Table 4.1 delineates the ownership percentages of LECs. While specific data on CWEPDs ownership remains unavailable, the limited ownership by LECs infers that a sizable share is outside of LEC purview. Portions of this share are held by the Dutch government and individual owners, including small-scale farmers, but CWEPDs' share is notably prominent.

Fundamentals of CWEPDs

The rise of commercial wind energy developers as central actors in the nation's renewable energy sector can be traced to the latter stages of the 20th century. Multiple Western nations commenced renewable energy development in the 1970s, prompted by the oil crisis and reports such as that of the Club of Rome, which highlighted potential depletions of conventional energy resources (Kamp, 2004). Initial wind energy ventures often had the backing of communities or local governments. However, the subsequent decades saw the advent of commercial entities, driven by potential economic gains, supportive governmental policies, tax incentives, and the global shift towards sustainability (Strachan et al., 2009).

Understanding CWEPDs legally

In the Netherlands, energy developers frequently align themselves with legal structures such as the Private Limited Companies (BV) and Public Limited Companies (NV) (RvO Nederland, 2023a). The BV, locally termed 'besloten vennootschap', is favored by smaller to medium-sized entities, offering a unique legal identity and protection for its directors from personal financial risks. This structure necessitates a collaboration with a civil-law notary and a registration process through the Netherlands Chamber of Commerce (KVK) (Netherlands Chamber of Commerce, KVK, 2023a). On the other hand, the NV, known as 'naamloze vennootschap', is typically chosen by more extensive corporations. It boasts an autonomous legal identity, facilitates independent decisions, and operates under a governance board, creating a clear distinction between its ownership and management (Netherlands Chamber of Commerce, KVK, 2023b). These legal structures provide energy developers with the flexibility and foundational framework essential for the dynamic and capital-intensive energy sector in the Netherlands (RvO Nederland, 2023a).

CWEPDs Identity

CWEPDs exhibit a hierarchical organisational structure, diverging from cooperatives that may uphold democratic orientations. Decision-making within CWEPDs is usually centralised at the executive level and then distributed to the rest of the organisation. Many CWEPDs are established with specialised goals, directing resources towards the achievement of specific projects. Such a focused approach can optimize resource allocation and enhance project effectiveness (Bohlmeijer, 2022). In terms of profit distribution, CWEPDs primarily channel returns towards shareholders. Profits may not necessarily be reinvested in community projects but tend to reflect share ownership. This operational approach diverges significantly from the community-oriented strategies seen in LECs (Bohlmeijer, 2022). These entities underscore professionalism and frequently employ individuals possessing extensive industry expertise. Their wealth of resources, paired with methodical business strategies, facilitates the efficient execution of wind energy projects (Verbong & Geels, 2007).

Challenges Faced by CWEPDs

During the progression of wind energy initiatives, CWEPDs may be subjected to resistance. The root of this opposition frequently arises from perceptions of the CWEPDs' profit-driven agendas and an apparent disconnect with local communities (Bohlmeijer, 2022). CWEPDs often not originate from the areas they operate in which can occasionally lead to disparities with local community interests. Various local governmental units advocate for CWEPDs to collaborate with LECs in wind energy ventures. These affiliations often involve community involvement and engagement from LECs (Klok et al., 2023). Renowned CWEPDs, for instance, Raedthuys Windenergie B.V., have acknowledged the advantages of such cooperative collaborations (HIER, 2017).

4.7. Comparative Analysis: CWEPDs and LECs

CWEPDs and LECs present the following characteristics in their operational frameworks:

1. **Professionalism**: CWEPDs, unlike LECs, consist of salaried professionals with the skills and experience required to manage complex wind energy ventures. LECs, on the other hand, are predominantly volunteer-driven, potentially lacking comparable professional depth.
2. **Profit Orientation**: While LECs emphasize community welfare and local benefits, CWEPDs' primary objective revolves around profit generation.
3. **Profit Allocation**: CWEPDs allocate profits to shareholders, whereas LECs redirect their profits either towards community welfare or future project development.
4. **Geographical Orientation**: CWEPDs may not always have roots in the regions of their projects, occasionally causing potential frictions with local stakeholders. Conversely, LEC possess a pronounced regional and local emphasis.
5. **Governance Structure**: CWEPDs operate under a structured hierarchical system, guided by a board responsible for major decisions. In contrast, LECs generally follow a more democratic governance model where all members have equal voting rights.

When exploring the differences in between LECs and CWEPDs, insights from an industry interview highlighted the critical importance of trust. The interview revealed that LECs have built trust within their communities by allowing member participation in decision-making processes. They choose representative boards to manage wind farm development, aligning the project with community aspirations. In contrast, CWEPDs might sometimes face trust issues, leading to legal conflicts as stakeholders attempt to address their concerns. In LECs, the interests of members are generally recognised and addressed, making legal disputes uncommon. The detailed interview can be found in appendix B.

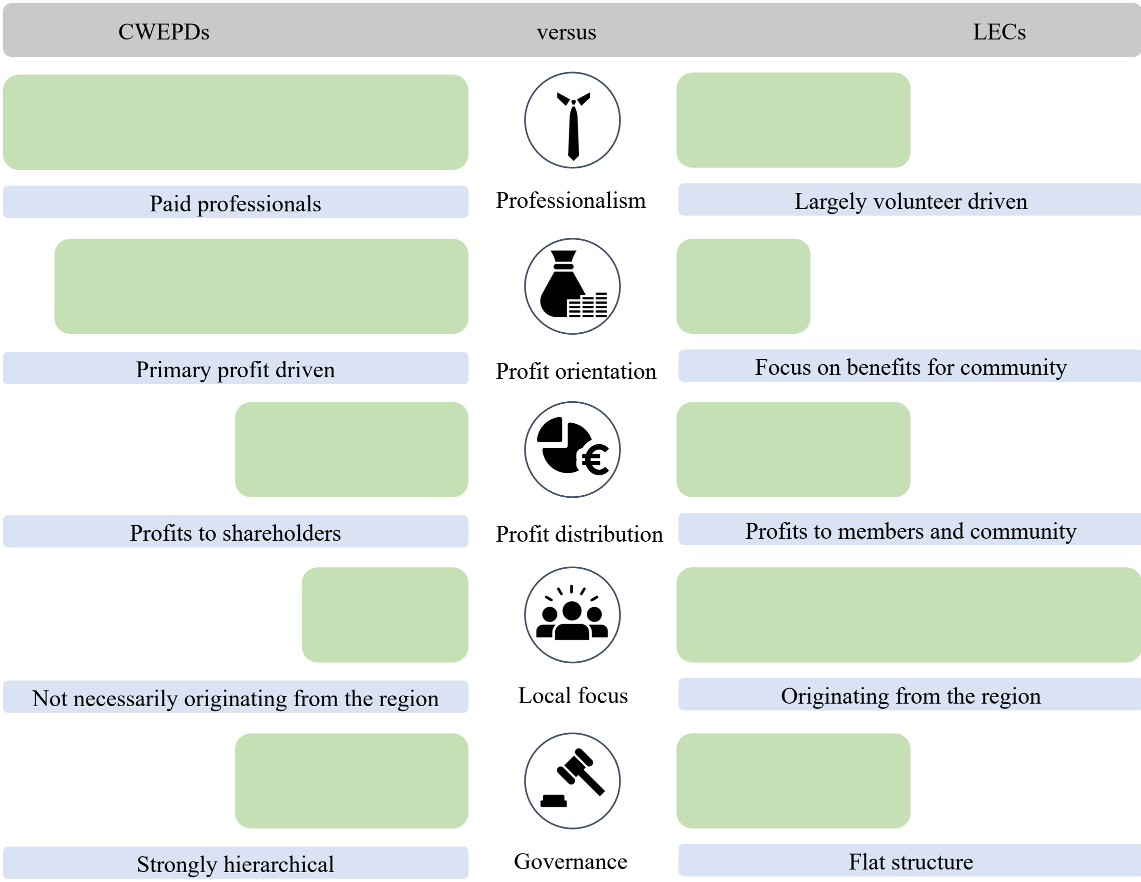


Figure 4.5: Graphical representation contrasting CWEPDs and LECs; bar length denotes the extent of principle adherence.

4.8. Conclusion

The goal of the initial research phase was to understand the wind energy environment in the Netherlands. The Dutch wind energy sector is characterised by the confluence of biophysical conditions, community attributes, and diverse regulatory directives. Both CWEPDs and LECs manifest distinct characteristics and operational attributes within the industry.

Biophysical Conditions

Biophysical conditions define the physical environment central to action situations in wind energy project planning and development. These conditions, vital for determining the feasibility and design of wind energy projects, encompass geographical and biophysical limitations. In examining the geographical attributes of the Netherlands, coastal regions generally manifest stronger wind patterns than the interior regions. However, the importance of inland regions cannot be understated; their terrains can host turbines to harness consistent high-altitude winds, leading to significant energy output. Strategic placement of turbines is paramount, aiming to maximize renewable energy yields while preserving the diverse Dutch landscapes, from natural terrains to urban configurations. Although no uniform regulation dictates the specific spacing between turbines and residential structures, the goal remains to limit potential disturbances, particularly noise and shadow flicker. Prevailing guidelines define acceptable noise thresholds and outline constraints on shadow flicker effects on residential areas. Preliminary guidelines propose an approximate distance of 400 meters between turbines and dwellings, although site-specific evaluations may suggest adjustments. Geographical factors such as existing infrastructure, transport pathways, and vital installations further challenge turbine placement decisions. Spatial constraints, ranging from zones designated for low-altitude aircraft movements to protected natural reserves, underscore the importance of comprehensive site evaluations to ensure optimal turbine positioning.

Attributes of Community

Community attributes refer to the social and cultural factors influencing decision-making processes. Key elements include stakeholder trust, historical interactions, community diversity, and collective renewable energy awareness. In the scope of this research, the primary stakeholders identified are:

1. **Government**: Through policy frameworks such as the Dutch Climate Agreement and the Energy Agreement, the Netherlands expresses its intention to enhance wind energy initiatives by 2030. Emphasising the role of local communities in energy transition, the aim is to achieve a minimum of 50% local ownership in all future wind energy projects.
2. **Public**: The inclination of the Dutch population towards renewable energy, specifically solar and wind energy, is evident. The shift from fossil fuels has broad acceptance, especially among educated younger individuals and urban residents. While many advocate for wind turbines, concerns about aesthetics, environmental impact, and financial viability without significant subsidies remain. Preferences indicate reservations against turbines near residential zones, favoring industrial areas, open fields, and peripheries of towns.
3. **Wind Developers**: Distinct entities operate within the Dutch wind energy domain. While there are multiple key stakeholders, this research adopted the following division:

   - **CWEPD**: Defined by a professional approach and a profitability-driven strategy, these entities have the expertise to navigate the regulatory landscape. They regard wind energy as integral to their core operations, predominantly aligned with the broader renewable energy sector.
   - **LEC**: With a focus on community welfare, these entities emphasize local participation and sustainability. Their commitment to local concerns is pronounced. Rather than prioritising profitability, they place higher importance on social and environmental goals, using wind energy as a means to further these objectives.

Formal and Informal Regulatory Landscape

Rules encompass both formal and informal norms and regulations guiding behavior and actions. These norms and regulations can either influence the entire process or be pertinent to particular segments. While this study delves deeply into the informal 'rules-in-use' and their impacts on selected case studies, a preliminary glimpse of some informal rules is provided for this research question, without adhering to a specific structuring methodology.

Formal Rules

Formal rules, such as the Dutch Climate Agreement, Energy Agreement, and the spatial policy framework, set the broader direction and standards for wind energy projects in the Netherlands. Government mandates, regulatory protocols, and incentives together provide a structured framework within which entities in the sector must operate. Spanning from national to local levels, these directives delineate the operational boundaries for all involved entities.

Informal Rules

Beyond the formal regulations, underlying customs and practices significantly influence the behavior of actors in action arenas. CWEPDs prioritize professionalism, resource management, and profit optimisation. In contrast, LECs concentrate on community involvement, local benefits, and inclusive decision-making. This divergence is evident in their relationships and integration with communities. LECs, through their community ties, have built trust over time, highlighting mutual benefits and clear governance. Conversely, CWEPDs, not necessarily originating from the local area, often encounter resistance from local communities and find it more challenging to establish trust. Yet, LECs, while following the same regulations, incorporate community conventions and discussions into their strategies. The focus on local ownership aligns with community feelings, ensuring a balance between business pursuits and community interests.

This chapter offered a detailed exploration of the Dutch wind energy landscape. The insights served as a foundation for subsequent evaluations. Chapter 5 continues with an examination of the individual cases through the lens of the IAD framework.

5 Individual Case Study Results

This chapter presents the findings from the individual case studies through the lens of the IAD framework. The final case selections are detailed in section 5.1. Section 5.2 outlines the stakeholders who were interviewed as part of this research. The outcomes derived from using the IAD framework are elaborated in section 5.3. The scoring system employed to analyse trends linked to LECs and CWEPDs is elaborated upon in section 5.4. The aggregated scores for each case are presented in section 5.5, while section 5.6 details the outcomes of the projects, setting the foundation for analyses in the subsequent chapters. Conclusively, section 5.7 integrates the insights from the IAD framework, providing a comprehensive answer to the second research question.

5.1. Case selection

Organisations like WindStats.nl and Bosch & van Rijn have generously shared with me comprehensive data on all extant wind turbines in the Netherlands. The foundation HIER published an extensive overview of all cooperative wind projects on their website (HIER, 2023). Drawing from these resources, a cohesive data set was compiled, serving as a robust platform for case comparison and selection. The culmination of this process identified 14 projects, detailed in table 5.1. It is noteworthy that, within the province of Flevoland, a wind farm initially studied by a Bachelor's End Projects Student was omitted, as it did not align with the prescribed selection criteria.

Case	Province	Percentage LEC (%)	No. of Turbines*	Mast Height (m)	Avg. Cap.* (MW/turbine)	Dist. First House* (m)	Dist. First Res. Area* (m)	Repowering
Kookepan	Limburg	100	3	132	4.5	450	2000	No
Ospeldijk	Limburg	50	4	135	4	435	2500	No
Greenport Venlo	Limburg	0	9	140	4.5	340	1800	No
Nijmegen-Betuwe	Gelderland	95	4	99	2.5	450	900	No
Koningspleij	Gelderland	50	4	120	3	500	720	No
Deil	Gelderland	36	11	140	4.2	430	2000	No
Avri	Gelderland	25	3	120	3.6	750	1500	No
Bijvanck	Gelderland	0	4	117	4.4	450	1500	No
Groene Delta	Gelderland	0	2	115	3.6	430	480	No
Oostzeedijk	Zeeland	100	3	85	5.7	500	1200	Yes
Jacobahaven	Zeeland	0	3	90	4.2	230	750	Yes
Battenoord	South Holland	50	6	95	3.6	500	2000	No
Oude Maas	South Holland	0	5	120	3.6	200	750	No
Jaap Rodenburg II	Flevoland	20	10	100	3.8	1500	1600	Yes

*No. of Turbines: Total number of wind turbines installed
*Avg. Cap.: Average turbine capacity
*Dist. First House: Distance from the wind farm to the nearest house
*Dist. First Res. Area: Distance from the wind farm to the nearest residential area

Table 5.1: Wind turbine case details

5.2. Interviews

A methodological approach incorporated expert interviews and desk research, enriching the IAD framework. An overview of interviewees' roles is in table 5.2. While expert names are undisclosed for privacy, their roles provide context. To maintain confidentiality, links between functions and cases are not revealed, preventing indirect identification.

Function	Number of Interviews
Commercial Project Developer	6
Board Member of Energy Cooperative	8
Municipal Employee Involved in the Project and Process	10
Provincial Employee Involved in the Project and Process	1
Permit Application Guide (Consultant)	2
Wind Turbine Opposition Group	2
Total	29

Table 5.2: Number of interviews by function

5.3. IAD Findings on Institutional Rules

This section presents the findings from each individual case analysis and explore the differences in rule adherence between CWEPDs and LECs. I personally analysed six cases and these analyses are provided as supplementary materials in this study. One of the case studies can be seen in appendix E.2. However, due to strict privacy constraints, the IAD analyses carried out by the bachelor's students have not been directly presented in the thesis. I do however have full accessibility on their results and materials. For those interested in accessing the data, please contact Rutger van Bergem at R.vanBergem@tudelft.nl. It should be noted that this data will be stored for a maximum duration of three years.

Information Rule

In CWEPD and LEC projects there was a noticeable difference in information dissemination. For example, wind farm Kookepan (100% LEC) stands out. To maintain transparency, the LEC disseminated detailed updates on the project's progress through multiple avenues, including regular meetings, individual discussions, the LECs website, newsletters, and public sessions. This approach ensured all stakeholders were consistently informed and engaged throughout the project. Those who needed more information or had questions knew where to go. Other LEC projects like Koningspleij (50%) also exhibited effective information exchange, though some challenges persisted due to due to differing opinions between community members and project initiators. Nijmegen-Betuwe (95% LEC) displayed efficient communication between initiators and the community, with minor setbacks due to inter-municipal differences. Across these projects, communication between project initiators and authorities remained open and consistent. More importantly, these LECs often went door-to-door to inform local residents. They conducted these "living room" conversations with people from their own village, to convey information and to involve them in the project. On the other hand, CWEPDs as seen in cases like Greenport Venlo and Bijvanck faced issues in information sharing. In Greenport Venlo, there was confusion among residents about whom to approach with their queries, as the CWEPD directed them to local authorities, who in turn redirected them back to the CWEPD. In the case of Bijvanck, the unclear rationale behind the wind park's location led to resident dissatisfaction. In contrast, CWEPD projects such as 'Groene Delta' and 'Jacobahaven' aligned more closely with the information rule, emphasising transparency from the beginning. For example, Groene Delta formed a working group that included the CWEPD, provincial representatives, and local residents to foster open dialogue. While LECs often had a open and decentralised information rule approach, the varied experiences across projects suggest that factors beyond ownership type can impact adherence to this rule.

Payoff Rule

In many LECs cases, the application of certain payoff rules was more pronounced than in CWEPDs. Bijvanck, Greenport Venlo, and Oude Maas, all CWEPD developed wind farms, often did not adequately allocate potential financial benefits from the projects to the local communities or sufficiently address negative externalities. While Greenport Venlo began discussions on financial participation and cooperative ownership, they did not finalize notable financial arrangements, affecting their performance in this regard. Similarly, the challenges encountered by Bijvanck offer valuable insights. Although local residents received some form of compensation, they perceived it as inadequate. This highlights the perception that certain negative externalities were not fully compensated. LECs on the other hand presented a range of compensation forms. While the primary aim was to ensure a fair distribution for local residents, this approach potentially reduced project delays from objections in the later stage. An illustrative example is wind farm Kookepan (100% LEC): LEC members invested €2.2 million and were allocated returns based on their contribution. Compensations based on the proximity to the wind farm was extended to local landowners and residents. Additionally, the project initiated the Kookepan Community Fund and set aside funds for sustainability and local environmental improvements. Given the limited objections faced in a later stage, the LEC's approach seemed balanced in addressing potential opposition. In summary, while LECs frequently prioritised the provision of diverse financial compensations for local residents, CWEPDs often fell short in this regard.

Position Rule

In evaluating position rules between CWEPD and LEC cases, clear differences were observed. In CWEPD projects, decision-making is mostly centralised. For example, at Greenport Venlo and Bijvanck the CWEPD largely dictated the process, with minimal involvement from government entities and the wider local community. This centralised decision-making is particularly clear in Greenport Venlo, where the CWEPD is responsible for both the project development and community engagement, with government entities mainly in advisory roles. As a result, they saw increased local resident involvement in the form of public opposition in the second stages. Contrasting, LEC projects show a more distributed approach to decision-making. Windfarms Avri and Deil, (25% & 36% LEC), blend developer-led knowhow with significant community input. Ospeldijk, (50% LEC), similarly showed this balance where both CWEPDs and LECs entities collaboratively dictate the course, and the local populace actively partakes in decision-making. Kookepan (100% LEC) is a testament to this trend, with every stakeholder, from provincial authorities to locals, having well-defined roles. The case serves as an example of multi-role projects that clearly defines the roles for all stakeholders. In summation, while CWEPDs tend towards top-down decision-making, LECs foster a more participatory approach.

Choice Rule

The choice rule exhibited similarities between CWEPDs and LECs. However, CWEPDs sometimes leaned towards more restricted options for permissible actions or less consistency in decisions taken. For instance, in 'Greenport Venlo', inconsistencies emerged with varying support from local authorities. Initially supportive, the local council later opposed the park, leading the province to take over. Challenges also surfaced when project ownership changed, and LECs faced capital raising hurdles. This situation highlighted a series of restrictive actions, leaving other stakeholders, like the local residents, feeling marginalised in the decision-making process. In the first phases of LEC projects Avri and Deil (25% & 36% LEC) collaboration between the municipality and developers led to the wind vision, designating specific areas for development. Initial choice rules balanced formal regulations and informal dialogues, aiming for a cooperative approach of developing the two wind farms. As the processes evolved, focus remained for community engagement and transparency with little changes. In general, LECs exhibited a slightly higher flexibility and consistency in choices, though the difference with CWEPDs was subtle.

Aggregation Rule

While CWEPD projects exhibited a range of how actors jointly affect collective decision-making, LECs predominantly veered towards collaborative engagements. CWEPDs, exemplified by Groene Delta, Greenport Venlo and Bijvanck, showcased a diverse application of aggregation rules. Groene Delta, for instance, leans towards a more inclusive approach with substantial collaboration. Contrarily, Greenport Venlo predominant employed individualistic decision-making, emphasising the project owner's authority. Bijvanck, a CWEPD project, shows little collaborative decision-making and the action arena is predominantly influenced by one regional business association. These examples hints that decision-making in CWEPD projects are not easily influenced by external stakeholders, leading to individualistic choices. On the other hand, LECs predominantly display more inclusive aggregation rule behaviour. Taking wind farm Ospeldijk as an empirical case: in its first phase, a wide spectrum of key actors, from provincial and municipal governments to LECs and CWEPDs, played active roles. Decisions were not unilateral; they encapsulated co-creation and coalition building. The second phase was influenced by broad-based consultations and community engagement, signifying the role of aggregation rules. This inclusive approach also expedited the completion of the project with less community resistance. In general, CWEPDs display a wide range of decision-making approaches, whereas LECs tend to favor collaborative collective decision-making.

Boundary Rule

The Boundary rule's implementation in the cases showed subtle differences between CWEPDs and LECs. Wind farm Jacobahaven, under CWEPD management, illustrated a relatively open action arena in its first phase. Early in the project, they organised informational evenings where local residents could gather information and make arrangements concerning noise and shadow flicker. However, the arena became somewhat restrictive in the second phase, which resulted in residents showing increased reservations and more legal objection, resulting in a prolonged second phase. Similarly, CWEPD projects like Greenport Venlo and Bijvanck often had limited stakeholder involvement. In contrast, LEC projects like Kookepan (100% LEC) often had more open engagement. The project's participation guidelines evolved over time. Starting with the LEC, it expanded to involve the municipality and later broadened to engage local residents, promoting extensive collaboration. Such instances highlight the potential benefits of LECs in fostering inclusively in wind farm projects.

Scope Rule

Both CWEPDs-owned and LECs-owned cases presented distinct patterns in their application of the scope rule, without clear differences between the two categories. However, LECs have exhibited a slightly greater openness to change. For instance, some LECs have displayed flexibility in outcomes, such as the potential addition or placement of turbines. Koningspleij (50% LEC) is such a case in point, evolving from a three-turbine design to include a fourth turbine. In essence, both forms showed varied application of the Scope rule, and the organisational structure did not necessarily dictate the level possible (and impossible) outcomes of interaction in a particular arena.

5.4. Scoring System for Cross-case Analyses

A scoring system was developed using the seven rules-in-use. This system facilitated the conversion of insights from individual cases into metrics for cross-case comparison. Each rule has been structured to translate qualitative observations into quantitative scores, with each score reflecting the extent to which a particular rule type is evident

Information rule

Definition: Specified the amount and type of information available to participants (e.g., about the technology, policies, meetings, or costs- and benefits) and whether this information was freely and openly shared among all participants.

- **0** Info was highly closed. The amount and type of information available was highly specific and limited, covering very few topics. Information sharing was entirely restricted, not open to any participants.
- **0.2** Info was mostly closed. The information available was quite limited, covering only a small range of topics. Some information was shared between the project initiators and the authority, but none was shared with those experiencing negative externalities.
- **0.4** Info was closed. There was a moderate amount of information available, but it remained somewhat restricted in its range of topics. Most of the information was shared between project initiators and the authority, with only a bit of it being shared with those experiencing negative externalities.
- **0.6** Info was more open than closed. A balanced mix of information was available, covering a wider range of topics. Information sharing was open among all actors, but some participants were not entirely sure how to access certain information or acquire specific knowledge.

0.8 Info was open and shared among all participants. The range of information available was broad, spanning a variety of topics. While the information was open to all, it was not presented or stored in a neutral location that was easily accessible to everyone.

1 All information was open and shared among everyone. The range of information available was comprehensive, covering an extensive variety of topics. Information sharing was completely open, with every participant having unrestricted access to all information. Nothing was held back.

Payoff rule

Definition: Specified the costs and benefits resulting from specific actions and outcomes. It ensured these costs and benefits were clear, equitably shared, and perceived as balanced and fair by all participants. Additionally, the rule considered the availability of options to compensate for negative externalities and the extent of such externalities.

0 Costs and benefits resulting from specific actions and outcomes were highly specific and focused. The distribution was significantly skewed and perceived as unfair by many participants. There were no options to compensate for negative externalities.

0.2 A ”Community Benefit Fund” was established. However, no other forms of compensation for negative externalities were provided. The distribution of costs and benefits was somewhat focused, and some participants may have perceived it as unfair.

0.4 A ”Community Benefit Fund” was in place. Additionally, some forms of negative externality compensation were provided: for example, compensation for diminished house value as a direct compensation for those living close by. Most participants viewed this distribution as reasonably fair.

0.6 A ”Community Benefit Fund” was set up, and multiple forms of negative externality compensation were provided: compensation for diminished house values, direct compensation for nearby residents, extra noise reduction agreements, and extra wing shadow agreements. Nearly all participants perceived this distribution as fair.

0.8 A ”Community Benefit Fund” was utilised. Multiple forms of negative externality compensation existed, like compensation for diminished house values, direct compensation for nearby residents, noise reduction agreements, and wing shadow agreements. Additionally, financial participation and obligation options were available, making the distribution more equitable.

1 All financial gains flowed back to the local area, benefiting the inhabitants where the wind turbines were located. Financial compensations were abundant, ensuring a wide array of options to offset negative externalities. Every participant perceived the distribution of costs and benefits as fair.

Position rule

Definition: Specify the roles that various actors hold in the process, including the project initiators, municipality and residents. Additionally, it considers whether the actors are aware of their positions and act according to their responsibilities, such as if the province and municipality perform their tasks and take responsibility when necessary.

0 Roles and responsibilities in the planning process are highly undefined, leading to significant confusion among actors. There is a profound lack of awareness among actors regarding their roles, and responsibilities are rarely fulfilled as they should be.

0.2 Roles are mostly undefined. The local council votes against the plan, causing the province to intervene with a Provincially Initiated Plan (PIP). This approach introduces further uncertainties about actor responsibilities in the broader planning process. Many actors, including LECs and CWEPDs are uncertain of their exact duties.

0.4 The local council supports the plan, but roles remain more undefined than defined. The municipality and province have some awareness of their responsibilities but do not act comprehensively, leaving actors uncertain about responsibilities.

0.6 Roles are more defined than undefined. With the local council's approval, the province adopts a hands-off approach, allowing the municipality to lead. Despite this, some participants remain unsure about specific responsibilities.

0.8 Roles are clearly defined. An acceleration team, appointed by the province, is established to enhance process efficiency. Minor confusion persists about specific role details and interconnected responsibilities.

1 All roles in the process are comprehensively defined. Every actor, from the province to local residents, understands their responsibilities. The province's acceleration team ensures smooth operations, with all stakeholders confident in the overseeing authorities.

Choice rule

Definition: This rule described possible actions for actors in specific roles under certain conditions, whether due to informal agreements or driven by policy tools, laws, or regulations. The emphasis was on the latitude and flexibility of choices within the given framework.

0 Actions were highly restrictive. Most stakeholders lacked real choices, with a dominant authority driving unilateral decision-making.

0.2 There was a nominal allowance for stakeholder input, but it was largely symbolic. Regulatory confines were tight, offering minimal flexibility for diverse influence.

0.4 Actor choices were largely pre-set. While influential groups might have had some input, many felt their choices were limited.

0.6 A more balanced distribution of choice became evident. While key stakeholders had significant influence, local residents and action groups also felt they could make choices within bounds.

0.8 Most stakeholders had extensive choices available. Regulatory or procedural constraints were viewed as necessary safeguards rather than arbitrary limits. Most felt empowered to actively participate.

1 An environment existed where every stakeholder had a great number of choices. There were no unwarranted restrictions, with all feeling flexible in decision-making.

Aggregation rule

Definition: Specified how decisions were made, either individually or collaboratively. It clarified the influence of each actor when multiple positions had partial control over the same decision, affecting how actors jointly impacted collective decision-making. It aimed to understand the balance between individual decision-making and collective consensus among stakeholders like the province, local government, project developers, residents, and action groups.

0 Decision-making was primarily individualistic. The project owner or primary stakeholder exerted almost total control, leaving no space for inputs from other actors.

0.2 Limited collaboration was observed. While the primary stakeholder maintained significant control, minor decisions might have been open for input from specific influential groups, like the local government.

0.4 Some joint decision-making was evident. A few key stakeholders, such as the local residents and local government, were involved in select decisions, but there was still a notable dominance by the project owner.

0.6 Balanced decision-making. Most stakeholders, including local residents and action groups, had a say in the decision-making process. While the project owner may still have had a slightly more dominant role, the influence of other actors was evident.

0.8 Predominantly collaborative. Almost all decisions were made through a joint process, with each stakeholder, from local residents to the province, playing significant roles. The project owner's dominance was considerably reduced, ensuring a more inclusive approach.

1 Entirely collaborative. Every stakeholder, irrespective of their scale or influence, was equally involved in the decision-making process. The project saw a true coalition of stakeholders, with each having an equal say in the project's outcomes.

Boundary rule

Definition: Determined (1) who was eligible to engage in the decision-making process, (2) the process by which actors were allowed to participate, and (3) the ways actors could exit the decision-making process.

0 The engagement process was highly complicated and exclusive. Stringent conditions allowed only select actors, chosen by the dominant authority, to enter or exit the action situation.

0.2 Some allowance existed for additional actors to engage, mostly limited to entities like local government and LECs. Local residents and action groups faced complex requirements and limited representation.

0.4 Participation became more inclusive. Local governments, LECs, and selected organisations were involved. However, local residents mainly engaged through one-off surveys or public hearings without continuous involvement.

0.6 A more inclusive approach was adopted. Local government, LECs, action groups, and many local residents actively participated. While minor barriers for broader public participation might have existed, the process became more inclusive.

0.8 Nearly all stakeholders, from LECs to individual residents, could participate in decision-making. Mechanisms ensured diverse group voices were heard. Minor nuances, like weighted voting for specific groups, may have persisted.

1 The decision-making process was wholly democratic and inclusive. Every participant had equal access to the action arena, with all votes having equal weight. Residents and others could actively engage in decision-making without direct obligations.

Scope rule

Definition: The scope rule defined the range of feasible outcomes stemming from actor interactions in a specific action arena. Within the context of wind park realisation, this rule evaluated the extent to which project details, such as location, number of turbines, and environmental measures, could be flexibly adjusted or if they were rigidly predetermined.

0 Strictly predetermined. Key details were set in stone, leaving stakeholders with no room to effect significant changes.

0.2 Minimal flexibility. While slight modifications, like infrastructure tweaks, were permissible, the main project parameters were non-negotiable.

0.4 Moderate flexibility. Principal features, such as the site of the wind park, might have been predetermined, but other attributes like the number of turbines could be adjusted.

0.6 Considerable flexibility. Stakeholders had the capability to suggest and incorporate major changes in diverse project elements.

0.8 Pronounced adaptability. Save for a few non-negotiable aspects, most of the project attributes were open to stakeholder input and adjustments.

1 Utmost flexibility. Stakeholders possessed comprehensive authority over the project's planning and roll-out, ensuring the final output mirrored collective consensus.

5.5. Overview of Scores Per Case

Using the aforementioned scoring system, scores were assigned to each case. The scores can be viewed in Table 5.3. For a deeper understanding of the findings and the reasoning behind the scores given, refer to the detailed IAD frameworks provided in the supplementary work.

Case	%LEC	Information rule	Payoff rule	Position rule	Boundary rule	Choice rule	Scope rule	Aggregation rule
Oostzeedijk	100	0.8	0.8	0.6	0.6	0.6	0.6	0.8
Kookepan	100	0.8	0.8	1.0	0.8	0.8	0.6	0.8
Nijmegen-Betuwe	95	0.6	0.8	0.6	0.6	0.4	0.6	0.8
Battenoord	50	0.6	0.8	0.8	0.6	0.4	0.4	0.6
Koningspleij	50	0.6	0.8	0.8	0.6	0.6	0.8	0.8
Ospeldijk	50	0.8	0.8	0.8	0.8	0.6	0.6	0.8
Deil	36	0.8	0.8	0.8	0.6	0.8	0.6	0.8
Avri	25	0.8	0.8	0.8	0.6	0.8	0.4	0.8
Jaap Rodenburg II	20	0.6	0.8	0.8	0.6	0.6	0.4	0.6
Bijvanck	0	0.2	0.2	0.2	0.4	0.4	0.6	0.4
Greenport Venlo	0	0.4	0.4	0.2	0.2	0.2	0.4	0.2
Groene Delta	0	0.8	0.6	0.8	0.6	0.8	0.4	0.8
Jacobahaven	0	0.6	0.6	0.6	0.6	0.4	0.4	0.6
Oude Maas	0	0.2	0.4	0.4	0.6	0.4	0.4	0.6
MIN		0.2	0.2	0.2	0.2	0.2	0.4	0.2
AVERAGE		0.6	0.7	0.7	0.6	0.6	0.5	0.7
MAX		0.8	0.8	1.0	0.8	0.8	0.8	0.8

Table 5.3: Scores of cases ased on the seven rules-in-use

Although no significance tests had been conducted at this stage, certain observations were evident. CWEPD cases showed a wider range of scores, varying from a low of 0.2 to a high of 0.8 in specific rule categories. In contrast, LEC cases typically registered higher scores. Figure 5.1 illustrates a comparison of the rule scores between LECs and CWEPDs. For this representation, all projects involving LECs were collectively categorised as 'LEC'. While no statistical tests were applied, the figure suggests that projects with LEC involvement generally achieved higher scores on the rules

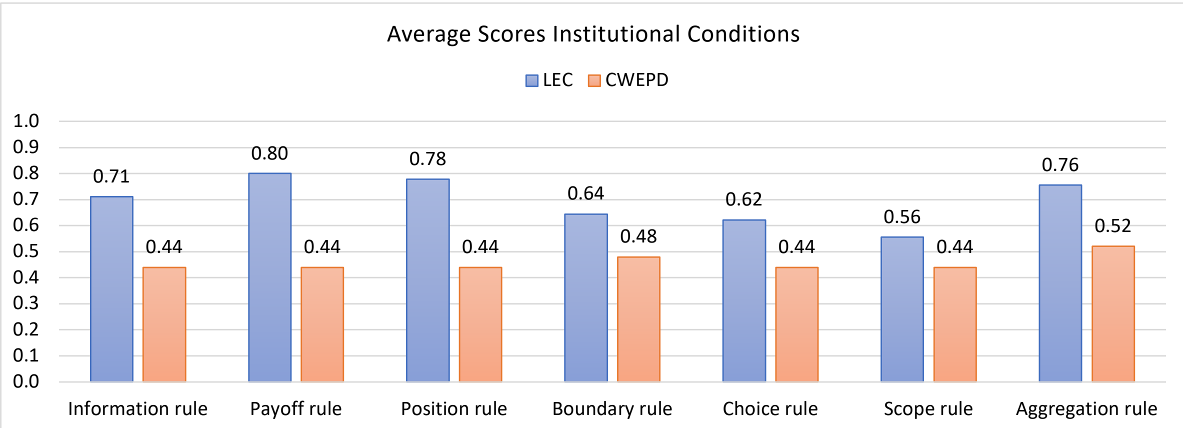


Figure 5.1: Comparison of average scores on the rules-in-use

5.6. Individual Outcomes of the Examined Cases

Table 5.4 provides an overview of the outcomes of the cases. The table outlines the project durations, including the duration of the two phases. It also indicates the number of views during permit application and the number of appeals to the Council of state. Other than presenting the findings from the IAD analysis and making a number of first observations, no tests were conducted on these outcomes. A more detailed analysis is undertaken in Chapters 6 and 7. The following observations appeared:

1. **Duration**: Projects led by LECs appeared to exhibited shorter completion times. This observation was particularly evident in the second phase.
2. **Community Engagement and Disputes**: LECs appeared to face fewer legal challenges, such as appeals to the Council of State. IAD analysis found that LECs generally had better alignment

with community interests which possibly leads to fewer disagreements. Also the occurrence of forced provincial takeovers as found in the case studies of only the CWEPD projects could indicate potential governance issues.

3. **Ownership Dynamics**: Initial observations suggested a possible correlation between the degree of LEC ownership and project duration. Projects with a higher percentage of LEC ownership generally progressed through the project more quickly.

In essence, the results indicated potential benefits of LECs involvement in wind energy projects, notably in project duration, community alignment, and legal aspects. Further statistical analyses was crucial for a more definitive understanding.

Case	Percentage LEC (%)	Duration Phase 1 (months)	Duration Phase 2 (months)	Total Duration (months)	No. Views*	No. Appeals*
Oostzeedijk	100	21	37	58	0	0
Kookepan	100	38	29	67	26	2
Nijmegen-Betuwe	95	24	12	36	4	1
Battenoord	50	32	38	70	353	5
Koningspleij	50	39	49	88	154	10
Ospeldijk	50	21	29	50	17	1
Deil	36	27	18	45	30	1
Avri	25	27	26	53	19	3
Jaap Rodenburg II	20	43	34	77	22	1
Bijvanck	0	15	81	96	56	7
Greenport Venlo	0	50	47	97	58	1
Groene Delta	0	39	38	77	108	4
Jacobahaven	0	27	54	81	60	4
Oude Maas	0	51	52	103	331	10
MIN		15	12	36	0	0
AVERAGE		32	39	71	88	4
MAX		51	81	103	353	10

*No. Views: Number of public views after permit application
*No. Appeals: Number of appeals lodged with the Council of State

Table 5.4: Outcomes of wind energy cases: Project Duration and Legal Procedures

5.7. Conclusion

The IAD framework by Ostrom offered valuable insights into LEC and CWEPD projects. Throughout this analysis, the adherence of rules has emerged as a significant indicator of project success and alignment. LECs, underpinned by community trust and community-based engagement, generally manifest a higher adherence to these rules, in contrast to CWEPDs which exhibit a more varied range of adherence scores. This distinction, however, is nuanced, with projects like Greenport Venlo and Bijvanck presenting exceptions to the observed trends.

The rule-by-rule breakdown revealed the following:

- **Information Rule:** LECs consistently kept stakeholders informed and engaged, leveraging local relationships and trust. CWEPDs, on the other hand, have demonstrated varied transparency levels showing gaps in communication and misdirection of stakeholder queries.
- **Payoff Rule:** LECs often prioritized fair financial compensation for local residents, promoting community buy-in which reduced potential project delays. CWEPDs have at times been perceived by those experiencing negative externalities as providing inadequate compensation.
- **Position Rule:** LEC projects adopted a more participatory and distributed decision-making approach, contrasting with the centralised decision-making often seen in CWEPD projects. Moreover, municipalities seemed more willing to cooperate with LECs than with CWEPDs.
- **Boundary Rule:** LECs fostered inclusivity in their action arenas, while CWEPDs were more restrictive, affecting stakeholder sentiment and project timelines.

- **Choice Rule:** While there were overarching similarities between LECs and CWEPDs in decision-making flexibility, LECs tended to display slightly higher adaptability, emphasising choice consistency and informal dialogues.
- **Scope Rule:** Both LECs and CWEPDs exhibited variability in project adaptability, but LECs generally leaned towards greater flexibility and openness to change.
- **Aggregation Rule:** LECs leaned towards collective and inclusive decision-making. In contrast, CWEPDs leaned towards more unilateral and individualistic decision-making.

Overarching these specific rules, trust emerged as an indispensable factor, enhanced by LECs' community-centric approach. Trust-building activities, such as door-to-door community engagement by LECs, distinguish them from some CWEPDs, thereby influencing the adherence to and impact of the various rules. "If I run into that person in the supermarket, I still want to be able to look him straight in the eyes, after I've sat in his kitchen to convince him to participate in this project." This sentiment captures the essence of the findings, serving as a prime example of how LECs worked in enhancing and valuing trust. In contrast, CWEPDs faced greater challenges in gaining trust within the local community. However, this could be mitigated by adequately informing the community from the outset and engaging residents through working groups and allow them to participate in the action arena. Financial benefits to residents, such as the creation of substantial community funds that are perceived adequately, also played a role. This approach seemed to reduce objections and accelerates the process, irrespective of the organisation form. However, there could be other explanations for the differences in project outcomes. These may include prior experiences that offer insights into potential challenges, concerted efforts that drive public engagement and external considerations such as location value. Given these insights, follow-up studies were essential to solidify the causative relationships between institutional forms and project outcomes.

This chapter addressed the second sub-question. It set the stage for cross-case examinations in chapters 6 and 7, where the interplay of the conditions were further explored.

6 Statistical Tests Results

This chapter examined the relationships between organisational forms, the scores, and outcomes using statistical tests. Each test focused on specific research variables to provide insights into the main research hypothesis. **Test 1** (see section 6.1), confirms the similarities among the selected cases and ensures that differing factors have no effect on the outcome. **Test 2** (section 6.2) explores the relationship between the scores and organisational forms. **Test 3** (section 6.3) is similar to Test 2 but centers on the relationship between percentage of LECs ownership in a project and the scores. Moving to **Test 4** (section 6.4), the focus shifts to outcomes linked to specific organisation forms. This test examines how the LEC and CWEPD forms influence outcome variables, such as duration, views, and appeals. **Test 5** (section 6.5) is a more detailed version of Test 4. It studies the relationship between percentages of LECs ownership and outcome variables, aiming to understand if outcomes change based on LECs ownership levels. Finally, **Test 6** (section 6.6) investigates the relationship between scores and outcomes without focusing on organisational forms. The objective here was to identify which institutional conditions affect the outcome variables. The chapter concludes in section 6.7, summarising the findings from the tests.

6.1. Statistical Test 1: Control Test

The objective of this test was to ascertain if no factors beyond the primary areas of interest influence the outcome variables. Spearman's rho was used for this analysis and the results are presented in table 6.1.

In assessing the influence of other factors on primary outcome variables (duration, number of appeals, and number of views), several parameters were considered. It becomes clear that the number of wind turbines, mast height and repowering did not exhibit a significant correlation with these outcomes at the examined significance levels.

The following observation emerges: there is a negative correlation between "No. Appeals" and "Avg. Capacity" (*Spearman's rho*, $p = 0.059$). This implies that as the average capacity decreases, there tends to be an increase in the number of appeals lodged with the Council of State. However, this observed correlation does not necessarily imply a causative relationship for all outcome variables. Additionally, given the seemingly counter intuitive association of lower capacity with more appeals, there exists the possibility of a spurious correlation. Therefor in subsequent tests, the average capacity was deemed to not have a significant correlation with the outcome variables.

The only variable that indicates a significance with multiple primary outcomes is "Distance to the First Residential Area". It correlates negatively with the duration (*Spearman's rho*, $p = 0.074$), especially the duration of phase 2 (*Spearman's rho*, $p = 0.056$), and with the number of appeals (*Spearman's rho*, $p = 0.054$). This particular variable appears to have an impact on the selected cases. The correlations indicate that the processes of wind farms may have been influenced by the proximity to residential areas. This could potentially affect the reliability of subsequent analyses. Therefore, additional tests

Spearman's Rho	Total Duration	Duration Phase 1	Duration Phase 2	No. Views	No. Appeals	No. Turbine	Mast Height	Avg. Cap.	Dist. House	Dist. Res. Area
Duration Phase 1	.559**	-	-	-	-	-	-	-	-	-
$p-value$	(.019)	-	-	-	-	-	-	-	-	-
Duration Phase 2	.903***	.224	-	-	-	-	-	-	-	-
$p-value$	(<.001)	(.221)	-	-	-	-	-	-	-	-
No. Views	.684**	.580*	.663**	-	-	-	-	-	-	-
$p-value$	(.003)	(.015)	(.005)	-	-	-	-	-	-	-
No. Appeals	.612**	.288	.656**	.804***	-	-	-	-	-	-
$p-value$	(.010)	(.159)	(.005)	(<.001)	-	-	-	-	-	-
No. Turbine	.101	.291	-.065	.178	-.118	-	-	-	-	-
$p-value$	(.365)	(.157)	(.412)	(.272)	(.345)	-	-	-	-	-
Mast Height	.0240	.254	-.206	.042	-.043	.353	-	-	-	-
$p-value$	(.467)	(.191)	(.240)	(.443)	(.442)	(.108)	-	-	-	-
Avg. Cap.	.104	-.225	.148	-.278	-.437*	-.035	.141	-	-	-
$p-value$	(.362)	(.219)	(.306)	(.168)	(.059)	(.452)	(.315)	-	-	-
Dist. House	-.326	-.198	-.333	-.362	-.154	-0.305	-.169	-	-	
$p-value$	(.128)	(.249)	(.123)	(.102)	(.300)	(.472)	(.145)	(.282)	-	-
Dist. Res. Area	-.396*	-.222	-.435*	-.288	-.447*	.456*	.440*	.418*	0.181	-
$p-value$	(.080)	(.224)	(.060)	(.159)	(.055)	(.051)	(.057)	(.068)	(.297)	-
Repowering	-.043	.087	-.151	.281	.354	.110	.630**	-.350	-.196	.174
$p-value$	(.442)	(.384)	(.303)	(.166)	(.107)	(.354)	(.008)	(.110)	(.251)	(.276)

*	Correlation is significant at the 0.1 level (1-tailed)
**	Correlation is significant at the 0.05 level (1-tailed)
***	Correlation is significant at the 0.01 level (1-tailed)

Table 6.1: Spearman's rho correlation table for control variables

were performed to further assess its influence. Table 6.2 indicates that there is no significant correlation between this variable and either of the two organisational forms. Table 6.3 indicates that there is no significant correlation between this variable and the institutional conditions and percentage LECs ownership. Based on the statistical results of these two tests, this particular variable was deemed to not have a significant influence on the outcome of interest.

	Distance Res. Area
Mann-Whitney U	10
Z	-1.680
p-value	0.112

*	Correlation is significant at the 0.1 level (1-tailed)
**	Correlation is significant at the 0.05 level (1-tailed)
***	Correlation is significant at the 0.01 level (1-tailed)

Table 6.2: Mann-Whitney U results for organisation form and Distance to Residential Area

Spearman's Rho	Distance Res. Area
Percentage LECs Ownership	0.339
$p - value$	(0.118)
Information rule	0.245
$p - value$	(0.200)
Payoff rule	0.357
$p - value$	(0.105)
Position rule	0.308
$p - value$	(0.142)
Boundary rule	0.276
$p - value$	(0.170)
Choice rule	0.085
$p - value$	(0.387)
Scope rule	0.098
$p - value$	(0.370)
Aggregation rule	-0.058
$p - value$	(0.421)

*	Correlation is significant at the 0.1 level (1-tailed)
**	Correlation is significant at the 0.05 level (1-tailed)
***	Correlation is significant at the 0.01 level (1-tailed)

Table 6.3: Results of Spearman's rho correlation between Distance to Residential Areas, Institutional Conditions, and Percentage of LECs

6.2. Statistical Test 2: Correlation Test Organisational Form and the Institutional Conditions

This test examined the correlation between institutional conditions and the organisational forms. The outcomes of this test are depicted in table 6.4.

"Payoff Rule" is found to have a significant effect (*Fisher's-exact*, $p =< 0.01$), suggesting a potential link between the payoff rule and cases with LECs ownership. This indicates that LECs might have a tendency to score higher in payoff rules. Additionally, correlations are identified for the "Information Rule" (*Fisher's-exact*, $p = 0.101$) and "Aggregation Rule" (*Fisher-exact*, $p = 0.063$). This suggests a potential relationship between higher scores for these rules and LECs. For rules such as "Position Rule" (*Fisher-exact*, $p = 0.112$), "Boundary Rule" (*Fisher's-exact*, $p = 0.215$), "Choice Rule" (*Fisher's-exact*, $p = 0.191$), and "Scope Rule" (*Fisher's-exact*, $p = 0.371$), no significant correlation is found with either of the organisational forms at the examined significance levels.

	Scores						
Fisher's Exact	**0**	**0.2**	**0.4**	**0.6**	**0.8**	**1**	***p*-value**
Information Rule							0.101*
CWEPD	0	2	1	1	1	0	
LEC	0	0	0	4	5	0	
Payoff Rule							<0.01***
CWEPD	0	1	2	2	0	0	
LEC	0	0	0	0	9	0	
Position Rule							0.112
CWEPD	0	2	1	1	1	0	
LEC	0	0	0	2	6	1	
Boundary Rule							0.215
CWEPD	0	1	1	3	0	0	
LEC	0	0	0	7	2	0	
Choice Rule							0.191
CWEPD	0	1	3	0	1	0	
LEC	0	0	2	4	3	0	
Scope Rule							0.371
CWEPD	0	0	4	1	0	0	
LEC	0	0	3	5	1	0	
Aggregation Rule							0.063*
CWEPD	0	1	1	2	1	0	
LEC	0	0	0	2	7	0	

* Correlation is significant at the 0.1 level (2-tailed)
** Correlation is significant at the 0.05 level (2-tailed)
*** Correlation is significant at the 0.01 level (2-tailed)

Table 6.4: Fisher's-exact results for Organisation form (LEC vs CWEPD)

In conclusion, while the ”Payoff Rule”, ”Information Rule” and ”Aggregation Rule” showed some degree of correlation with the LECs, other rules did not indicate a notable relationship with any specific organisational form.

6.3. Statistical Test 3: Correlation Test Percentage of LECs Ownership and the Scores

In this analysis, the relationship between the percentage of LECs ownership in a project and the scores is assessed using Spearman's rho. The results are detailed in table 6.5.

A positive correlation is found for the ”Pay-off Rule” (*Spearman's rho*, $p =< 0.001$), suggesting a potential association between this rule and the percentage of LECs ownership. Similarly, the ”Scope Rule” (*Spearman's rho*, $p = 0.009$) and the ”Aggregation Rule” (*Spearman's rho*, $p = 0.006$) exhibit positive correlations, indicating a potential association with the percentage of LECs ownership. Additionally, correlations are identified for the ”Information Rule” (*Spearman's rho*, $p = 0.027$), ”Position Rule” (*Spearman's rho*, $p = 0.036$), and ”Boundary Rule” (*Spearman's rho*, $p = 0.012$). These findings suggest a possible relationship between these rules and the percentage of LECs ownership. The ”Choice Rule” (*Spearman's rho*, $p = 0.127$) does not show a significant correlation at the examined significance levels, suggesting that this particular rule might not have a strong association with the percentage of LECs ownership among the conditions assessed.

Spearman's Rho	Percentage LEC Ownership
Information rule	.526**
$p - value$	(0.027)
Payoff rule	.832***
$p - value$	(<.001)
Position rule	.496**
$p - value$	(0.036)
Boundary rule	.596**
$p - value$	(0.012)
Choice rule	0.327
$p - value$	(0.127)
Scope rule	.619***
$p - value$	(0.009)
Aggregation rule	.655***
$p - value$	(0.006)

* Correlation is significant at the 0.1 level (1-tailed)
** Correlation is significant at the 0.05 level (1-tailed)
*** Correlation is significant at the 0.01 level (1-tailed)

Table 6.5: Spearman's rho correlation coefficient results for Percentage LEC Ownership

In conclusion, only the "Choice Rule" does not present a notable association with the percentage of LECs ownership at the explored significance levels.

6.4. Statistical Test 4: Correlation Test Organisational Form and the Outcome Variables

This test contrasts outcome variables CWEPDs projects between those with LECs ownership using the Mann-Whitney U test. Statistical significance is gauged by the p-value in table 6.6. When significant, median values in table 6.7 reveal which group typically had higher or lower values for the variables.

	Total Duration	Duration Phase 1	Duration Phase 2	No. Views	No. Appeals
Mann-Whitney U	2.500	15.500	2.500	9.000	11.500
Z	-2.670	-0.940	-2.673	-1.800	-1.503
p-value	.004b***	.364b	.004b***	.083b*	.147b

* Correlation is significant at the 0.1 level (1-tailed)
** Correlation is significant at the 0.05 level (1-tailed)
*** Correlation is significant at the 0.01 level (1-tailed)

Table 6.6: Mann-Whitney U results for Organisational Form and Outcome Variables

	Total Duration	Duration Phase 1	Duration Phase 2	No. Views	No. Appeals
Median LEC	27	29	58	22	1
Median CWEPD	39	52	96	60	4

Table 6.7: Median for outcome variables per organisation form

For the variable "Total Duration" with (*Mann-Whitney U*, $p = 0.004$), there is a statistically significant difference in medians between LECs and CWEPDs. "Duration Phase 2" with (*Mann-Whitney U*, $p = 0.004$) reveals a similar observation. When examining the median values, project with LECs ownership appear to have shorter durations, notably during the second phase. The variable "Number of Views" is found to have a significant effect (*Mann-Whitney U*, $p = 0.083$), suggesting that LECs seem to receive fewer views. For both "Duration Phase 1" and "Number of Appeals to the Council of State", no significant p-values are recorded, leading to the retention of the null hypothesis for these variables across the tested significance levels.

To summarize, there is evidence indicating that project with LECs ownership influenced project durations, particularly in the second phase. LEC projects have concluded faster and generally received fewer views on permit applications. However, evidence does not suggest that the LEC form had a significant impact on the number of appeals made to the Council of State. Following tests provide insights into potential institutional conditions affecting these outcomes.

6.5. Statistical Test 5: Correlation Test Percentage of LECs Ownership and the Outcome

This test examined the correlation between the percentage of LECs ownership and outcome variables using Spearman's rho. The results are presented in table 6.8.

Spearman's Rho	**Percentage LEC Ownership**
Time Total	-.655***
$p - value$	(0.004)
Time Phase 1	-0.358
$p - value$	(0.104)
Time Phase 2	-.611**
$p - value$	(0.01)
No. Views	-.506**
$p - value$	(0.032)
No. Appeals to Council of State	-0.413*
$p - value$	(0.071)

*	Correlation is significant at the 0.1 level (1-tailed)
**	Correlation is significant at the 0.05 level (1-tailed)
***	Correlation is significant at the 0.01 level (1-tailed)

Table 6.8: Spearman's rho correlation coefficient results for Percentage LEC Ownership and Outcome

Both "Total Duration" (*Spearman's rho*, $p = 0.004$) and "Duration Phase 2" (*Spearman's rho*, $p = 0.01$) were found to have a negative significant effect. This implies that wind farm projects with a greater percentage of LECs ownership experience reduced total duration and, notably, a shorter second phase. Furthermore, "No. Views" (*Spearman's rho*, $p = .032$) is found to have a negative correlation. This implies that wind farm projects with higher LECs ownership attract fewer views during the permit application process. Additional, a negative correlation is found for "No. Appeals to Council of State" (*Spearman's rho*, $p = .071$). This suggests that as the percentage of LECs ownership in wind farm projects increases, there are fewer appeals to the Council of State.

In conclusion, projects with a higher percentage of LECs ownership experienced shorter overall durations, especially during their second phase. Additionally, such projects appeared to attract fewer views during the permit application process. Meanwhile, increased LECs ownership is associated with fewer appeals to the Council of State.

6.6. Statistical Test 6: Correlation Test Scores and the Outcome

This test examined the relationship between institutional conditions and outcome variables, setting aside organisational form. Spearman's rho was employed for the analysis, with results displayed in table 6.9.

Spearman's Rho	Information Rule	Payoff Rule	Position Rule	Boundary Rule	Choice Rule	Scope Rule	Aggregation Rule
Total Duration	-.737***	-.770***	-.492**	-.533**	-.500**	-0.339	-.729***
$p-value$	(0.001)	(<.001)	(0.037)	(0.025)	(0.034)	(0.118)	(0.002)
Duration Phase 1	-0.299	-0.206	0.090	-0.117	-0.069	-.495**	-0.283
$p-value$	(0.150)	(0.240)	(0.379)	(0.346)	(0.407)	(0.036)	(0.163)
Duration Phase 2	-.669***	-.756***	-.533**	-.486**	-.536**	-0.212	-.673***
$p-value$	(0.004)	(<.001)	(0.025)	(0.039)	(0.024)	(0.234)	(0.004)
No. Views	-.483**	-.462**	-0.066	-0.267	-0.285	-0.354	-.447*
$p-value$	(0.040)	(0.048)	(0.411)	(0.178)	(0.161)	(0.107)	(0.055)
No. Appeals	-.481**	-.428*	-0.061	-0.147	-0.170	-0.123	-0.268
$p-value$	(0.041)	(0.063)	(0.419)	(0.308)	(0.281)	(0.337)	(0.177)

*	Correlation is significant at the 0.1 level (1-tailed)
**	Correlation is significant at the 0.05 level (1-tailed)
***	Correlation is significant at the 0.01 level (1-tailed)

Table 6.9: Spearman's rho correlation results for the Rules-in-Use and Outcome

Negative correlations were found between "Total Duration" and the rules: "Information" (*Spearman's rho*, $p = 0.001$), "Payoff" (*Spearman's rho*, $p =< 0.001$), and "Aggregation" (*Spearman's rho*, $p = 0.002$). Specifically, the "Duration Phase 2" within this total duration is negatively correlated with "Information Rule" (*Spearman's rho*, $p = 0.004$), "Payoff Rule" (*Spearman's rho*, $p =< 0.001$), and "Aggregation Rule" (*Spearman's rho*, $p = 0.004$). This correlation suggests that projects with higher rule scores tend to have shorter durations, especially in the second phase, resulting in reduced total project durations.

Furthermore, a negative correlation is found between "Duration Phase 1" and the "Scope Rule" (*Spearman's rho*, $p = 0.036$), implying that the initial phase's duration is influenced by higher scope rule scores. Besides, "Total Duration" is found to be negatively associated with the "Position Rule" (*Spearman's rho*, $p = 0.037$), "Boundary Rule" (*Spearman's rho*, $p = 0.025$), and "Choice Rule" (*Spearman's rho*, $p = 0.034$). Specifically, the "Duration Phase 2" has negative correlations with the "Position Rule" (*Spearman's rho*, $p = 0.025$), "Boundary Rule" (*Spearman's rho*, $p = 0.039$), and "Choice Rule" $\rho = 0.024$), underscoring that higher rule scores correlate with reduced durations in both phases. The "No. Views" metric is negatively associated with the "Information Rule" (*Spearman's rho*, $p = 0.040$) and the "Payoff Rule" (*Spearman's rho*, $p = 0.048$), suggesting that projects with higher rule scores receive fewer views during permit applications. Moreover, "No. Appeals" correlates negatively with the "Information Rule" (*Spearman's rho*, $p = 0.041$), indicating fewer appeals to the council of state with increasing information rule scores.

Furthermore, "No. Views" is found to have a negative significant correlation with the "Aggregation Rule" (*Spearman's rho*, $p = 0.055$), hinting at fewer views for projects with higher aggregation rule scores. Additionally, "No. Appeals" correlates negatively with the "Payoff Rule" (*Spearman's rho*, $p = 0.063$), suggesting that increased payoff scores lead to fewer appeals to the council of state. In conclusion:

- The "Information Rule" has negative correlations with "Total Duration", "Duration Phase 2", and "Number of Views" and is further correlated to fewer appeals to the Council of State.
- The "Payoff Rule" is associated with a reduced "Total Duration" and "Duration Phase 2", fewer permit application views, and suggests fewer appeals to the Council of State.
- Higher scores on the "Aggregation Rule" relate to shorter "Total Duration" and "Duration Phase 2" durations and fewer permit application views.

- The ”Position Rule”, ”Boundary Rule”, and ”Choice Rule” primarily influence project durations in the second phase.
- The ”Scope Rule” impacts project durations only in the first phase.

6.7. Chapter Conclusion

In this chapter, the relationship between organisation form, their institutional conditions, and the outcomes was thoroughly examined through a series of tests. The primary aim was to determine the impact of LECs on wind energy project.

Control Test Overview

The control test was conducted to evaluate potential correlations between factors, other than the primary ones of interest, and key outcomes such as duration, number of appeals, and views. Among these factors, the number of wind turbines, mast height, average capacity, and repowering exhibited no correlation with these outcomes. However, a correlation was observed with the ”Distance to First Residential Area” variable. Projects situated further from residential areas appear to have shorter durations and fewer appeals. Despite this observation, subsequent tests showed the significance of this correlation remains limited. Further research is needed to determine its influence conclusively. Nevertheless, its limited impact on the outcome indicates a consistent selection in non-significant factors.

Interplay of organisational Form and Institutional Conditions

Certain rules showed correlations with projects that have some sort of LECs ownership. Specifically, LECs project align more with the ”Payoff Rule” and also correlate with the ”Information Rule” and ”Aggregation Rule”. However, other rules like ”Position”, ”Boundary”, ”Choice”, and ”Scope” did not exhibit a significant association with any specific organisational form.

Influence of Cooperative Percentages on Institutional Conditions

A correlation has been identified between the percentage of cooperative ownership and rules like ”Payoff”, ”Scope”, ”Aggregation”. ”Information”, ”Position”, and ”Boundary”. Conversely, the ”Choice” rule did not exhibit a statistically significant correlation.

Impact of Organisational Form on Outcome

Project durations seem to differ between LECs and CWEPDs, with LECs tending to have shorter durations, especially in the project’s second phase. Additionally, project with some form of LECs ownership receive fewer views on permit applications, but the number of appeals made to the Council of State does not show a clear correlation with organisational form.

LECs Percentages and Outcomes

Higher LEC ownership percentages correlate with shorter project durations, especially in the second phase. Furthermore, these projects tend to have fewer views during the permit application process and a reduced number of appeals to the Council of State.

Correlation of Institutional Conditions and Outcome

The ”Information Rule and Payoff Rule” displayed negative correlations with ”Total Duration”, ”Duration Phase 2”, and ”Number of Views”, further suggesting fewer appeals to the Council of State. Higher scores on the ”Aggregation Rule” are linked to shorter durations for both ”Total Duration” and ”Duration Phase 2”, and a decreased number of permit application views. The influence of the ”Position Rule”, ”Boundary Rule”, and ”Choice Rule” predominantly pertains to project durations during the second phase, while the ”Scope Rule” predominantly impacts durations in the first phase.

This chapter examined the relationship between institutional rules, cooperative structures, and wind energy project outcomes. The data shed light on the potential influence of organisational characteristics and their connection to institutional conditions in shaping project outcomes. The subsequent chapter 7 presents the results from the qualitative analysis, offering deeper insights into combinations of various variables and conditions on the outcome.

7
Qualitative Comparative Analysis Results

This chapter delves into the results derived from the QCA analysis, utilising the findings from chapters 5 and 6. This chapter begins by explaining the methodology and the condition selection of the fsQCA in section 7.1. In section 7.2, the data used for the fsQCA analysis is detailed. Two distinct tests were conducted, each incorporating a slightly different set of conditions. The first QCA test is detailed in section 7.3. The following test is presented in section 7.4. The Robustness testing section 7.5 explores threshold selections for fsQCA. The chapter concludes with consolidating the findings in section 7.6.

7.1. Approach and Criteria for Condition Selection in fsQCA

In QCA, there is a need for a balanced relationship between antecedent and measured conditions, aligning the number of conditions with case count. This aspect of QCA examines all possible combinations to pinpoint an outcome (2^K, where K is the condition count, as discussed in section 3.8.2). A rise in condition count results in exponentially more combinations, leading to the ”limited diversity” challenge with many unobserved ”logical remainders” (Ragin, 1987, 2008). Hence, condition selection should prioritize theoretical and empirical significance. For 13-15 cases, up to five causal conditions are advisable (P. Fiss, 2009). Therefore, the first test considered Information, Payoff, Aggregation, Position, and Choice rules, rooted in their links to outcome variables as found in chapter 6. The second test included Payoff, Information, Aggregation, and the organisational form, LECs. The test unveiled pathways that combined both LECs and other critical conditions, or highlighted paths where LEC involvement was possibly not essential, pointing to trajectories driven by institutional conditions alone.

When splitting conditions across multiple tests, as done here, careful interpretation is essential. Adjustments for multiple comparisons are necessary to reduce the risk of false positives and maintain rigor. The within-case analysis and empirical data collection enhanced the clarity of the outcome. Additionally, robustness checks were integrated to ensure reliability.

7.2. Data Sets, Calibrated Data Set and Solution Types

The data set for fsQCA analysis, referenced in table 7.1, originated from the preliminary stages of this study.

Case	Total Duration	Organisation Form*	Information Rule	Payoff Rule	Position Rule	Choice Rule	Aggregation Rule
Avri	53	1	0.8	0.8	0.8	0.8	0.8
Battenoord	70	1	0.6	0.8	0.8	0.4	0.6
Bijvanck	96	0	0.2	0.2	0.2	0.4	0.4
Deil	45	1	0.8	0.8	0.8	0.8	0.8
Greenport Venlo	97	0	0.4	0.4	0.2	0.2	0.2
Groene Delta	77	0	0.8	0.6	0.8	0.8	0.8
Jacobahaven	81	0	0.6	0.6	0.6	0.4	0.6
Jaap Rodenburg II	77	1	0.6	0.8	0.8	0.6	0.6
Koningspleij	88	1	0.6	0.8	0.8	0.8	0.8
Kookepan	67	1	0.8	0.8	1	0.8	0.8
Nijmegen-Betuwe	36	1	0.6	0.8	0.6	0.6	0.8
Oostzeedijk	58	1	0.8	0.8	0.6	0.8	0.8
Ospeldijk	50	1	0.8	0.8	0.8	0.2	0.8
Oude Maas	103	0	0.2	0.4	0.4	0.4	0.6

* ’1’ indicates projects with LECs involvement, while ’0’ denotes those solely developed by CWEPDs

Table 7.1: Raw data set

The raw data set required calibration, which involved setting threshold values for each factor and avoiding values of 1 and 0. This study used the breakpoints 0.95, 0.50, and 0.05 for data sets with a normal distribution, as recommended by Pappas & Woodside (Pappas & Woodside, 2021). The chosen breakpoints, aligned with theoretical thresholds, rely on relative percentiles and are not arbitrary. In treating the duration, data values were inverted, so the full contribution indicate the shortest duration and vice versa. The organisation form avoided the 1 and 0 by using 0.95 and 0.05. While the seven rules’ initial scoring were anticipated on the right distribution range, further refinement proved essential. The data treatment approached and associated membership values are illustrated in table 7.2.

Condition	Threshold Basis	Distribution	Calibration Rule	Full Membership value	Intermediate membership value	No membership value
Total Duration	Mean value of dataset	Normal	(0.95,0.5, 0.05)	36	69.5	103
Organisation Form	-	Categorical	(0.95, 0.05)	0.95	-	0.05
Institutional Conditions	Mean value of dataset	Normal	(0.95,0.5, 0.05)	0.95	0.43	0.05

The calibration values were generated using the fsQCA 3.0 software, resulting in a refined data set for the fsQCA examination. Table 7.2 displays the calibrated data set created for this study.

Case	Total Duration	Organisation Form	Information Rule	Payoff Rule	Position Rule	Choice Rule	Aggregation Rule
Avri	0.83	0.95	0.95	0.95	0.95	0.95	0.95
Battenoord	0.53	0.95	0.50	0.95	0.73	0.18	0.50
Bijvanck	0.09	0.05	0.05	0.05	0.14	0.18	0.05
Deil	0.90	0.95	0.95	0.95	0.95	0.95	0.95
GreenportVenlo	0.08	0.05	0.05	0.18	0.05	0.05	0.05
GroeneDelta	0.37	0.05	0.95	0.18	0.73	0.95	0.50
Jacobahaven	0.29	0.05	0.50	0.18	0.35	0.18	0.18
JaapRodenburgII	0.37	0.95	0.50	0.95	0.73	0.48	0.95
Koningspleij	0.17	0.95	0.50	0.50	0.73	0.95	0.95
Kookepan	0.59	0.95	0.95	0.95	0.73	0.95	0.95
Nijmegen-Betuwe	0.95	0.95	0.50	0.50	0.35	0.48	0.50
Oostzeedijk	0.76	0.95	0.95	0.50	0.35	0.95	0.95
Ospeldijk	0.86	0.95	0.50	0.50	0.95	0.95	0.95
OudeMaas	0.05	0.05	0.05	0.18	0.14	0.18	0.18

Table 7.2: Calibrated data set

7.3. QCA Test 1: Duration as outcome, Information/Payoff/Position/-Choice/Aggregation as condition

To obtain the result, two primary threshold analyses were performed: the necessity analysis identified essential conditions, and the truth table analysis determined sufficient configurations of conditions (ERIM, 2023). Single necessary conditions are common and vital, without them outcomes do no occur. However, in multicausal analyses, single sufficient conditions are rare. Thus, QCA emphasises combinations yielding sufficient outcomes (ERIM, 2023). Given the multiple causal conditions in this research, no condition indeed reached a consistency of 0.90 (Schneider & Wagemann, 2012), as shown in table 7.3. Therefore the results section only concentrated on the truth table analysis. The initial methodology suggested a consistency threshold of 0.75, and all cases exceeded this value. Given the limited number of cases, the frequency threshold was set at one. The frequency threshold specified the minimum number of cases (instances or observations) that a particular configuration (a combination of conditions) must have to be considered relevant for further analysis. Both parsimonious and intermediate solutions were presented, ensuring a comprehensive analysis (P. C. Fiss, 2011). The next section delves deeper into these solutions.

Condition	Consistency	Coverage
Payoff	0.699717	0.797771
Position	0.709494	0.830065
Choice	0.650835	0.829182
Aggregation	0.663405	0.871560
Information	0.706701	0.863481

Table 7.3: Analysis of single necessary conditions

Table 7.1 uses filled circles to indicate the presence and hollow circles for the absence of a condition. Blank spaces denote no effect on the outcome. Larger circles represent primary conditions vital in both intermediate and parsimonious solutions, consistent across counterfactual scenarios. Smaller circles signify secondary conditions, present only in intermediate solutions and having a weaker causal link. This differentiation aligns with Fiss' methodology, emphasising conditions crucial for understanding solution pathways (P. C. Fiss, 2011).

⬤ A core condition that must be present in both the intermediate and parsimonious solutions
◯ A core condition that must be absent in both the intermediate and parsimonious solutions
● A peripheral condition that must be present but only appears in the intermediate solution
○ A peripheral condition that must be absent but only appears in the intermediate solution
Empty spaces denote irrelevance; it does not matter if a condition is either present or absent

	Solution at 0.80 threshold consistency			
	Solution pathway 1	**Solution pathway 2**	**Solution pathway 3**	**Solution pathway 4**
Information	⬤	⬤	⬤	⬤
Payoff	●	●		○
Position		●	○	●
Choice	●	○	○	●
Aggregation	●		○	○
Consistency	0.835237	0.92381	0.867021	0.90625
Raw coverage	0.748542	0.283627	0.238305	0.211989
Unique coverage	0.478073	0.0380118	0.0204679	0.0263159
Cases	Deil, Avri , Kookepan, Ospeldijk , Oostzeedijk, Koningspleij	Battenoord, Jaap Rodenburg II	Jacobahaven, Nijmegen-Betuwe	Groene Delta
Solution Consistency	0.798898			
Solution Coverage	0.847957			

Figure 7.1: Solution pathways for the presence of Duration: QCA Test 1

The fsQCA evaluation revealed four causal pathways that contribute positively to the outcome. Each configuration is characterised by three key metrics: raw coverage, unique coverage, and consistency. The configurations from this fsQCA analysis have a raw coverage range of 0.21 to 0.75 and showcase an relatively high consistency scores ranging from 0.84 to 0.92. Their unique coverage scores fluctuate between 0.02 and 0.48. Overall, the configurations demonstrate a consistency of 0.85 and a coverage of 0.80. Given these metrics, the following pathways were identified:

7.3.1. Intermediate Solutions

Pathway 1

- Information*Payoff*Choice*Aggregation
- Information AND Payoff AND Choice AND Aggregation
- This pathway has the highest raw coverage, suggesting it is the most common combination leading to shorter project durations (74.9% of the cases). Almost half of the cases (47.8%) were solely influenced by this pathway, indicating its unique impact. With a consistency of 83.5%, this combination was thus reliable in producing the outcome most of the time. Cases like Deil, Avri, Kookepan, Ospeldijk, Oostzeedijk, and Koningspleij fall under this category

Pathway 2

- Information*Payoff*Position*~Choice
- Information AND Payoff AND Position AND NOT Choice
- This pathway covered 28.4% of cases leading to shorter durations, showing its moderate influence. However, it uniquely affects only 3.8% of the cases, implying that there are overlaps with other configurations. Its consistency of 92.4% suggests that when this combination arises, it is very likely to lead to a diminished duration. The cases Battenoord and JaapRodenburg II are associated with this configuration

Pathway 3

- Information*~Position*~Choice*~Aggregation
- Information AND NOT Position AND NOT Choice AND NOT Aggregation
- Covering 23.8% of the cases, this pathway's influence is a bit less but still notable. Its unique impact is minimal at 2.05%, meaning it often overlaps with other configurations in its effect. A consistency of 86.7% indicates its strong reliability in producing the desired outcome. Cases Jacobahaven and Nijmegen-Betuwe are associated with this configuration

Pathway 4

- Information*~Payoff*Position*Choice*~Aggregation
- Information AND NOT Payoff AND Position AND Choice AND NOT Aggregation
- It covers around 21.2% of the cases, placing it as the least influential among the four pathways, but still considerable. Its unique effect is seen in 2.63% of the instances, which means there is a significant overlap with other configurations. With a consistency of 90.6%, this pathway is reliable for shorter project durations when present. Windfarm de GroeneDelta follows this configuration

7.3.2. Parsimonious Solution

Pathway: Information

	Raw Coverage	**Unique Coverage**	**Consistency**
Information	0.883045	0.883045	0.742015
Solution coverage: 0.883045 Solution consistency: 0.742015			

Table 7.4: Parsimonious solution: QCA Test 1

Only the ”Information” factor covers 88.3% of all the cases. This made ”Information” a very dominant and influential factor when considering shorter project durations. Its consistency is at 74.2%, which is slightly lower compared to some pathways. This indicates that while ”Information” alone had a significant impact, combined with other conditions it could increase the probability of achieving shorter durations.

Overview of the findings from QCA Test 1

From the pathway analysis, it was evident that various configurations of conditions influenced project durations differently. When examining the unique coverages, some pathways, like Pathways 2 and 4, uniquely accounted for only a small percentage of the cases (3.8% and 2.6% respectively). This meant that these particular configurations, while consistent, were not as frequently the sole explanations for shorter durations. On the other hand, Pathway 1's unique coverage of 47.8% indicated that nearly half the time, its specific configuration was the only reason for the observed outcome. Lastly, the Parsimonious Solution Analysis that solely revolved around the ”Information” factor reinforced its centrality. With a coverage of 88.3%, ”Information” played a pivotal role. However, the consistency of 74.2% suggest that while ”Information” was critical, other conditions in combination could further influence the project's duration.

- **Payoff:** In Pathway 1 and Pathway 2, ”Payoff” was present. Its combination with ”Information” in Pathway 1 covered a significant 74.9% of cases, indicating its dominant role in affecting the project duration. The high coverage suggested that ”Payoff”, when combined with ”Information”, was a frequently observed configuration that led to shorter durations. Additionally, the consistency of 83.5% in Pathway 1 revealed that when both ”Information” and ”Payoff” were present, there was a strong likelihood that they influenced the project durations.
- **Choice:** ”Choice” appeared in contrasting manners. In Pathway 1, its presence combined with ”Information” had a high coverage of 74.9%. However, in Pathway 2, the absence of ”Choice” covered only 28.4% of instances. While the presence of ”Choice” in a configuration seemed to be more dominant, its absence still played a role, albeit in fewer cases. The high consistency of 92.4% in Pathway 2 suggested that when ”Choice” was absent alongside ”Information”, ”Payoff”, and ”Position”, it was very likely to lead to the outcome, even if this configuration was less common.
- **Aggregation:** Was present in Pathway 1 with a coverage of 74.9% and absent in Pathways 3 and 4 which collectively covered 45.03% of cases. The varied presence and absence in pathways revealed that ”Aggregation”, depending on other co-existing conditions, had a diverse influence. However, its presence in the high coverage Pathway 1 suggested that when ”Aggregation” was combined with ”Information”, it was a frequently observed configuration affecting duration.
- **Position:** Influenced duration in both Pathway 2 (present, 28.4% coverage) and Pathway 3 (absent, 23.8% coverage). Although neither pathway had as dominant a coverage as Pathway 1, ”Position” did play a role in a significant portion of the cases. Its absence in Pathway 3, coupled with a consistency of 86.7%, implied that in a small number of instances where ”Position” was not a factor (and other conditions like ”Information” were present), the outcome of a shorter duration was observed.

7.4. QCA Test 2: Duration as outcome, LEC/Information/Payoff/Aggregation as condition

The factors chosen for this QCA test were LEC (representing all cases with LEC' involvement), Information rule, Payoff rule, and Aggregation rule. Their selection stemmed from their significant correlation with project duration, as highlighted in Chapter 6. The rationale behind this is if pathways emerge where LEC was not a dominant factor, it would imply that CWEPDs configurations, in tandem with other factors, drove the outcome. If not, LEC was the dominant factor in realising the outcome. The data set presented in table 7.2 served as the basis for the fsQCA analysis. Similar to QCA Test 1, no single condition here met the required consistency threshold. However, this is not surprising given the multiple causal conditions (ERIM, 2023; Schneider & Wagemann, 2012). Initially, the methodology recommended a consistency threshold of 0.8 for the solutions, aiming to identify the most consistent causal patterns in the truth table. In this test, one pathway exhibited a consistency of 0.76. As a result, the consistency threshold was revised to 0.75 to encompass more causal patterns observed in the truth table. In-depth analyses of these solutions will be presented in the subsequent section.

⬤ A core condition that must be present in both the intermediate and parsimonious solutions ◯ A core condition that must be absent in both the intermediate and parsimonious solutions ● A peripheral condition that must be present but only appears in the intermediate solution ○ A peripheral condition that must be absent but only appears in the intermediate solution Empty spaces denote irrelevance; in this context it does not matter if a condition is either present or absent	Solution at 0.75 threshold consistency	
	Solution pathway 1	**Solution pathway 2**
LEC	●	○
Information	⬤	⬤
Payoff	●	○
Aggregation		○
Consistency	0.829653	0.759036
Raw coverage	0.76901	0.184211
Unique coverage	0.66667	0.0818716
Cases	Deil, Avri, Kookepan, Nijmegen-Betuwe, Ospeldijk, Jaap Rodenburg II, Oostzeedijk, Battenoord, Koningspleij	Jacobahaven, Groene Delta
Solution Consistency	0.79726	
Solution Coverage	0.850882	

Figure 7.2: Solution pathways for the presence of Duration: QCA Test 2

The fsQCA evaluation revealed two causal pathways that contributed to the outcome. The configurations from this fsQCA analysis have a raw coverage range of 0.18 to 0.77 and showcase consistency scores ranging from 0.76 to 0.83. Their unique coverage scores fluctuate between 0.08 and 0.67. Overall, the configurations demonstrate a consistency of 0.74 and a coverage of 0.88. Given these metrics, the following conclusions can be drawn:

7.4.1. Intermediate Solutions

Pathway 1

- LEC*Information*Payoff
- LEC AND Information AND Payoff
- This pathway was present in a large share of cases, reflected by its raw coverage of 76.9%. The pathway's unique coverage of 66.7% suggests that it had a distinct influence on the outcome, separate from other pathways. Its consistency stands at approximately 83%, indicating a generally reliable association with the outcome. Cases that are characterised by this configuration include Deil, Avri, Kookepan, Nijmegen-Betuwe, Ospeldijk, JaapRodenburgII, Oostzeedijk, Battenoord, and Koningspleij.

Pathway 2

- Information*~LEC*~Payoff*~Aggregation
- Information AND NOT LEC AND NOT Payoff AND NOT Aggregation
- Although less prevalent than the first, this pathway still played a role with its 18.4% raw coverage. Its unique influence on the outcome is around 8.2%, suggesting that it often overlapped with other configurations in the cases it was found. With a consistency score of 75.9%, this configuration was relatively frequent in its association with the outcome. Notably, cases Jacobahaven and Groene Delta feature this pathway.

7.4.2. Parsimonious Solution

Pathway: Information

	Raw Coverage	Unique Coverage	Consistency
Information	0.883045	0.883045	0.742015
Solution coverage: 0.883045			
Solution consistency: 0.742015			

Table 7.5: Parsimonious solution: QCA Test 2

The findings indicated the role of the "Information" factor in influencing project durations. With a raw coverage of 88.3%, "Information" was identified as a significant factor in determining the outcome in projects. Its presence in a majority of cases highlighted its association with shorter project durations. The consistency level of 74.2% suggest that while "Information" was influential, its presence did not always correspond with the desired outcome of shortened time. This pointed to the potential for other factors or conditions that, in conjunction with "Information", might affect the outcome.

Overview of the findings from QCA Test 2

The analysis of the pathways provided insights into how various configurations of conditions impacted project durations. In Pathway 1, with a raw coverage of 76.9%, this configuration, encompassing "LEC", "Information", and "Payoff", was present in a significant number of cases. The unique coverage of 66.7% suggest that in about two-thirds of the instances, this configuration was the primary determinant of the observed outcome. Pathway 2 offered a different perspective with a raw coverage of 18.4%. Its unique coverage of 8.2% indicate that while this configuration influenced project durations, it often appeared alongside other influential factors. The Parsimonious Solution emphasized the role of the "Information" factor. With a raw coverage of 88.3%, "Information" appeared to be a major factor in determining project durations. However, a consistency of 74.2% suggest that "Information", although significant, was not the only determining factor. Other conditions could interact with "Information" and influence project durations.

- **LEC:** In Pathway 1, "LEC" combined with "Information". The raw coverage of 76.9% for this pathway signifies the importance of "LEC" when paired with "Information" in determining the project's duration. With a consistency of 83% in Pathway 1, the joint presence of "Information" and "LEC" robustly contributed to the desired outcome of shorter durations. Conversely, in Pathway 2, the absence of "LEC" alongside "Information" covered 18.4% of instances. This suggested that while "LEC" enhanced the desired outcome when present, there were scenarios where its absence, with "Information" retained, could also be effective.
- **Payoff:** "Payoff" paired with "Information" and "LEC" in Pathway 1, resulting in a raw coverage of 76.9%. This indicated that when "Payoff" combined with these conditions, they significantly determined project durations. Its unique coverage of 66.7% also hinted at its independent role in influencing the outcome separate from other pathways. Meanwhile, the absence of "Payoff" in Pathway 2 implied configurations where "Information" was influential without the presence of a "Payoff".
- **Aggregation:** The data available showed the absence of "Aggregation" in Pathway 2. This combination with "Information" covered 18.4% of cases, implying that certain projects might achieve shorter durations without relying on aggregation processes, provided there was effective information rule implementation. Given that in Pathway 1 "Aggregation" was deemed non-essential, this condition appeared flexible; its presence or absence did not predominantly dictate the project's duration when "Information", "Payoff", and "LEC" were present.
- **Information Alone:** The Parsimonious Solution presented "Information" as the sole significant condition. With a dominant raw coverage of 88.3%, it highlighted the undeniable role of "Information" in determining project durations. While it stood out on its own, the other pathways underscored the modulating effect of conditions like "LEC" and "Payoff" on its influence.

7.5. Robustness Test

In line with Parente's guidance, methodological decisions around threshold selections for thresholds in fsQCA are exploratory and should be verified for robustness (Parente & Federo, 2019). Adjustments, including consistency and frequency thresholds, should be assessed against derived solutions

(Schneider & Wagemann, 2012). Ideally, variations should align with original analyses or explain the differences. For this research, robustness was evaluated using two data set variations:

1. **Variance in Consistency Threshold**: Consistency cut-off was initially set according to the solutions covered in the truth table. A different consistency measure should lead to inclusion or exclusion of other cases.
2. **Variation in Frequency threshold**: The second variation is alteration of the frequency threshold. Varying the frequency threshold provides a way to test the sensitivity of the results to the inclusion or exclusion of less common configurations. If the core findings remain largely unchanged across different frequency thresholds, it provides added assurance about the validity and robustness of the conclusions drawn from the core analysis.

Both robustness checks were employed for both results. From these checks, the following methodological insights emerge: results remained stable across robustness checks with no significant deviations from the primary solution. Raising the consistency threshold enhanced confidence in the identified pathways but reduced the case coverage. The original cutoff, capturing a wide range of cases while ensuring reliability, appears optimal. Altering the frequency threshold resulted in the exclusion of cases considered important. Given the small sample size in this report, the frequency threshold was determined to be appropriately set. The results of these checks are detailed in Appendix F.

7.6. Chapter Conclusion

Drawing Ostrom's insight within the QCA analysis, this analysis offered insights into how specific rules impact the duration of wind farm projects. Notably, the ”Information” rule emerged consistently as a significant factor influencing project duration. Aligning with Ostrom's proposition, it is observed that informed stakeholders tend to have had a diminishing effect on project timelines. Yet, the presence and interaction of other rules alongside the ”Information” rule proved to also have had influence on the projects timeline.

The first test revealed the pronounced influence of the ”Information” rule highlighting its importance in wind farm project planning and development. The amount and type of information available to participants and whether this information is freely and openly shared was deemed most important in influencing the projects durations. Other conditions in combination can further enhance or influence the project's duration.

- **Payoff Rule:** When combined with ”Information”, it frequently drove shorter durations. This stresses the context-dependent role of the payoff, especially considering both benefits and costs and the options to compensate for negative externalities and the combination with open information dissemination.
- **Choice Rule:** This rule, which mapped out potential decisions for stakeholders, had a varied impact. While its presence in Pathway 1 covered 74.9% of cases, its absence in Pathway 2 indicated a less common, yet consistent, configuration leading to the desired outcome.
- **Aggregation Rule:** The decision-making mechanism had a diverse influence, as was evident from its varied presence and absence across pathways. Notably, its presence in the dominant Pathway 1 suggested a frequent influence when combined with adherence to the ”Information rule”.
- **Position Rule:** This featured in several pathways with significant, yet non-dominant coverage. Its absence in Pathway 3 suggested that certain configurations without high scores on ”Position Rule” could still lead to shorter durations when other conditions like ”Information Rule” prevailed. For instance, projects like Deil were impacted by how clearly roles were defined.

Findings from Test 2 pointed towards LECs projects, especially those adhering to the ”Information” and ”Payoff” rules, as more inclined to achieve shorter duration in outcomes. Conversely, certain CWEPDs projects, when in alignment with the right set of rules, achieve shorter outcomes, albeit less substantial.

- **Information Rule:** Its dominant role was clear, but its interactions with conditions like ”LEC” and ”Payoff Rule” in a number of cases modulated its influence.

- **LEC:** It was highly influential when combined with high scores on ”Information Rule”. Its absence in some pathways indicated potential effectiveness in CWEPDs projects where high scores on ”Information Rule” were met.
- **Payoff Rule:** It was notably influential when paired with high scores on ”Information Rule”. Its absence in Pathway 2 highlighted configurations where information dissemination was influential even without fair cost-benefit distributions.
- **Aggregation Rule:** It was not consistently essential. Its absence in Pathway 2 suggested that certain projects could achieve desired durations without high scores on ”Aggregation Rule”, provided there was effective information dissemination.

In conclusion, the importance of open information dissemination in influencing project durations was consistently observed. LECs, when closely aligned with institutional conditions like open information dissemination and equitable benefit sharing, were observed to influence project durations in about 75% of the times. While the LEC form played a key role in many instances, its necessity was diminished when the open information dissemination was adequately met. An inclusive understanding necessitates examining the interplay of multiple rules. Cases like Deil, Avri, and Groene Delta offer examples of effective rule interactions, meriting further exploration. CWEPDs lacked clear correlation with specific rules, affecting their project timelines. This analysis, grounded in the IAD framework and informed by QCA findings, highlights the pivotal role of rules in determining wind farm project timelines. These findings both support the underlying conceptual theory and underscore the significance of understanding interrelations between rules, organisational forms, and outcomes. In closing this chapter, addressing research question 4, marked the conclusion of the research phase. The subsequent chapter focuses on interpreting the broader implications, identifying potential study limitations, and suggesting directions for future research.

8

Conclusions and Recommendations

In this concluding chapter, the findings are consolidated and the research findings are placed in a broader context. Section 8.1 revisits the identified knowledge gaps, outlines the primary research questions, and systematically addresses each sub-question. Following this, section 8.2 discusses the academic contributions of this research. In section 8.3, the limitations followed by a set of recommendations for future scholars will be presented. This chapter ends with a set of recommendations for policymakers in section 8.4.

8.1. Main findings

The shift toward sustainable energy on a global scale underscores the importance of understanding the dynamics, roles, perceptions, and responses of involved entities. During the 1970s, challenges such as oil shortages brought about an energy crisis, leading to increased interest in alternative energy solutions, with wind energy emerging as a potential candidate (IRENA, 2021). This perspective was further bolstered by the Club of Rome's report, shedding light on potential limitations associated with conventional energy resources (Kamp, 2004). In response, countries like the Netherlands began exploring the potential of wind energy. By the late 1970s, the Dutch policy landscape started reflecting a favorable stance toward wind energy, viewing it as a potential alternative to conventional energy sources.

Simultaneously, Local Energy Cooperatives (LECs) began to establish themselves across Western Europe. The Netherlands, in particular, saw an increase in such cooperatives during the transition from the 1980s to the 1990s. These groups, often formed due to environmental concerns and opposition to nuclear energy, typically managed one or more community-centric wind turbines (Warbroek & Hoppe, 2017). Over time, their focus expanded to include broader sustainability objectives, such as energy conservation and technological efficiency. The growth of LECs was notable, with the number increasing from 20 in 2011 to 705 by 2022 (HIER and Energie Samen, 2023). In European discussions, LECs are often referred to as REScoops (Renewable Energy Community Cooperatives). Although REScoops might not always have a legal cooperative status, they adhere to seven foundational principles established by the International Cooperative Alliance (REScoop.eu, 2023). Members of such entities often benefit from electricity at competitive rates and have the opportunity to participate in profit-sharing and investment decisions. In contrast, Commercial Wind Energy Project Developers (CWEPDs) have traditionally been involved in wind energy development, often backed by significant investors. Over the years, their wealth of resources, paired with professional business strategies, has contributed significantly to the expansion of wind energy (Verbong & Geels, 2007). However, recent observations have pointed toward questions about the transparency of their operations, especially with the inclusion of foreign investments in their portfolios (Bohlmeijer, 2022).

The Netherlands, recognising the potential of wind energy, set targets through the Energy Agreement for Sustainable Growth in 2013, aiming for 6 GW of onshore wind energy by 2020 (Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013a). Following this, further goals were established, targeting the production of 35 terawatt-hours of renewable electricity on land by 2030

(Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). Public surveys suggest that a significant portion of the Dutch population, approximately 70%, supports the establishment of new wind turbines, with 14% in opposition (Kloosterman et al., 2021). However, while there is general support for wind energy, individual projects sometimes face resistance, a phenomenon often labeled as the NIMBY syndrome (Wolsink, 2000). Compounding these challenges are issues such as land acquisition and associated activities like land speculation (Bohlmeijer, 2022). In response to these challenges, policy measures have been introduced to promote a more inclusive approach. The Dutch Climate Agreement emphasises the importance of community participation in renewable energy projects (HIER, 2019; Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013b). The proposed model suggests that local communities should ideally own half of renewable projects, giving both residents and businesses a substantial stake. This model is a guideline, but can be adapted to fit the specific needs of each project. However, despite these guidelines, the real-world execution of community involvement and local ownership is not well-defined (NP RES, 2021). Questions remain about understanding the influential factors for collaboration, optimal organisational configurations, and stakeholder collaboration.

The Institutional Analysis and Development (IAD) framework offers an approach to explore these stakeholder dynamics. Historically linked to common-pool resource governance, its relevance to the energy sector is becoming more evident (A. Koster & Anderies, 2013; Lammers & Hoppe, 2019; Milchram et al., 2019; Newell et al., 2017). Previous research has delved into various dimensions of these dynamics (Klok et al., 2023; Lammers & Hoppe, 2019; Nabielek, 2020). However, in settings of the scale addressed in this research, the interplay between organisational structures and institutional dynamics remains less examined. Particularly in the context of quantitative research, the influence of these factors on project outcomes remains under explored. A deeper understanding of this interplay could hold significant value for the broader energy community. The outcome of this study can potentially streamline future energy projects, ensuring more efficient and community-accepted outcomes. With this overarching objective, the main research question was:

"How do institutional rules vary between LECs and CWEPDs in shaping the trajectories and outcomes of wind farm planning and development in selected Dutch onshore wind farm projects?"

Answering this research question entailed answering the following four sub-questions:

SQ 1. *What are the factors, encompassing biophysical constraints, community attributes, and both formal and informal rules, that delineate the trajectory of wind farm planning and development for LECs and CWEPDs?*

SQ 2. *How do the institutional conditions of LECs and CWEPDs vary in influencing the trajectory of wind farm planning and development in selected Dutch onshore wind farm projects*

SQ 3. *How do the institutional conditions of LECs and CWEPDs vary in influencing the outcome of wind farm planning and development in selected Dutch onshore wind farm projects*

SQ 4. *What combination of institutional conditions coupled with the LEC or CWEPD form contribute to variations in wind farm planning and development in selected Dutch onshore wind farm projects?*

8.1.1. Results for SQ 1

In the first research question, the focus was on understanding the Dutch wind energy landscape and the nuances between CWEPDs and LECs. This question delved into various factors, from biophysical conditions and community attributes to formal and informal rules. The main observations were:

In the examination of the Netherlands' geographical attributes, it was found that coastal regions typically exhibit stronger wind patterns compared to the interior regions. Nevertheless, inland regions, by employing taller wind turbines, effectively harnessed consistent high-altitude winds. The strategic placement of turbines emerged as crucial to maximise renewable energy yields while safeguarding the diverse Dutch landscapes, spanning from natural terrains to urban settings. While no standardised regulation specified the exact spacing between turbines and residential structures, efforts were directed to mitigate potential disturbances, notably noise and shadow flicker. Initial guidelines recommended a rough distance of 400 meters between turbines and residences, yet site-specific evaluations often necessitated adjustments. Factors such as pre-existing infrastructure, transportation routes, and critical installations added complexities to turbine placement decisions. Spatial restrictions, including areas marked for low-altitude aircraft movements and protected natural reserves, highlighted the necessity for thorough site evaluations, ensuring turbines were optimally positioned considering all geographical aspects.

Community attributes reflected the social and cultural facets of the decision-making context. This includes stakeholder trust, history of prior engagements, diversity within the community, and their collective understanding of renewable energy. For the scope if this study, three primary stakeholders stood out:

1. **Government**: The Dutch Climate Agreement and the Energy Agreement reflect the country's ambition to heavily invest in wind energy by 2030. The nation's drive for a significant local ownership in wind projects emphasises the integral role of local communities in the energy transition.
2. **Public**: Public opinion in the Netherlands strongly favors renewable energy, with significant support for both solar and wind energy. The general sentiment leans towards transitioning from fossil fuels, especially among the educated, younger population, and city residents. Regarding wind turbines, while a majority support their installation, concerns about visual aesthetics, ecological impact, and financial sustainability without subsidies exist. Many also express reservations about having turbines close to residential areas, favoring placements in industrial zones and open fields.
3. **Wind developers**: The Dutch wind energy market consists of varied players but for the purposes of this study, a division into CWEPDs and LECs was adopted:

    - **CWEPD**: These organisations emphasise professionalism and prioritise profit. With substantial financial and professional resources, CWEPDs efficiently navigate regulations and fiscal obstacles. However, being externally driven, they might not always grasp the intricacies of the local context, which can result in trust issues and potential disputes.
    - **LEC**: With a community-centric approach, they encourage local input and ownership. Their operations might not always match the CWEPD's efficiency, but their dedication to sustainable practices and community involvement stands out.

Rules-in-use represented the prevailing formal and informal norms and regulations that guide behavior and actions. Central to this study was the exploration of these informal rules, often referred to as the 'rules-in-use'. The study delved into how the unwritten norms and practices influenced the trajectory and outcome of processes in selected case studies. Therefore, only the formal rules are stated here, while next sections will focus on the informal rules. The formal rules are as follows: Instruments such as the Dutch Climate Agreement, Energy Agreement, and the spatial policy framework established the primary benchmarks and standards for wind energy endeavors in the Netherlands. These mandates and incentives created a structured framework to which sector stakeholders must adhere to. Ranging from national to local levels, these policies had set the boundaries for all involved entities.

8.1.2. Results for SQ 2

The second sub-question delved into specific cases to analyse the institutional variations during planning and development. Data was collected through desk research and stakeholder interviews. The IAD framework was used to differentiate how institutional rules were applied in CWEPD cases compared to those with LEC involvement. Throughout this analysis, the adherence the these rules has emerged as a significant indicator of project success and alignment. The following results were found:

- **Information Rule:** LECs consistently kept stakeholders informed and engaged by leveraging local relationships and trust. In contrast, CWEPDs showed varied levels of transparency, leading to communication gaps and occasional misdirection of stakeholder queries.
- **Payoff Rule:** LECs often prioritised fair financial compensation for local residents. On the other hand, CWEPDs were sometimes perceived as providing insufficient compensation by those affected by negative externalities,

- **Position Rule:** Cases with LECs involvement employed a participatory and distributed decision-making approach. This was in contrast to the centralised decision-making that was frequently observed in CWEPD cases. Notably, municipalities had shown a higher inclination to cooperate with LECs than with CWEPDs.
- **Choice Rule:** While there were fundamental similarities in the decision-making flexibility of LECs and CWEPDs, LECs generally displayed marginally greater adaptability.
- **Aggregation Rule:** LEC involved cases showed more collective and inclusive decision-making processes. Conversely, CWEPDs showed a more unilateral and individual-centric decision-making approach.
- **Boundary Rule:** LECs championed inclusivity in their respective action arenas. CWEPDs, however, occasionally imposed more restrictive boundaries, influencing both stakeholder sentiments and the progression of project timelines.
- **Scope Rule:** It was found that both LECs and CWEPDs showed variability in project adaptability. However, LECs generally exhibited a greater inclination towards flexibility and adaptability.

Overarching these specific rules, trust emerged as an indispensable factor. Activities undertaken by LECs, such as community consultations, distinguished them from several CWEPDs, The prevailing sentiment was that personal engagement significantly bolstered trust levels. CWEPDs had generally encountered more challenges regarding community trust. Effective communication and including residents in decisions were found to mitigate this. Fair financial incentives, like community funds, also matter. These strategies seem to reduce opposition regardless of organisation type.

Based on the principles of the IAD framework, an unique scoring system was designed for the 'rules-in-use'. This system enabled the transformation of insights from individual cases into quantifiable metrics for comparative analysis. Each score indicated the degree to which a specific rule is evident. The following conclusions were derived:

- **Ownership Influence**: CWEPDs generally registered lower scores. This implied that ownership by LECs has a favorable effect the operationalisation of specific rules. Instances featuring pronounced LEC ownership consistently registered higher scores across a majority of the rules. Notably, there was a significant difference in scores for the 'Information rule' and 'Payoff rule' between LECs and CWEPDs. Yet, exceptions to this trend existed, indicating the interplay of other influencing factors.
- **Range of Scores**: CWEPD cases exhibited a wider score range, indicating differences between cases. Conversely, LEC cases generally exhibited a lower range.

This research phase also reported on the outcomes of the cases. Outcomes were found with respect to the project duration, the number of views during permit application and the number of appeals to the Council of state. Although this phase did not conduct statistical tests on these findings, the within-case analysis provided the following observations:

- **Duration**: Projects led by LECs appeared to exhibited shorter completion times. This observation was particularly evident in the second phase.
- **Community Engagement and Disputes**: LECs appeared to face fewer legal challenges, such as appeals to the Council of State. IAD analysis found that LECs generally had better alignment with community interests which possibly lead to fewer disagreements. Additionally, the occurrence of forced provincial takeovers in only the CWEPD projects indicated potential governance issues.
- **Percentage of LEC Ownership**: Initial observations suggested a relationship between the degree of LEC ownership and project duration. Projects with a higher percentage of LEC ownership generally progressed through the project more quickly.

In essence, the results indicated benefits of LECs involvement in wind energy projects, notably in project duration, community alignment, and legal aspects. Further statistical analysis were crucial for a more definitive understanding.

8.1.3. Results for SQ 3

In addressing the third sub-question, statistical testing was initially employed to discern the institutional variables that influenced variations in project trajectories and results.

The tests between organisational form and institutional conditions revealed that 'Payoff Rule', 'Information Rule', and 'Aggregation Rule' displayed correlations with the LECs form. On the contrary, rules like 'Position', 'Boundary', 'Choice', and 'Scope' lacked a substantial link to any organisational form. This indicates that project with LECs involvement shows open information dissemination, fair distribution of benefits and inclusive decision-making. Moreover, LECs projects showed a pattern of shorter durations, especially during the second phase. There was also an significant correlation of receiving fewer views during permit applications. The correlation analysis, however, did not show a significant relationship between the number of appeals to the Council of State and any of the organisational forms.

The tests between the percentage of LECs ownership and institutional conditions revealed that a correlation between higher LECs ownership percentages and most rules were found, with the exception of the 'Choice' rule. This implies that as LECs gain more ownership, there is an enhancement in information dissemination, fair distribution of benefits, well-defined roles, inclusive decision-making, and greater project flexibility. The noted trend of shorter project durations with higher LEC ownership insinuated that higher local involvement and ownership leads to more efficient project realisations, especially during the second phase.

A test was conducted to examine the correlation between institutional conditions and project outcomes. Negative correlations were found between certain institutional rules, particularly 'Information', 'Payoff', and 'Aggregation', with project duration and number of views and appeals. This implies that as projects adopted more open information practices, fair distribution of benefits, and collective decision-making, they experienced fewer delays, and challenges. For instance, projects that scored high on the 'Information Rule' faced fewer obstacles due to transparent communication and informed stakeholders. Similarly, higher scores in the 'Payoff Rule' indicated that the equitable sharing of benefits reduced disputes, thus minimising delays. The specific correlations of rules like 'Position', 'Boundary', 'Choice', and 'Aggregation' with total project duration, especially during phase 2, reflected the impact of actor roles, participation inclusivity, available actions, and decision-making mechanisms on the project's execution phase. Lastly, the correlation of the 'Scope Rule' with the project's first phase pointed to the idea that projects with less rigid plans navigated the initial stages more swiftly.

In conclusion, the distinctions between the two organisational forms revealed that rules played a role in influencing outcomes. The correlation between certain rules, notably the 'Payoff Rule', 'Information Rule', and 'Aggregation Rule', and the LECs form signified a preference for open information dissemination, equitable benefit distribution, and collective decision-making. Conversely, the absence of a strong correlation for rules such as "Position", 'Boundary', 'Choice', and 'Scope' with either of the two organisational forms suggested that these rules are not attributed to a specific organisational form. The variation in project durations and public interaction (views during permit applications) further underscored the influence of these rules on outcomes. Furthermore, as LECs accumulated more ownership, the enhancement in most institutional conditions reflected the positive impact of local involvement on the efficiency and effectiveness of project implementation. Conversely, CWEPDs did not display correlations with scores on any of the institutional rules, reflecting a potential non-adherence or lesser alignment with these conditions.

The clear link between institutional rules and outcomes, as evidenced by the correlations with project duration, views, and appeals, indicated that the practice of information dissemination, benefit distribution, and decision-making mechanisms directly influenced the trajectory of the projects. The overall analysis indicated that the adoption of specific rules had a profoundly affect on project outcomes, emphasising the pivotal role of institutional conditions in shaping organisational results. Notably, LECs tendrf to align more effectively with these conditions compared to CWEPDs, resulting in reduced project durations and fewer public objections.

8.1.4. Results for SQ 4

The fourth sub-question aimed to determine how combinations of institutional conditions, when paired with organisational forms, influenced the outcomes. The Qualitative Comparative Analysis method was employed to uncover causal combinations of institutional and organisational conditions.

The first test revealed the pronounced influence of the 'Information Rule', irrespective of organisation form, in highlighting its importance in wind farm project planning and development. Other conditions in combination were found to further enhance or influence the project's duration.

- **Payoff Rule:** When combined with 'Information Rule', it frequently lead to shorter duration of projects. The findings underscored the context-dependent role of the payoff rule.
- **Choice:** These rule, which map out potential decisions of stakeholders, had a varied impact. While its presence in a high share of outcomes was notable, its absence in some indicated a less common, yet consistent, configuration leading to the desired outcome of short project durations.
- **Aggregation Rule:** Its diverse influence was evident from its varied presence and absence in examined cases. Notably, its presence in a number of cases suggested positive influence when combined with 'Information Rule'.
- **Position Rule:** Featured in several pathways with significant, yet non-dominant coverage. Its absence in some pathways suggested that certain configurations without 'Position Rule' still lead to shorter durations when other conditions like 'Information Rule' prevailed. Projects were found that could be impacted by how clearly roles were defined.

Having identified the rules that most influenced the projects, the subsequent test delved deeper into the LEC aspect within causal combinations. Findings from this test pointed towards LECs projects, especially those adhering to the 'Information' and 'Payoff' rules, as more inclined to achieving shorter duration in outcomes. Conversely, certain CWEPDs projects, when in alignment with the right set of rules, could still achieve outcomes, albeit less substantial.

- **Information Rule:** Its dominant role was emphasised but its interactions with conditions like 'LEC' and 'Payoff' in other instances were found to modulate its influence.
- **LEC:** Highly influential when combined with 'Information Rule'. Its absence in some cases indicated potential effectiveness in scenarios where 'Information Rule' was dominant.
- **Payoff Rule:** Notably influential when paired with 'Information Rule' in. But its absence in some cases highlighted configurations where 'Information Rule' was primarily influential without 'Payoff Rule'.
- **Aggregation Rule:** Not consistently essential. Its absence in some cases suggested that certain projects could achieve desired duration without high scores on aggregation, provided effective information dissemination.

In conclusion, the QCA emphasised the 'rules-in-use' in shaping wind farm project durations. The results stressed the importance of understanding the connections between rules, organisational forms, and outcomes. Both individual and combined institutional rules were found to have an impact on project outcomes. The interplay of certain rules significantly affected project courses. LECs, when closely aligned with institutional conditions like open information dissemination and equitable benefit sharing, were observed to influence project durations in about 75% of the times. In contrast, CWEPDs lacked clear correlation with specific rules. The 'Information' rule's impact on project durations was consistently evident. Although LECs played a central role in many situations, their importance was reduced when the 'Information Rule' was satisfied. Therefore, both LEC and CWEPD cases highlighted diminishing project duration when the 'Information Rule' was prioritised.

8.1.5. Answering the Main Research Question

The research conducted a systematic examination of how Ostrom's 'rules-in-use' interact with the chosen organisational structures throughout the different stages of wind farm planning and development. Actions and decisions made during the phase leading up to the permit application were found to substantially impact the direction and potential challenges during the development phase.

Compared to CWEPDs, LECs finalised projects 33.3% more rapidly and encountered fewer views during permit applications. An examination of the developmental trajectories revealed that LECs typically exhibited a more transparent and consistent dissemination of information (Information Rules). They also displayed a perceived equitable distribution of the financial outcomes of actions (Payoff Rules), along with a more centralised decision-making approach (Aggregation Rules). Furthermore, the data unveiled an inverse relation between the extent of LEC ownership and both the project duration and the number of views during permit applications. This suggested that projects with a higher percentage of LEC ownership tended to attract fewer views during the permit application phase and had shorter development durations. The percentage of LEC ownership showed no relation with the number of formal appeals submitted to the Council of State. Observing the trajectories, the results suggested that with a greater percentage of LEC ownership, projects lean towards a more centralised and collaborative approach across most of the institutional rules under examination, with the exception of the flexibility of stakeholder actions.

Regarding the confluence of multiple factors, the study identified the following. The proficient management and distribution of information emerged as instrumental across all tested conditions. A streamlined information flow typically diminished projects duration. A combination of LECs adhering rules overseeing the accessibility of information (Information Rules) and the equitable financial distribution (Payoff Rules) was predominantly associated with reduced project timelines.

8.2. Scientific Contribution

This study explored wind energy development in the Netherlands. It built upon prior research emphasizing institutional conditions and spatial planning within the IAD framework (Graaff, 2018; Lammers & Hoppe, 2019; Nabielek, 2020). While earlier research mostly used qualitative approaches, this study incorporated a scoring system to offer a quantitative perspective on the IAD framework's principles. Interviews with 29 stakeholders were undertaken to provide the individual case analysis with empirical depth. Merging the IAD framework with statistical methods and QCA allowed a more detailed comparison between LECs and CWEPDs. This approach offered insights into the interplay of institutional rules and the organisational forms of LECs and CWEPDs in fourteen projects within the Dutch wind energy sector. A key aim was to identify distinct institutional conditions and their influence on project paths and results. Furthermore, the study highlighted previously unexamined correlations, especially between LECs ownership percentages and rule adherence, and its effect on project results.

This research provided a deeper understanding of wind energy development, building upon and complementing the insights from existing literature. This research emphasised the importance of transparent information sharing and fair financial distribution in wind energy projects. These findings are consistent with Klok et al.'s research, which linked increased financial involvement and enhanced transparency in the process, with greater acceptance of wind energy projects (Klok et al., 2023). Moreover, the insights resonated with those of Koelman et al., who underscored the pivotal role of a competent authority in the renewable energy transition (Koelman et al., 2022). The importance of clearly defined roles and responsibilities in the management of renewable energy projects were also a key finding in this research.

The climate agreement mandates a 50-50 ownership division between CWEPDs and local communities. Interpretation and application of this guideline are shaped by prevailing organisational cultures and individual views (Spijkerboer, Zuidema, Busscher, & Arts, 2019). The findings from this study are in line with Spijkerboer et al.'s emphasis on understanding the relationship between institutional frameworks and organisational behaviors. This research offered insight into the key factors for effective wind energy project implementation.

In conclusion, this study enhanced knowledge on wind energy development in the Netherlands. It presentsed guidance on project development strategies by elucidating the influence of specific institutional conditions on projects. The findings have implications that reach beyond just the domain of wind energy, touching on discussions related to common goods and spatial planning challenges. This makes the study relevant not only to the scientific field but also to broader areas of public interest, proving valuable for a diverse audience including policymakers and project developers.

8.3. Limitations and Recommendations

Limitations of the IAD Framework

The IAD framework, chosen for its relevance to Dutch wind turbine institutional dynamics, has its limitations. While robust, the IAD primarily focuses on internal dynamics, potentially missing external influences like technological advancements. Also the occasional blur between legal rules and 'rules-in-use' are named as limitations of the IAD framework (Cole, 2014). Additionally, while the study controlled for community attributes by selecting similar province cases, deeper historical analysis might provide clearer insights. Furthermore, the IAD framework typically captures a static moment in time. However, in this study, the framework was applied over an extended period. This exposed vulnerabilities for certain parameters, like ownership transitions. Notably, some projects, such as Avri and Deil, had changing LEC ownership percentages. This variability might introduced analytical discrepancies when comparing projects.

Case Selection Constraints

The study's case selection focused on successful developments, potentially overlooking insights from unsuccessful ones. While initial assessments found correlations, such as distance to residential areas, further testing rendered them non-influential. However, their potential influence may not be dismissed. The non-random selection could introduce bias, and a broader case pool might have yielded different insights.

Interviews

The study's semi-structured interviews may have limited data depth. Different formats could yield varied insights. Data consistency was challenged by diverse interviewee roles, focusing on similar roles between cases might have enhanced uniformity. While a minimum of two interviews were held for each case, increasing this number and engaging all key stakeholders might have provided broader insights.

Defining Project Phases

The project timeline was segmented into two distinct phases: from ideation to permit application, and from permit application to the start of construction. However, identifying the project's exact start was occasionally ambiguous, possibly impacting timeline accuracy.

Development of the Scoring Mechanism

While the aim was to represent rules quantitatively, some rules proved challenging to convert into numeric scores. This implies that certain rules might capture their intended meaning more accurately than others. For example, the scoring for the payoff rule was more straightforward, with every additional measure incrementing the score. However, translating all rules into quantitative values was not always seamless, which could influence the precision of the insights derived. Additionally, while the scoring adhered to a predefined system, it still contained an element of subjectivity. The transition from individual case analysis to a scoring system also resulted in a loss of empirical depth.

Views During Permit Application

The number of views during permit applications might not accurately represent public opinion. In one instance, local groups were observed to inflate view counts through repeated objections. Deeper research could elucidate the underlying dynamics, and analyzing more cases could help balance potential biases.

QCA and fsQCA

The limited number of cases in this study restricted the inclusion of more factors. Ideally, all seven rules should have been considered, differentiating between LECs and CWEPDs. Yet, achieving this would require at least 36 cases (P. Fiss, 2009). While fsQCA presents challenges like potential false positives and issues with causality (Braumoeller, 2015; Fischer & Maggetti, 2016; Paine, 2016), it served as a complementary tool in this study, enhancing the overall analytical depth.

Recommendations for Future Research

When reflecting upon this study, several directions for future research and improvements come to the fore. An initial recommendation, in relation to the depth of analysis, is the broader application of the

IAD framework. By integrating the IAD framework across all pivotal action situations, researchers can encapsulate the entire process, offering a more rounded understanding of the institutional conditions under study. In future research, increasing interviews per case can enhance qualitative insights and address specific case details. Maintaining uniformity in interviewee roles ensures better data comparison. Broadening stakeholder engagement captures varied perspectives. Furthermore, future research could adopt randomised case selection to enhance the findings' generalisability. Including both successful and unsuccessful development cases will give a fuller understanding of influential factors. The significance of aspects like distance to residential areas, deemed non-influential, could be re-examined in diverse case scenarios. Another path could be into into refining the methods used to translate rules into quantitative scores. Exploring alternative scoring systems and comparing them to this study can validate the current findings and suggest improvements. Given the subjectivity in the scoring process, introducing multiple independent scorers and comparing their scores might help control this subjectivity and improve the scoring system's reliability. Lastly, a larger data set improves the result credibility and allows more conditions to be tested with QCA.

Ostrom's eight design principles for effective resource management offer a framework for comparison. It would be insightful for future studies to compare the findings of this research with theses principles. Such an analysis could uncover any alignments or differences which can help understand the dynamics. Furthermore, the relationship between wind farm locations and socio-economic elements offers promising areas for further research. Considering that individuals can achieve returns of up to 6% annually (Windpark Kookepan) when invested, adjusting regulatory or incentive structures related to wind energy might shift public perceptions. Such changes could influence property valuations and might even foster a PIMBY (Please-In-My-Backyard) sentiment. Exploring this dynamic can provide valuable insights for shaping policy strategies during sustainable energy transitions.

Insights from this study could potentially inform solutions for other spatial planning dilemmas, including the current housing crisis in the Netherlands and even refugee camps. The findings could potentially offer a perspective on how community-based approaches might address broader societal challenges. Another challenge, as highlighted by Demsas, is the strong influence of local community groups on development outcomes (Demsas, 2022). Using this study, policymakers can better understand and tackle such opposition. Effective communication, understanding local concerns, and aligning them with broader societal needs can guide successful planning. Another interesting recommendation is to explore what drives people's views on Local Energy Communities and Commercial Wind Energy Project Developers. It is worth examining if the rising interest in LECs indicates a broader societal need for community amidst growing individualism. Robert D. Putnam's "Bowling Alone" discusses the trend towards solitary activities and decreasing community involvement (Putnam, 2001). This trend implies that while society may lean towards individualism, there is a strong underlying need for communal connection. In the context of wind energy, understanding this balance between personal and community interests could be key. Building trust and ensuring community involvement might be critical for the success of wind energy projects, especially in a time where societal dynamics are shifting.

8.4. Policy and Practical Recommendations

In considering policy and practical recommendations for wind energy development, several insights emerged that can guide future endeavors. It is observed that there might be consistent opposition from a small group to some wind energy projects. Therefore, it is recommended that engagement strategies primarily focus on the larger demographic, notably those who are yet to form a strong opinion. This can be achieved through clear communication and by including them in the decision-making processes. At the governance level, the roles of provincial and municipal entities are significant. Assigning intermediaries that act as an overarching body with the capability to provide transparent communication and decision-making could be beneficial for these governing bodies. Provincial entities should consider providing (financial) support by facilitating advisory groups for continuous project oversight. The economic aspects of wind energy projects are significant. Considering the potential returns from these projects, there is a need for an equitable distribution model. If local communities experience potential adverse effects from these projects, such as alterations to their auditory or visual surroundings, it is crucial to ensure they also participate in the project's economic benefits. If people have a stake in the project or see the returns in the form of community funds, their willingness to cooperate increases. This not only compensates for any negative externalities but also fosters a sense of ownership and acceptance among the local community. The collaboration between CWEPDs and LECs requires attention. CWEPDs can offer critical expertise in legal, financial, and technical domains, contributing to project feasibility. LECs, familiar with local contexts, are positioned for community engagement activities. Combining the strengths of CWEPDs and LECs might be beneficial in obtaining local consensus. Furthermore, including local residents in the decision-making processes of the project is advised. Their involvement should be substantial, allowing them to influence project design and execution. This approach leads to a more comprehensive understanding of community interests, resulting in solutions that consider varied perspectives. Concluding, while the Dutch Climate Agreement initiated the conversation on local involvement in wind energy projects, this study provides tangible guidelines to enhance future successes.

9 Clarification on the Use of Writing Tools

Per TU Delft's guidelines, we must specify when AI Bots, like ChatGPT, contribute to report composition. The rules apply when using ChatGPT for information, not mere writing assistance.

For the purpose of this research, tools including Grammarly, QuillBot, and ChatGPT were employed. Their application was strictly for refining the quality of writing and enhancing clarity, akin to utilising aids like Google Translate, receiving feedback from peers, or any other non-AI based writing assistance. It is pivotal to underscore that these tools were absolutely not consulted as knowledge sources, nor did they contribute to the generation of content, insights, or ideas presented herein.

These aids streamlined the writing process, enabling a wider topic coverage in the given time. The content, interpretations, and conclusions are entirely mine. I bear full responsibility for this research's content.

References

Andrade, C. (2019). The p value and statistical significance: Misunderstandings, explanations, challenges, and alternatives. *Indian J Psychol Med*, *41*, 210-215. (PMID: 31142921; PMCID: PMC6532382) doi: 10.4103/IJPSYM.IJPSYM_193_19

Arab, R. (2022). Explaining sustainability transitions by bringing together the multilevel perspective and the multiple streams framework. Retrieved from http://resolver.tudelft.nl/uuid:25c8b6b8-cfd2-4c05-92c6-90f9e70c28b5

Blatter, J., & Haverland, M. (2012). *Designing case studies: Explanatory approaches in small-n research*. Palgrave Macmillan UK.

Bohlmeijer, L. (2022). *Power to the people: geef de energiemarkt terug aan de burger.* Retrieved 2022-12-12, from https://decorrespondent.nl/13680/power-to-the-people-geef-de-energiemarkt-terug-aan-de-burger/431824e8-a4f6-04f2-0c26-997fae933974

Braumoeller, B. F. (2015). Guarding against false positives in qualitative comparative analysis. *Political Analysis*, *23*(4), 471–487. doi: 10.1093/pan/mpv017

Breukers, S., & Wolsink, M. (2007). Wind energy policies in the netherlands: Institutional capacity-building for ecological modernisation. *Environmental Politics*, *16*(1), 92-112. doi: 10.1080/09644010601073838

BRO. (2018). *Ruimtelijke onderbouwing "windpark de kookepan te neer".* Retrieved 2023-03-06, from https://www.planviewer.nl/imro/files/NL.IMRO.1640.OV18NeWPKookepan-VG01/d_NL.IMRO.1640.OV18NeWPKookepan-VG01.pdf

Cleophas, T., & Zwinderman, A. (2010). *Spss for starters*. Springer Netherlands.

Coenen. (2009). *Public participation and better environmental decisions*. Springer. doi: https://doi.org/10.1007/978-1-4020-9325-8

Cole, D. (2014, 7 24). *Formal institutions and the iad framework: Bringing the law back in.* Retrieved 2023-10-02, from https://ssrn.com/abstract=2471040 (Available at SSRN or http://dx.doi.org/10.2139/ssrn.2471040)

Demsas, J. (2022). Community input is bad, actually. *The Atlantic*. (Angry neighborhood associations have the power to halt the construction of vital infrastructure. It doesn't have to be this way.)

Elzenga, H., & Schwencke, A. M. (2015). Lokale energiecoöperaties: nieuwe spelers in de energie. *Bestuurswetenschappen*. doi: 10.5553/Bk/092733872015024002002

ERIM. (2023). *Necessary condition analysis.* Retrieved 2023-08-01, from https://www.erim.eur.nl/necessary-condition-analysis/about-nca/faq/nca-and-other-data-analysis-methods/nca-and-qca/ (Erasmus University)

Fereday, J., & Muir-Cochrane, E. (2006). Demonstrating rigor using thematic analysis: A hybrid approach of inductive and deductive coding and theme development. *International Journal of Qualitative Methods*, *5*(1), 80-92. doi: https://doi.org/10.1177/160940690600500107

Fischer, M., & Maggetti, M. (2016, 03). Qualitative comparative analysis and the study of policy processes. *Journal of Comparative Policy Analysis: Research and Practice*, *19*, 1-17. doi: 10.1080/13876988.2016.1149281

Fiss, P. (2009). *Practical issues in QCA. professional development workshop on qualitative comparative analysis (QCA) conducted at the meeting of the academy of management.* Retrieved 2023-07-26, from http://www-bcf.usc.edu/~fiss/QCA_PDW_2009_Fiss_Practical_Issues.pdf

Fiss, P., Marx, A., & Cambré, B. (2013, 01). Chapter 1 configurational theory and methods in organizational research: Introduction. In (Vol. 38, p. 1-22). doi: 10.1108/S0733-558X(2013)0000038005

Fiss, P. C. (2011). Building better causal theories: A fuzzy set approach to typologies in organizational research. *Academy of Management Journal*, *54*(2), 393-420.

Gemeente Leudal. (2018a). *Nota van zienswijzen windpark de kookepan.* Retrieved 2023-05-14, from https://www.ruimtelijkeplannen.nl/documents/NL.IMRO.1640.OV18NeWPKookepan-VG01/b_NL.IMRO.1640.OV18NeWPKookepan-VG01_bd23.pdf

Gemeente Leudal. (2018b). *Omgevingsvergunning.* Retrieved 2023-05-06, from https://www.planviewer.nl/imro/files/NL.IMRO.1640.OV18NeWPKookepan-VG01/vb_NL.IMRO.1640

.OV18NeWPKookepan-VG01.pdf

Ghorbani, A., Nascimento, L., & Filatova, T. (2020). Growing community energy initiatives from the bottom up: Simulating the role of behavioural attitudes and leadership in the netherlands. *Energy Research and Social Science*, *70*. Retrieved from https://www.scopus.com/inward/record.uri?eid=2-s2.0-85092287854&doi=10.1016%2fj.erss.2020.101782&partnerID=40&md5=3860afcf5302fd9099e5b150f5c73133 doi: 10.1016/j.erss.2020.101782

Graaff, S. d. (2018). *The long road of local renewable energy initiatives in developing solar pv-installations along national transport infrastructure in the netherlands* (Master's Thesis). Rijksuniversiteit Groningen. (Environmental & Infrastructure Planning)

Hardin, G. (1968). The tragedy of the commons. *Science*, *162*(3859), 1243–1248. Retrieved 2023-06-29, from http://www.jstor.org/stable/1724745

HIER. (2017). *Windenergie: Samen slagen.* Retrieved 2023-05-24, from https://www.hier.nu/achtergrondinformatie-over-collectief-windenergie-opwekken/windenergie-samen-slagen

HIER. (2018). *De coöperatie: een unieke rechtsvorm.* Retrieved 2023-03-07, from https://www.hier.nu/organiseren-van-je-energie-initiatief/cooperatie-een-unieke-rechtsvorm

HIER. (2019). *50% lokaal eigendom: veelgestelde vragen.* Retrieved 2023-02-01, from https://www.hier.nu/achtergrondinformatie-over-collectief-windenergie-opwekken/50-lokaal-eigendom-veelgestelde-vragen

HIER. (2020). *Windpark de kookepan: Samen onze eigen energie opwekken.* Retrieved 2023-05-11, from https://www.hier.nu/windpark-kookepan-samen-onze-eigen-energie-opwekken

HIER. (2023). *Collectieve windprojecten.* Retrieved 2023-05-24, from https://www.hier.nu/lokale-energie-monitor-2022/collectieve-windprojecten#:~:text=Er%20zijn%20twee%20nieuwe%20coöperatieve,toegenomen%20ten%20opzichte%20van%202021.

HIER and Energie Samen. (2023). *Lokale energie monitor 2022.* Retrieved 2023-06-19, from https://www.hier.nu/LEM2022

HIER en Bureau 7TIEN. (2023). *Knelpunteninventarisatie energiecoöperaties.* Retrieved 2023-03-04, from https://www.hieropgewekt.nl/uploads/inline/Knelpunteninventarisatie%20energiecooperaties.pdf

Hoppe, T. (2022, 02). Wat kan er geleerd worden van burgercollectieven in de energietransitie? In *Burgerinitiatieven: de nieuwe aanvoerders van de inclusieve en circulaire economie* (p. 40-50).

Hoppe, T., van Bueren, E., & Sanders, M. (2016, 10). Inleiding themanummer 'energietransitie en lokaal bestuur'. *Bestuurswetenschappen*, *70*, 5-8. doi: 10.5553/Bw/016571942016070003002.

Hrelja, R., Monios, J., Rye, T., Isaksson, K., & Scholten, C. (2017). The interplay of formal and informal institutions between local and regional authorities when creating well-functioning public transport systems. *International Journal of Sustainable Transportation*, *11*(8), 611-622. doi: https://doi.org/10.1080/15568318.2017.1292374

ICA. (1995). *Cooperative identity, values principles.* Retrieved 2023-03-07, from https://www.ica.coop/en/cooperatives/cooperative-identity (International Cooperative Alliance)

ICA. (2021). *The seven cooperative principles.* Retrieved 2023-04-10, from https://www.ica.coop/en/what-co-operative/ica-statement-identity (International Cooperative Alliance)

Informatiepunt Leefomgeving. (2023). *Provinciale omgevingsvisie.* Retrieved 2023-03-02, from https://iplo.nl/regelgeving/instrumenten/omgevingsvisie-provincie/

IRENA. (2021). *Renewable power generation costs in 2021* (Technical Report). International Renewable Energy Agency. Retrieved from https://www.irena.org/publications/2021/Mar/Renewable-Power-Costs-in-2020

Kamp, L. M. (2004). Wind turbine development 1973–2000: A critique of the differences in policies between the netherlands and denmark. *Wind Engineering*, *28*(4), 341-354. doi: 10.1260/0309524042886414

Klok, Kirkels, A., & Alkemade, F. (2023). Impacts, procedural processes, and local context: Rethinking the social acceptance of wind energy projects in the netherlands. *Energy Research Social Science*, *99*, 103044. Retrieved from https://www.sciencedirect.com/science/article/pii/S2214629623001044 doi: https://doi.org/10.1016/j.erss.2023.103044

Klok, P. J., Coenen, F. H. J. M., & Denters, S. A. H. (2006). Institutional conditions for complementarities between urban leadership and community involvement. In H. Heinelt, D. Sweeting, &

P. Getimis (Eds.), *Legitimacy and urban governance, a cross-national comparative study* (p. 265–285). Abingdon, United Kingdom: Routledge. (https://doi.org/10.4324/9780203099629)

Kloosterman, R., Akkermans, M., Reep, C., Wingen, M., 't Veld, H. M.-I., & van Beuningen, J. (2021). *Klimaatverandering en energietransitie: opvattingen en gedrag van nederlanders in 2020.* CBS. Retrieved from https://www.cbs.nl/nl-nl/longread/rapportages/2021/klimaatverandering-en-energietransitie-opvattingen-en-gedrag-van-nederlanders-in-2020/3-opvattingen-over-energietransitie (Publicatiedatum: 4-6-2021)

Kluskens, N., Vasseur, V., & Benning, R. (2019). Energy justice as part of the acceptance of wind energy: An analysis of limburg in the netherlands. *Energies*, *12*(22). Retrieved from https://www.scopus.com/inward/record.uri?eid=2-s2.0-85075998298&doi=10.3390%2fen12224382&partnerID=40&md5=1e34f3995d5dca6d8e62ed173970dbe7 doi: 10.3390/en12224382

Koelman, M., Hartmann, T., & Spit, T. J. M. (2022). When tensions become conflicts: wind turbine policy implementation and development in the netherlands. *Journal of Environmental Planning and Management*, *65*(3), 375-397. doi: 10.1080/09640568.2021.1885018

Koster, A., & Anderies, J. (2013, 06). Institutional factors that determine energy transitions: A comparative case study approach. *Lecture Notes in Energy*, *23*, 33-61. doi: 10.1007/978-1-4471-5595-9_3

Koster, A. M., & Anderies, J. M. (2013). Institutional factors that determine energy transitions: A comparative case study approach. In *Lecture notes in energy* (Vol. 23, p. 33-61). doi: https://doi.org/10.1007/978-1-4471-5595-9_3/TABLES/3

Lammers, I., & Hoppe, T. (2019). Watt rules? assessing decision-making practices on smart energy systems in dutch city districts. *Energy Research Social Science*, *47*, 233-246. Retrieved from https://www.sciencedirect.com/science/article/pii/S2214629618300999 doi: https://doi.org/10.1016/j.erss.2018.10.003

Leudal Energie. (2020). *Windpark de kookepan.* Retrieved 2023-06-02, from https://leudalenergie.nl/windpark-de-kookepan/

Limburg, R. (2019). *Uitspraak rechtbank limburg.* Retrieved 2023-06-02, from https://www.omgevingsweb.nl/jurisprudentie/eclinlrblim20196137/

Lokale Energie Monitor 2022. (2022). *Hieropgewekt.* Retrieved 2023-02-24, from https://www.hieropgewekt.nl/lokale-energie-monitor-2022/wind

Mcginnis, M., & Ostrom, E. (2014, 06). Social-ecological system framework: Initial changes and continuing challenges. *Ecology and Society*, *19*. doi: 10.5751/ES-06387-190230

McGinnis, M. D. (2011). An introduction to iad and the language of the ostrom workshop: A simple guide to a complex framework. *Policy Studies Journal*, *39*(1), 169-183. doi: 10.1111/j.1541-0072.2010.00401.x

Milchram, C., Märker, C., Schlör, H., Künneke, R., & van de Kaa, G. (2019). Understanding the role of values in institutional change: The case of the energy transition. *Energy, Sustainability and Society*, *9*, 46. doi: 10.1186/s13705-019-0235-y

Ministerie van Binnenlandse Zaken en Koninkrijksrelaties. (2023). *Hoe en wanneer kan ik bezwaar maken tegen een bestemmingsplan?* Retrieved 2023-06-01, from https://www.rijksoverheid.nl/onderwerpen/ruimtelijke-ordening-en-gebiedsontwikkeling/vraag-en-antwoord/hoe-kan-ik-bezwaar-maken-tegen-een-bestemmingsplan

Ministerie van Economische Zaken, & Ministerie van Infrastructuur en Milieu. (2013a). *Energieakkoord.* Retrieved 2023-03-31, from https://open.overheid.nl/documenten/ronl-archief-2c12d99a-e816-4e93-a199-f9e9feef318c/pdf

Ministerie van Economische Zaken, & Ministerie van Infrastructuur en Milieu. (2013b). *Klimaatakkoord.* Retrieved 2023-03-21, from https://www.rijksoverheid.nl/binaries/rijksoverheid/documenten/kamerstukken/2013/11/22/klimaatakkoord-2013/klimaatakkoord-2013.pdf

Ministerie van Economische Zaken, & Ministerie van Infrastructuur en Milieu. (2022). *Monitor wind op land over 2022.* Retrieved 2023-03-04, from https://www.rvo.nl/sites/default/files/2023-05/Monitor-wind-op-land-2022.pdf

Ministerie van Infrastructuur en Waterschap. (2020). *Hoe is m.e.r. ontstaan?* Retrieved 2023-05-05, from https://www.infomil.nl/onderwerpen/integrale/mer/procedurehandleiding/index/ontwikkelingen/

Ministerie van Volkshuisvesting, Ruimtelijke Ordening en Milieubeheer. (2010). *Besluit van 14 oktober*

2010 tot wijziging van het besluit algemene regels voor inrichtingen milieubeheer en het besluit omgevingsrecht (wijziging milieuregels windturbines) (Vol. 2010) (AMvB No. 749).

Misangyi, V., Greckhamer, T., Furnari, S., Fiss, P., Crilly, D., & Aguilera, R. (2016, 11). Embracing causal complexity: The emergence of a neo-configurational perspective. *Journal of Management*, *43*. doi: 10.1177/0149206316679252

Mors, E. t., & Leeuwen, E. v. (2023). It matters to be heard: Increasing the citizen acceptance of low-carbon technologies in the netherlands and united kingdom. *Energy Research and Social Science*, *100*. Retrieved from `https://www.scopus.com/inward/record.uri?eid=2-s2.0-85159164146&doi=10.1016%2fj.erss.2023.103103&partnerID=40&md5=bca96aa50d6cfefe3f879d7001af43d6` doi: 10.1016/j.erss.2023.103103

Nabielek, P. (2020). Wind power deployment in urbanised regions: An institutional analysis of planning and implementation. *TU Wien Academic Press*. doi: https://doi.org/10.34727/2019/isbn.978-3-85448-033-4

Netherlands Chamber of Commerce, KVK. (2023a). *Private limited company (bv).* Retrieved 2023-05-24, from `https://www.kvk.nl/en/starting/private-limited-company-bv/`

Netherlands Chamber of Commerce, KVK. (2023b). *Public limited company (nv).* Retrieved 2023-05-24, from `https://www.kvk.nl/en/starting/public-limited-company-nv/`

Newell, D., Sandström, A., & Söderholm, P. (2017, 01). Network management and renewable energy development: An analytical framework with empirical illustrations. *Energy Research Social Science*, *23*, 199-210. doi: 10.1016/j.erss.2016.09.005

North, D. (1991). Institutions. *The Journal of Economic Perspectives*, *5*(1), 97-112. Retrieved from `http://www.jstor.org/stable/1942704`

NP RES. (2021). *Naar (betere) samenwerking tussen gemeenten, projectontwikkelaars en energiecoöperaties: Dialoog in de tussenruimte*. (samenwerking tussien NVDE, VNG, de Participatiecoalitie en NP RES)

Ostrom, E. (2002). Chapter 24 common-pool resources and institutions: Toward a revised theory. In *Agriculture and its external linkages* (Vol. 2, p. 1315-1339). Elsevier. Retrieved from `https://www.sciencedirect.com/science/article/pii/S1574007202100065` doi: https://doi.org/10.1016/S1574-0072(02)10006-5

Ostrom, E. (2009). *Understanding institutional diversity*. Princeton University Press. Retrieved from `https://books.google.nl/books?id=LbeJaji_AfEC`

Ostrom, E. (2010). Beyond markets and states: Polycentric governance of complex economic systems. *American Economic Review*, *100*(3), 641–672. doi: 10.1257/AER.100.3.641

Ostrom, E. (2011, 02). Background on the institutional analysis and development framework. *Policy Studies Journal*, *39*, 7-27. doi: 10.1111/j.1541-0072.2010.00394.x

Ostrom, E. (2015). *Governing the commons: The evolution of institutions for collective action*. Cambridge University Press. doi: 10.1017/CBO9781316423936

Ostrom, E., Gardner, R., & Walker, J. (1994). *Rules, games, and common-pool resources*. University of Michigan Press. Retrieved from `https://books.google.nl/books?id=DgmLa8gPo4gC`

Page, M., & et al. (2021, December). The prisma 2020 statement: an updated guideline for reporting systematic reviews. *Systematic Reviews*, *10*(1). doi: 10.1186/s13643-021-01626-4

Paine, J. (2016, 02). Still searching for the value-added: Persistent concerns about set-theoretic comparative methods. *Comparative Political Studies*, *49*. doi: 10.1177/0010414015626456

Pappas, I., & Woodside, A. (2021, 06). Fuzzy-set qualitative comparative analysis (fsqca): Guidelines for research practice in information systems and marketing. *International Journal of Information Management*, *58*, 102310. doi: 10.1016/j.ijinfomgt.2021.102310

Parente, T., & Federo, R. (2019, 08). Qualitative comparative analysis: Justifying a neo-configurational approach in management research.
doi: 10.1108/RAUSP-05-2019-0089

Polski, M., & Ostrom, E. (1999). An institutional framework for policy analysis and design. In *A framework for policy analysis* (p. 13-47). Retrieved from `https://ostromworkshop.indiana.edu/pdf/toolkit/iad-for-policy-applications.pdf`

Pure Energie. (2022). *Een geschikte locatie voor een windmolen.* Retrieved 2023-04-01, from `https://pure-energie.nl/kennisbank/een-geschikte-locatie-voor-een-moderne-windmolen-is-passen-en-meten/`

Putnam, R. (2001). *Bowling alone: The collapse and revival of american community* (1st Touchstone

ed. ed.). New York: Touchstone.
Ragin, C. (1987). *The comparative method: Moving beyond qualitative and quantitative strategies*. University of California Press. Retrieved 2023-07-08, from http://www.jstor.org/stable/10.1525/j.ctt1pnx57
Ragin, C. (2008). What is qualitative comparative analysis? *NCRM Research Methods Festival 2008. (Unpublished)*. Retrieved 2023-06-30, from https://eprints.ncrm.ac.uk/id/eprint/250/
Ragin, C., & Davey, S. (2023). *fuzzy set qualatative comparative analysis.* Retrieved 2023-06-12, from https://sites.socsci.uci.edu/~cragin/fsQCA/software.shtml
REScoop.eu. (2023). *The rescoop model.* Retrieved 2023-06-19, from https://www.rescoop.eu/the-rescoop-model
Rijpens, J., Riutort, S., & Huybrechts, B. (2013). Report on rescoop business models. *EMES network*.
RIVM. (2023). *Atlas leefomgeving - verken en ontdek je leefomgeving: Windturbines.* Retrieved 2023-10-02, from https://www.atlasleefomgeving.nl/thema/geluid-in-je-omgeving/windturbines#:~:text=Het%20geluid%20van%20windturbines%20valt,knipperende%20lichten%20kunnen%20hinder%20geven.
Roig-Tierno, N., González-Cruz, T., & Llopis-Martinez, J. (2017, 01). An overview of qualitative comparative analysis: A bibliometric analysis. *Journal of Innovation Knowledge*, *2*. doi: 10.1016/j.jik.2016.12.002
RvO Nederland. (2023a). *Duurzaam ondernemen met windenergie.* Retrieved 2023-05-05, from https://ondernemersplein.kvk.nl/duurzaam-ondernemen-met-windenergie/ (Rijksdienst voor Ondernemend Nederland)
RvO Nederland. (2023b). *Windenergie op land.* Retrieved 2023-03-06, from https://www.rvo.nl/onderwerpen/windenergie-op-land (Rijksdienst voor Ondernemend Nederland)
Rye, T., Monios, J., Hrelja, R., & Isaksson, K. (2018). The relationship between formal and informal institutions for governance of public transport. *Journal of Transport Geography*, *69*, 196-206. doi: https://doi.org/10.1016/j.jtrangeo.2018.04.025
Schneider, C. Q., & Wagemann, C. (2012). *Set-theoretic methods for the social sciences: A guide to qualitative comparative analysis*. Cambridge University Press. doi: 10.1017/CBO9781139004244
Seawright, J. (2016). *Multi-method social science: Combining qualitative and quantitative tools*. Cambridge University Press. doi: 10.1017/CBO9781316160831
Skarbek, D. (2020). Qualitative research methods for institutional analysis. *Journal of Institutional Economics*, *16*(4), 409–422. doi: 10.1017/S174413741900078X
Soetewey, A. (2021). *What statistical test should i do?* Retrieved 2023-06-24, from https://statsandr.com/blog/what-statistical-test-should-i-do/
Spijkerboer, R., Zuidema, C., Busscher, T., & Arts, J. (2019). Institutional harmonization for spatial integration of renewable energy: Developing an analytical approach. *Journal of Cleaner Production*, *209*, 1593-1603. Retrieved from https://www.sciencedirect.com/science/article/pii/S0959652618334085 doi: https://doi.org/10.1016/j.jclepro.2018.11.008
Strachan, P., Lal, D., & Toke, D. (2009). *Wind power and power politics: International perspectives*. Taylor & Francis. Retrieved from https://books.google.nl/books?id=WUaTAgAAQBAJ
Trampusch, C., & Palier, B. (2016). Between x and y: how process tracing contributes to opening the black box of causality. *New Political Economy*, *21*(5), 437-454. Retrieved from https://doi.org/10.1080/13563467.2015.1134465 doi: 10.1080/13563467.2015.1134465
van Aalderen, N., & Horlings, L. (2020, 03). Accommodative public leadership in wind energy development: Enabling citizens initiatives in the netherlands. *Energy Policy*, *138*, 111249. doi: 10.1016/j.enpol.2020.111249
van Staten afdeling Bestuursrechtspraak, R. (2023). *Uitspraak 201908374/1/r3.* Retrieved 2023-06-01, from https://www.raadvanstate.nl/uitspraken/@125043/201908374-1-r3/
Verbong, G., & Geels, F. (2007). The ongoing energy transition: Lessons from a socio-technical, multi-level analysis of the dutch electricity system (1960–2004). *Energy Policy*, *35*(2), 1025-1037. Retrieved from https://www.sciencedirect.com/science/article/pii/S0301421506000899 doi: https://doi.org/10.1016/j.enpol.2006.02.010
Vink, M. P., & Vliet, O. V. (2009). Not quite crisp, not yet fuzzy? assessing the potentials and pitfalls of multi-value qca. *Field Methods*, *21*(3), 265-289. Retrieved from https://doi.org/10.1177/1525822X09332633 doi: 10.1177/1525822X09332633

Warbroek, B., & Hoppe, T. (2017, 01). Modes of governing and policy of local and regional governments supporting local low-carbon energy initiatives; exploring the cases of the dutch regions of overijssel and fryslân. *Sustainability*, *9*, 75. Retrieved from https://www.mdpi.com/2071-1050/9/1/75 doi: 10.3390/su9010075

Williams, J. (2018). *Elinor ostrom's 8 rules for managing the commons.* Retrieved 2023-05-24, from https://earthbound.report/2018/01/15/elinor-ostroms-8-rules-for-managing-the-commons/

Windenergie-nieuws. (2020). *Burgerwindpark de kookepan kan doorgaan.* Retrieved 2023-06-08, from https://windenergie-nieuws.nl/08/burgerwindpark-de-kookepan-kan-doorgaan/

Witte, J., & Kuijers, T. (2023, 3). *Effecten van verschillende afstandsnormen voor windturbines op land.* RVO. Retrieved 2023-04-01, from https://www.rvo.nl/sites/default/files/2023-04/230317_Ruimtelijk%20effect%20afstandsnormering%20windenergie_def.pdf (Een ruimtelijke analyse, Eindrapportage)

Wolsink, M. (2000, 09). Wind power and the nimby-myth: Institutional capacity and the limited significance of public support. *Renewable Energy*, *21*, 49-64. doi: 10.1016/S0960-1481(99)00130-5

A

Literature Review Results

In this appendix, a systematic literature review methodology relevant to the study is delineated. Adhering to a structured approach, components from the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) are integrated, which encompass both inclusion and exclusion criteria as advised by PRISMA (Page & et al., 2021). Figure A.1 graphically illustrates the selection process using the PRISMA flowchart.

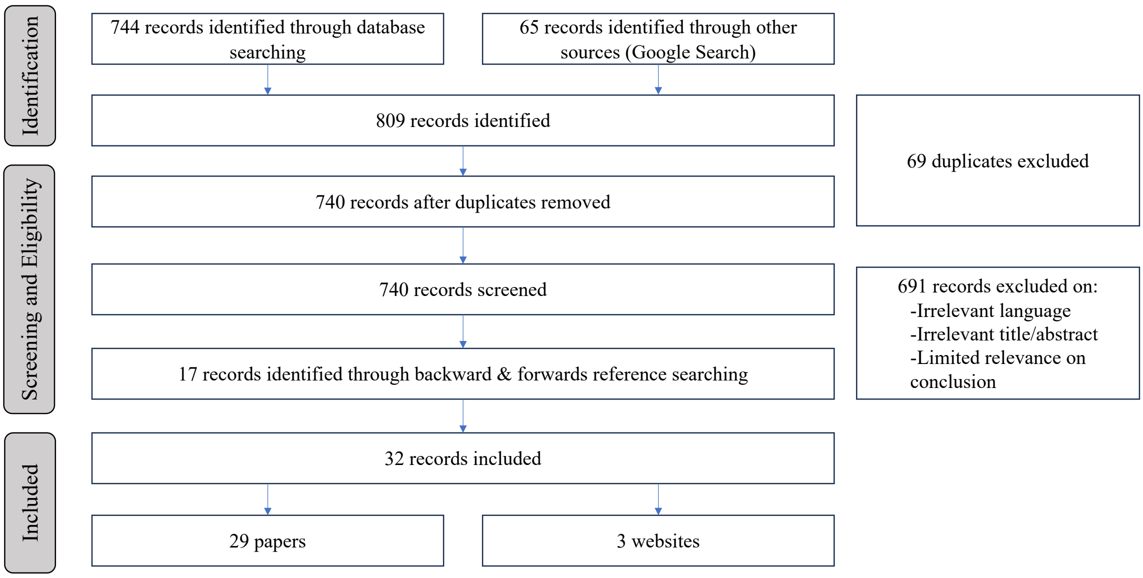


Figure A.1: PRISMA flowchart detailing literature selection

A.1. Literature Review for Theoretical Background

The relevant records and reason of relevancy are presented in tables A.1, A.2 and A.3 below.

Author	General view
(Hardin, 1968)	The "tragedy of the commons" describes the phenomenon where individuals, acting in their self-interest, deplete shared resources, a concept discussed by ecologist Garrett Hardin in his 1968 essay but originating from Aristotle.
(North, 1991)	This book delves into the concept of institutions as human-created constraints that guide political, economic, and social interactions, encompassing both informal customs and formal legal structures. It posits that institutions play a pivotal role in shaping economies through history, influencing the incentives and trajectories of economic activities, ultimately determining growth, stagnation, or decline, with the narrative grounded in economic history.
(Coenen, 2009)	Public Participation and Better Environmental Decisions" delves into the potential of public participation in environmental decision-making, emphasising that beyond experts and political elites, the general public's insights are crucial for comprehensive solutions. The book evaluates the benefits and limitations of public participation, exploring whether including public perspectives genuinely leads to better decisions and outcomes in environmental policy.
(Breukers & Wolsink, 2007)	This paper examines how institutional conditions influence policy and planning processes for wind energy implementation in the Netherlands, with a focus on building institutional capacity for policy learning, and discusses how locally owned wind projects have, as an unintended result of liberalisation, accelerated implementation despite increasing resistance and limited support.
(Wolsink, 2000)	This paper challenges the prevailing assumption that public acceptance, as measured by surveys, is the primary indicator of support for wind power, and argues that institutional factors play a more significant role in wind energy facility siting and implementation, providing two examples that illustrate how these factors shape the level of support for wind power projects.
(Polski & Ostrom, 1999)	This chapter presents the IAD framework as a tool for policy analysis and design, transitioning from its previous role as a research method. It provides a structured approach for policy evaluation, reform initiation, and new intervention design, supplemented with real-world examples.
(Ostrom, 2009)	In her book, Elinor Ostrom introduces the IAD framework, which offers a comprehensive method for analyzing economic, political, and social institutions, emphasising the importance of understanding the arena of interactions, the rules governing relationships, the biophysical world, and the community context. The book demonstrates the application of the IAD framework through field and experimental studies, focusing on the diversity of rules, the process of rule change, and the design principles of resilient, self-organised resource governance institutions.
(Ostrom, 2015)	Elinor Ostrom's research critiques traditional policy analysis on natural resources and provides empirical data to understand the governance of common-pool resources. Contrary to the "tragedy of the commons," Ostrom demonstrates that voluntary organisations can sometimes manage these resources effectively, as evidenced by cases like communal tenure and fisheries.

Table A.1: Literature overview institutional analysis (1/3)

Author	General view
(Nabielek, 2020)	This study, utilising the IAD framework, explores the tension between climate targets and the implementation of renewable energy, particularly wind power, in three urbanised regions in Europe, highlighting the significance of spatial planning approaches in wind energy deployment, and emphasising the need for a balanced institutional design that considers both energy policy goals and local contextual values to foster public acceptance and consensus-building efforts.
(Lammers & Hoppe, 2019)	This article investigates the impact of institutional conditions on decision-making processes for the introduction of smart energy systems in city district development projects, emphasising the need for the creation and orchestration of effective rules to address challenges and enable successful implementation. This case exemplifies how the combined use of IAD and Causal Process Tracing provides insights into the role of institutional conditions in decision-making processes.
(Kluskens, Vasseur, & Benning, 2019)	This study examines modes of participation and benefit distribution in wind energy projects, highlighting the preference for different participation modes in various project phases and the importance of a balanced approach to benefit distribution for local acceptance, indicating that while certain participation modes may not fully address procedural justice, distributive justice can be achieved by considering the mode of benefit distribution and maintaining a suitable balance.
(McGinnis, 2011)	This guide provides definitions or brief explanations of all the major terms and concepts used in the IAD framework. Also included are terms from the closely related frameworks on local public economies, public service industries, grammar of institutions, and social-ecological systems (SES).
(Milchram et al., 2019)	This paper introduces an interdisciplinary framework to understand how core values, such as affordability and sustainability, influence institutional changes in the transition to low-carbon energy systems. By integrating the IAD framework with concepts from moral philosophy, institutional economics, and social psychology, it offers a tool to analyse how values impact regulations, infrastructure, and behaviors, highlighting the role of value controversies in driving social learning and structural change.
(A. Koster & Anderies, 2013)	This chapter delves into energy transitions as pivotal components for achieving development objectives, highlighting the inherent challenges and prospects they present. Through the lens of the Institutional Analysis and Development Framework (IADF), the research aims to discern key institutional, biophysical, and social elements crucial for successful energy transitions, aspiring to establish ”design principles” or institutional drivers, and employs a comparative case-study approach to discern common patterns and influential institutional factors.
(Seawright, 2016)	”Multi-Method Social Science” is a comprehensive guidebook that champions the integration of qualitative and quantitative methods in social science research, using an array of statistical and qualitative tools to carry out causal inference and validate key assumptions about causation in social science through over a dozen multi-method designs.
(Rye et al., 2018)	This paper examines how formal and informal governance structures influence public transport planning and operations in four countries: England (excluding London), the Netherlands, Germany, and Sweden. Through qualitative research and a framework from institutional change literature, it studies how informal mechanisms complement formal structures, often improving the effectiveness of public transport where formal setups fall short.

Table A.2: Literature overview institutional analysis (2/3)

Author	General view
(Mors & Leeuwen, 2023)	In two experimental surveys conducted with Dutch and United Kingdom citizens, this study highlights the significance of providing local residents with genuine voice opportunities in the decision-making process for carbon capture utilisation and storage (CCUS) and onshore wind projects, as it positively influences project acceptance by enhancing perceived procedural fairness and trust in the project developer, while pseudo voice or no voice opportunities can be equally detrimental.
(Klok et al., 2023)	This study found that community acceptance of a project is determined by the extent of impact mitigation, compensation, and tolerance, consideration of the local context, and the degree of trust and fairness involved in the project's development process.
(Ghorbani et al., 2020)	The paper presents an agent-based simulation model exploring the formation of Local Energy Initiatives (LEIs), self-organised communities aiming to meet their energy demands with locally produced green energy. The model leverages social theories and empirical data, showing that the presence of cooperative or altruistic citizens and leaders is crucial for the formation of LEIs, thus suggesting that policies promoting such initiatives should target individuals and small groups with leadership potential.

Table A.3: Literature overview institutional analysis (3/3)

A.2. Literature Review Wind energy landscape in the Netherlands

This search examined the contextual landscape of wind turbine development in the Netherlands, evaluating its goal attainment to date and outlining the future objectives. Only reports specifically scrutinising Dutch policy on renewable energy and wind energy more specially were selected. Finally, the total number of records included in the this study is seven. The relevant records and reason of relevancy are presented in table A.4 below.

Author	General view
(Koelman et al., 2022)	Conflicts between local, regional, and national interests regarding wind energy objectives often result in local governments grappling with local issues. As they increasingly depend on private or higher-level entities, unresolved local concerns escalate, leading to heightened local opposition to wind energy developments and general public policy.
(van Aalderen & Horlings, 2020)	Incorporating national policy to local levels presents difficulties, as government-led participation schemes often inadequately support active citizenship and struggle to fit within existing policy frameworks, leaving the question of shared leadership in the energy transition between governments and Local Energy Initiatives (LEI) unresolved.
(Strachan et al., 2009)	The book aims to examine factors influencing wind power outcomes across various countries with significant wind power programs, focusing on the relationship between ownership patterns and outcomes, including the influence of social environments, financial policies, and the crucial role of widespread social support paired with effective financial support systems.
(Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2013a)	The Energieakkoord 2013, also known as the Energy Agreement for Sustainable Growth, was initiated by the Dutch government with various organisations and businesses, with the primary purpose of accelerating energy efficiency and the growth of renewable energy production in the Netherlands.
(Informatiepunt Leefomgeving, 2023)	The Provinciale Omgevingsvisie is a strategic plan developed by Dutch provinces to shape their environment, including the consideration of spatial aspects, aiming to balance the interests of housing, economy, nature, and energy transition in the region.
(Ministerie van Economische Zaken & Ministerie van Infrastructuur en Milieu, 2022)	The Monitor Wind op Land is an annual report developed by the Dutch government that tracks and evaluates the progress of onshore wind energy projects across the Netherlands, in alignment with the renewable energy goals outlined in the Energieakkoord 2013.
(RvO Nederland, 2023b)	The Dutch government's website provides comprehensive information for those interested in developing a wind park. It includes details about regulatory compliance, available subsidies, and further information related to the process of wind energy development in the Netherlands.

Table A.4: Literature overview wind energy landscape Netherlands

A.3. Literature Review for Comparison LECs & CWEPDs

To effectively delineate the attributes of LECs and CWEPDs, it was imperative to have a comprehensive understanding of their operational landscapes. As such, this review encompassed both CWEPDs and LECs, emphasising the following parameters:

- **Objective:** What objectives do these institutional forms pursue?
- **Profit Distribution:** How is the distribution of profit structured?
- **Decision Making:** How are decisions formulated and implemented?
- **Social Purpose:** Is there a societal directive? If present, what does it encompass?
- **Legal Form:** What legal structure characterizes these institutions, and what is their judicial status?

This review specifically aimed to include documents that assess Dutch-centric case studies or business models, with a particular focus on renewable energy. Most notably, wind energy. Upon finalisation of the selection process, six records were assimilated for analysis. Table A.5 elucidates these records and delineates the rationale behind their inclusion.

Author	General view
(Hoppe, 2022)	This paper explores key questions such as what drives citizens to form energy collectives, their organisational and business models, their positive effects and potential in sustainable energy development, and the factors that support the continuity of such initiatives, concluding with lessons to inform policy support for the development of these valuable initiatives.
(HIER en Bureau 7TIEN, 2023)	The report discusses the key challenges faced by energy cooperatives in the Netherlands, specifically manpower shortages and collaboration difficulties with municipalities, and proposes potential solutions including the establishment of a regional project office, remunerations for certain roles, and improving cooperation agreements with local governments.
(Elzenga & Schwencke, 2015)	This study discusses the energy cooperatives work on promoting energy use reduction and renewable energy production, but face challenges in realising larger projects like wind turbines and solar parks due to local resistance and limited financial support, suggesting the need for clear political stance on wind energy and broader financial support for cooperatively owned solar parks.
(HIER, 2018)	HIER, a leading organisation in cooperative energy, underscores the importance of cooperatives as a legal entity in the Netherlands, highlighting that these member-governed and financed entities, of which there are over 8000, including more than 400 energy cooperatives, are focused on satisfying the specific needs of their members and generating economic advantages rather than maximising profits, making them unique contributors to the country's economy.
(Klok et al., 2023)	This study found that community acceptance of a project is determined by the extent of impact mitigation, compensation, and tolerance, consideration of the local context, and the degree of trust and fairness involved in the project's development process.
(Ghorbani et al., 2020)	The paper presents an agent-based simulation model exploring the formation of Local Energy Initiatives (LEIs), self-organised communities aiming to meet their energy demands with locally produced green energy. The model leverages social theories and empirical data, showing that the presence of cooperative or altruistic citizens and leaders is crucial for the formation of LEIs, thus suggesting that policies promoting such initiatives should target individuals and small groups with leadership potential.

Table A.5: Literature overview organisational factors

B

Interview with Dutch Energy Cooperative Representative and Industry Expert

Q: What led to the creation of LECs?
A: LECs emerged for a number of reasons. The first began in the 1980s, with two main motivations - anti-nuclear sentiment and collective efforts from church communities for sustainable energy production. After the 2008 financial crisis, there was a push for control and autonomy over living environments, and this movement coincided with the time when solar panels became profitable, leading to a significant increase in LECs.

Q: How would you describe the new members joining these LECs?
A: These individuals often fall between activism and passive citizenship. They want to make a difference, but are not necessarily protesters. They possess a degree of entrepreneurship. They are often highly educated men, although we are seeing increasing diversity in the cooperatives, with more women getting involved as the focus shifts to local living environments.

Q: What are the formal and informal rules that govern LECs?
A: No LEC is really set up to make a lot of money. It's really about sustainability. This is reflected in the meetings, which are often social. People are involved in the LECs and carry out their activities. Discussions about how to approach things and ambiguities do exist, but generally there is a cordial atmosphere.

Q: Could you describe the process of a project from idea to actual construction?
A: The process can begin at the kitchen table, with no specific plan in mind, or it can start with a policy already in place. In many cases, LECs want to get started by engaging the community. A group of volunteers start, perhaps copying some statutes, getting a subsidy from the municipality to do some research, then possibly borrowing money from a development fund to actually start development. It involves getting a contract with a farmer for the land, or with a CWEPD for collaboration. Then the real work begins with permits, investigations, and then eventually a subsidy, a bank loan, and finally construction.

Q: What obstacles often come up in these different stages?
A: Obstacles include a lack of entrepreneurship in the LEC, opposition from the municipality, lack of capital, and of course technical and legal obstacles. Although the latter are in place for a reason - to protect birds and people - so they cannot really be considered obstacles.

Q: How do LECs start their projects?
A: Well, it often depends on the structure of the project. Those involved usually know where you can or

cannot build something. Using the GIS system, you can easily see the distance between houses and the proposed windmill locations.

Q: What is the role of the local municipality?
A: Often, a lot of initial discussions happen with the municipality. If you want to build something in the Netherlands, it either has to be in the zoning plan, or you must have a permit to build in deviation from the zoning plan. So, there is always a municipal process to adjust that, and in that process, you must involve the neighborhood.

Q: How can the local environment be part of the construction process?
A: They're involved in the process together. Planning and decision-making is collective. They can also become co-owners through a cooperative, meaning they can have a say in how the project looks and where it is located, and what happens with the distribution of the profits.

Q: How do you approach involving the neighborhood?
A: There are two ways you can do this. One way is to start building and simply start the process, where objections can be raised. Alternatively, you could engage with the people directly and say, "This is a location where you can build wind turbines. Will you join us? Shall we do this together?"

Q: How are LECs able to build and also disburse these compensations? Where does the capital come from?
A: These LECs raise their capital from their members. They simply allow citizens and businesses from their own community to invest in order to build these models. This makes up about 20% of the investment. The other 80% is provided by the bank.

Q: What happens if you want to build something that other people don't benefit from?
A: If you want to build something that doesn't benefit others and only affects their view, they won't cooperate. As a LEC, we try to build the wind turbines together with the local environment.

Q: Do you find that people are willing to cooperate on these kinds of projects?
A: The experience is that if you approach it correctly, it starts. But it's not a cure-all. The moment you offer co-ownership, not everyone is suddenly in favor. Some people will always say, "I have no need for that. I don't want that thing." But it does make a difference if a larger group of local people builds the project themselves and communicates directly with the local council members issuing the permits, versus an external party trying to enforce such a permit.

Q: Can you explain the variation in the realisation of a project between LECs and CWEPDs?
A: Trust plays a big role. LECs have created trust in the community by allowing people to have a say in the cooperative. They chose their own administration to build the wind turbines, making sure to take into consideration the interests of the residents. In comparison to projects coming from outside, where people do not have this trust, this can lead to legal procedures to protect their interests. With a LEC, you accommodate these interests and try to serve them as best as possible. That's why people don't turn to courts with cooperatives, as opposed to external CWEPDs, who often skip these steps because they want to develop something quickly.

C

Interview Questions

Interviews

Due to strict privacy regulations, interview named could not be published to ensure the protection of personal information. All names within the data have been anonymised to further safeguard individual identities. The reliability of the information presented in this research has been rigorously evaluated by my thesis supervisors. For those interested in accessing the data, please contact Rutger van Bergem at R.vanBergem@tudelft.nl. It should be noted that this data will be stored for a maximum duration of three years."

Questionnaire

This questionnaire contains questions that apply to two phases of the establishment of the wind park and these questions will be discussed for each of the following phases:

- Phase 1: Up to the permit application (initiation and planning)
- Phase 2: Period after the permit has been granted up to the construction of the wind park (objection/appeal, and further procedural progress) (phase before construction)

1. Can you provide a timeline of the process leading up to the construction of the wind park?
2. Which parties were involved in the [initiation & planning / phase before construction] of the wind park?
3. How did these parties get involved? (Boundary Rules)
4. How would you describe the nature of these parties? What is the composition of these groups?
5. Who/which parties had the most power in decision-making during the [initiation & planning / phase before construction]? (Position Rules)
6. What were the interests of the parties involved during the [planning / the phase before construction] of the wind park? (Position Rules)
7. What are the main choices these parties have made during the [initiation and planning / phase before construction] of the wind park? (Choice Rules)
8. Were there any previous collaborations between the parties involved during the [initiation & planning / the phase before construction] of the wind park? (Aggregation Rules)
9. How was information exchanged between the parties? (Information Rules)
10. How did the parties agree on the design & planning of the wind park? (Aggregation Rules)
11. How were residents and other direct stakeholders involved in decision-making around the [planning / the phase before construction] of the wind park? (Position Rules)
12. How were the costs and benefits around planning the wind park distributed according to you? (Payoff rules)
13. What are the main laws, rules and policy measures that have influenced the [initiation and planning / phase before construction] of the wind park? (Choice Rules)

14. How long did the [planning / the phase before construction] of the wind park last? (Scope Rules)
15. Did this take longer/shorter than initially expected? (Goal Attainment)
16. What were the main points of contention during the [initiation and planning / the phase before construction] of the wind park? (Key Moments)
17. How were these resolved?
18. Were there moments when parties involved had to drastically change their approach to reach a successful outcome? (Key Moments)
19. To what extent has there been resistance to the wind park during the [initiation and planning / the phase before construction] of the wind park and how did this manifest itself? (Scope Rules)
20. How was this dealt with?
21. To what extent does the wind park differ from the initial design (e.g. different/modified arrangement of wind turbines in the wind park, lower tip height, different location, fewer turbines)? (Scope Rules / Goal Attainment)
22. What is the cause of this?
23. Is there any additional information or perhaps contacts you could recommend me to consult for this research?

Vragenlijst

Deze vragenlijst bevat vragen die van toepassing zijn op twee fasen uit de totstandkoming van het windpark en deze vragen zullen voor elke van de volgende fases behandeld worden:

- Fase 1: Tot aan de vergunning aanvraag (initiatie en planning)
- Fase 2: Periode na de vergunningverlening tot de aanleg van het windpark (bezwaar/beroep, en verdere procesgang) (fase voor de aanleg)

1. Kunt u een tijdslijn geven van het proces tot aan de bouw van het windpark?
2. Welke partijen waren betrokken bij de [initiatie & planning / fase voor de aanleg] van het windpark?
3. Hoe zijn deze partijen hierbij betrokken geraakt? (Boundary Rules)
4. Hoe zou u het karakter van deze partijen beschrijven? Wat is de samenstelling van deze groepen?
5. Wie/welke partijen hadden de meeste macht in de besluitvorming tijdens de [initiatie & planning / fase voor de aanleg]? (Position Rules)
6. Wat waren de belangen van de betrokken partijen tijdens de [planning / de fase voor de aanleg] van het windpark? (Position Rules)
7. Wat zijn de belangrijkste keuzes die deze partijen hebben gemaakt tijdens de [initiatie en planning / fase voor de aanleg] van het windpark? (Choice Rules)
8. Waren er eerdere samenwerkingen tussen de partijen die betrokken waren tijdens de [initiatie & planning / de fase voor de aanleg] van het windpark? (Aggregation Rules)
9. Hoe vond de informatie-uitwisseling tussen de partijen plaats? (Information Rules)
10. Hoe zijn de partijen het eens geworden over het ontwerp & de planning van het windpark? (Aggregation Rules)
11. Hoe werden omwonenden en andere direct belanghebbenden betrokken in de besluitvorming rond de [planning / de fase voor de aanleg] van het windpark?(Position Rules)
12. Hoe waren de kosten en baten rond de planning van het windpark volgens u verdeeld? (Pay-off rules)
13. Wat zijn de belangrijkste wetten, regels en beleidsmaatregelen die de [initiatie en planning / fase voor de aanleg] van het windpark hebben beïnvloed? (Choice rules)
14. Hoe lang heeft de [planning / de fase voor de aanleg] van het windpark geduurd? (Scope Rules)
15. Heeft dit langer/korter geduurd dan op voorhand werd verwacht? (Goal Attainment)
16. Wat waren de belangrijkste knelpunten bij de [initiatie en planning / de fase voor de aanleg] van het windpark? (Key Moments)
17. Hoe zijn deze opgelost?

18. Zijn er momenten geweest waarop betrokken partijen hun aanpak drastisch hebben moeten veranderen om tot een succesvolle uitkomst te komen? (Key Moments)
19. In hoeverre is er weerstand geweest tegen de komst van het windpark tijdens de [initiatie en planning / de fase voor de aanleg] van het windpark en hoe manifesteerde dit zich?(Scope Rules)
20. Hoe is hier mee omgegaan?
21. In hoeverre verschilt het windpark van het initiële ontwerp (bijv. andere/gewijzigde opstelling van windmolens in het windpark, lagere tiphoogte, andere locatie, minder turbines)? (Scope Rules / Goal Attainment)
22. Wat is de oorzaak hiervan?
23. Is er nog aanvullende informatie of zijn er wellicht nog contactpersonen die u mij zou kunnen aanraden om te raadplegen voor dit onderzoek?

D

Coding scheme

Elements	Definition
Bio-physical conditions	Physical and material conditions, e.g., type of buildings, existing infrastructure and renewable energy technologies.
Attributes of Community	Characteristics and preferences of the involved community, e.g., socio-economic characteristics, political party in power, home-ownership.
Boundary rules	Specify the number of actors that participate in the local energy planning project (e.g., municipal policy officer), and how these actors join and leave the decision-making process.
Position rules	Specify the set of positions actors hold in the local energy planning process (e.g., project leader, network manager).
Choice rules	Specify the sets of actions that can (could have), may or must not (have) been taken at specific points in time, e.g., deriving from informal agreements or from policy instruments, laws or regulations.
Information rules	Specify the amount and type of information available to participants (e.g. about the technology, policies, meetings, or costs- and benefits) and how this information is used and shared (e.g., boundary spanning).
Aggregation rules	Specify how decisions are made, e.g., by an individual actor, or in collaboration with others (e.g., coalitions, co-creation).
Payoff rules	Specify the costs and benefits that derive from particular actions and outcomes, e.g., costs of project, pay-back time, distribution of costs and benefits among actors.
Scope rules	Specify the set of possible outcomes, as well as the jurisdiction and state of outcomes, e.g., geographic region and events affected, temporary or final status of the outcome.
Goal attainment	Original project goal vs. achieved outcome during the period under analysis.
Key moments	An instance in the decision-making process that influenced the outcome of decision-making, i.e., the introduction of a smart energy system.
Interactions	The ways in which the actors involved in the institutional arrangement interact with each other.
Evaluative criteria	The standards used to evaluate the performance of the institutional arrangement. Evaluative criteria may include efficiency, equity, sustainability, and legitimacy.

Table D.1: Coding scheme (Lammers & Hoppe, 2019)

E

A Case Study Analysed with the IAD Framework on the Development of Windpark Kookepan

E.1. Case narrative

The case begins on January 7, 2015, when Leudal Energie, a LEC focused on renewable energy generation and energy saving, sent a letter to the municipality of Leudal requesting cooperation in the development of a wind farm. This marked the beginning of the first phase of the project (BRO, 2018).

Later that year, on April 22, the municipalities of Leudal, Nederweert, and Weert declared their collective intention to collaborate on wind energy. This agreement culminated in a joint policy established by the aforementioned municipalities, including Peel and Maas, in early 2016. The municipalities announced their initial steps in realising this collaboration when they opened the tender process. Simultaneously, a number of regional LECs, including Leudal Energie, Peel Energie, Weert Energie, and Zuidenwind, founded the REScoop Limburg, which provides support for LECs in the development of wind energy.

By March 2016, Leudal was the first municipality to finalise the policy guidelines. Significant points included active community involvement in the development of the wind farm, maximised revenue returns to the local area, the importance of a robust spatial plan, and the prevention of land speculation. Armed with these principles, a working group from Leudal Energie commenced investigations into potential locations within Leudal for the development of a wind farm (Gemeente Leudal, 2018b). From the project's inception, stakeholders were diligently engaged with the plan's cooperative setup. These stakeholders included landowners within the search area, residents, and advisory groups. The first of six information sessions, spearheaded by the initiators, was held on May 30, 2016, and continued until November 30, 2017. These meetings discussed the importance of community acceptance, transparency, the LECs goals, donations, and member benefits.

On September 30, 2016, an initial request for planning cooperation was submitted to the municipality of Leudal. Subsequently, on April 3, 2017, a Wind Energy Collaboration Agreement was concluded between the Province of Limburg and the Mid-Limburg municipalities of Leudal, Weert, Peel and Maas, and Nederweert. Both the provincial and municipal governments shared authority in this partnership (Gemeente Leudal, 2018a). On June 29, 2017, REScoop Limburg, on behalf of Leudal Energie, submitted a detailed request for planning cooperation, which was reviewed by the college and then presented to the municipal council for discussion and approval. Among the applicants were LECs with local connections and commercial initiatives, the LEC was awarded the permit from the municipality (Gemeente Leudal, 2018b). By September 26, 2017, the municipal council unanimously decided to establish the request for planning cooperation under certain conditions. Regular consultations took place between Leudal Energie and local residents and landowners throughout the first quarter of 2018. Efforts were made to invite participation in the wind farm through local newspapers and signposts. The information sessions were instrumental in informing the community and attracting potential members and investors. To construct the three wind turbines, approximately 2.3 million euros were required. This was achieved through a campaign which attracted 200 additional members. More than half of these members contributed to the required sum within four months in 2020. The interest depended on the duration of the bond: 4% per year for 5 years, 5% per year for 10 years, and 6% per year for 15 years. The revenue generated from the energy produced was partially returned to the investing members, with the remainder sold to commercial parties (Leudal Energie, 2020).

The wind farm began operation in September 2021, and a series of compensatory measures for the surrounding area and its residents were implemented. These measures included: The establishment of the Kookepan Community Fund, to which Leudal Energie annually contributes an amount between €25.000 and €30.000 for local projects. This support extends to both sustainable initiatives such as the procurement of draught doors in care homes and the support of an energy development project, as well as non-sustainable initiatives such as donations to the local food bank and the replacement of a climbing frame. Landowners within the search area receive an annual land compensation fee of €80.000. The neighbors' agreement allows residents living within 1000 meters of the turbines to receive an annual financial compensation of €25.000. The compensation scales according to proximity: €250 for those living between 1000 and 900 meters from the turbines, with an additional €150 for every 100 meters closer. A regulation was put in place to incentives sustainability measures in homes within 1000 meters of the turbines. Measures include subsidies for insulation measures, solar panels, and heat pumps. A total of €200.000 is allocated for this purpose (HIER, 2020; Leudal Energie, 2020). A one-time amount of €100.000 was given for the enhancement of nature and landscape around the wind farm. On March 6, 2018, the license holder submitted an application for a permit to build a wind farm with three wind turbines in the Kookepan area, marking the end of the first phase and the beginning of the second. Once the application was submitted, individuals could file objections. The LEC tried to discuss and mitigate these objections directly, but as they pointed out, there would always be people opposed to wind turbines (Leudal Energie, 2020).

Eventually, two objectors took the matter to court but were not successful. All steps in the process met the set requirements. Two objections were addressed on May 14, 2018: one concerned the impact on nature (birds/bats), and the other the visual and auditory impact on a house located 1km away. There was no cause seen to factor in these objections (Limburg, 2019). On August 29, 2018, the local council granted a permit for the construction and operation of three wind turbines. The wind turbines had a maximum hub height of 132 m, a maximum tip height of 200 m, a maximum rotor diameter of 142 m, and a minimum tip height of 58 m. The power per wind turbine ranged between 3.15 and 4.5 megawatts (Gemeente Leudal, 2018b). Despite the permission granted, two residents who lived approximately 1 km and 900 meters from the wind farm respectively filed an appeal, fearing a disproportionate impact on their living environment. The administrative court in Roermond ruled on July 1, 2019, in favour of the wind farm, a decision which required further explanation. Although the objectors won their appeal on one point, the judgement was beneficial for Leudal Energie as the court decided that the impact of the 'instantaneous noise level 3 to 5 dB above the annual average noise level' was not problematic. This meant the granted permit could be used for the realisation of the wind farm (Windenergie-nieuws, 2020). The objectors filed an appeal against this ruling, leading to a hearing on January 14, 2020, at the Council of State. On April 8, 2020, the Council of State made a positive ruling about the environmental permit for the construction of three wind turbines in the Kookepan area in the municipality of Leudal, province of Limburg. The appellants had lodged their appeal with the Administrative Jurisdiction Division of the Council of State after an earlier appeal at the Limburg court had failed. On April 8, the Council of State declared the objections as unfounded. One resident living further from the turbines lodged an objection against his WOZ (property value) decision and managed to achieve some reduction in value (Limburg, 2019). The construction of the wind farm commenced on August 31, 2020, and production started in September 2021, marking the end of the second phase (Windenergie-nieuws, 2020). The timeline of the project was somewhat prolonged compared to the original plan due to the litigation process, which cost an additional year. It was acknowledged that it may not have been possible to prevent this delay, as there was an objector who had issues even before the turbines were built, claiming illness from the wind turbines based on literature and other reports.

Despite the challenges encountered during the execution of the Windpark Kookepan project, the successful resolution and subsequent implementation of the project marked a milestone for sustainable energy initiatives in the region. The expeditious implementation of this project can be ascribed to the comprehensive collaboration that existed among the LECs within the region, represented collectively under the REScoop Limburg umbrella. This collaboration was effectively supplemented by the proactive role of the government. In 2015, the government delineated several guiding principles for wind energy development in the regional context, which were embodied in provincial and municipal policies. They expressed a preference for a cooperative development, an active role of the local environment, a fair land compensation for all landowners to prevent speculation. They also wanted the profits to flow back to the community to the greatest extent possible. In 2022, this was achieved with the LECs wind farm (HIER, 2020). The timeline is visualised in figure E.1

Figure E.1: Timeline Windpark Kookepan

E.2. IAD Analysis

In this section, the IAD framework is applied to scrutinise the wind farm permit application process and the stages that follow until construction. The discussion commences with a definition of the various decision-making settings, referred to as action arenas, followed by an examination of the roles that different participants play within them. Next, the analysis will delve into the rules and regulations that steer this process.

This chapter aims to dissect two frameworks, with each embodying a series of processes, laws, and rules pivotal to the process leading up to the establishment of wind farms. Each framework signifies a distinct phase. Phase 1 captures the process up to the point of the (environmental) permit application (initiation and planning). Conversely, Phase 2 relates to the period succeeding the permit application up until the construction of the wind farm (objection/appeal, and subsequent procedural progression) (pre-construction phase).

E.3. Phase 1: Initiation and Planning

E.3.1. Action Situation

In January 2015, Leudal Energie, a LEC, approached the municipality of Leudal with a proposal to develop a wind farm, marking the onset of the first action situation (Leudal Energie, 2020). The LEC's proposal sparked a wave of regional cooperation, leading to a joint policy for wind energy development between the municipalities of Leudal, Nederweert, Weert, and Peel and Maas by early 2016. Regional cooperatives united, forming REScoop Limburg to aid LECs in developing wind energy (HIER, 2020). Significantly, in March 2016, Leudal finalised its policy guidelines with a focus on community involvement, local revenue generation, and robust spatial planning. A working group from Leudal Energie undertook investigations for potential wind farm locations, thus implementing these principles (BRO, 2018). The information-sharing process involved numerous stakeholders such as landowners, residents, and interest groups, who were engaged through six information sessions held from May 2016 to November 2017. These sessions fostered transparency, community acceptance, and awareness of the LEC's objectives. A request for planning cooperation submitted to the municipality of Leudal in September 2016 paved the way for a Wind Energy Collaboration Agreement with the Province of Limburg and other municipalities in April 2017. This agreement embodied power-sharing between provincial and municipal governments. A subsequent detailed planning request from REScoop Limburg was reviewed, approved, and resulted in a permit award for the LEC. By September 26, 2017, the planning cooperation request was formalised by the municipal council, and efforts continued to invite public participation in the wind farm. Through a fundraising campaign in 2020, over 150 members contributed to the €2.3 million needed for construction. The wind farm became operational by September 2021. As part of the outcomes, several preliminary agreed compensatory measures were set in motion for local residents, including a community fund, annual landowner compensation, home sustainability subsidies, and landscape enhancement funds. Marking the transition to the second phase, a permit application to build three turbines in the Kookepan area was submitted on March 6, 2018 (Gemeente Leudal, 2018b).

E.3.2. Participants

- **National Government:** The National Government is responsible for setting out and enforcing laws at a national level. They play an essential role in monitoring the enforcement of the Spatial Planning Act (Wet ruimtelijke ordening) and the Environmental Impact Assessment Decision (Besluit Milieueffectrapportage) under the Environmental Management Act (Wet milieubeheer). In 2012, they developed the Structural Vision Infrastructure and Space (Structuurvisie infrastructuur en ruimte), followed by the Structural Vision Wind on Land (Structuurvisie Wind op Land) in 2014. During the initial phase of planning, they play a significant role in determining the first actions to be undertaken.
- **Province of Limburg and Mid-Limburg Municipalities:** The Province of Limburg, along with other municipalities in the region, reinforced the strategic alignment between different governmental levels and shared authority with the existing municipal governments.
- **The Municipality of Leudal:** the municipality of Leudal not only collaborated with other munici-

palities to establish a joint policy for wind energy development but also served as the competent authority in managing the project. They finalised the policy guidelines first and led the way in promoting active community involvement, local revenue generation, and spatial planning integrity. the Municipality of Venlo serves as the competent authority.

- **Municipalities Nederweert, Weert, Peel and Maas:** These municipalities collaborated with Leudal to formulate a joint policy for wind energy development. They followed Leudal's lead in the LECs venture and shared the responsibilities of project management.
- **LEC Leudal Energie:** Leudal Energie initiated the project and played an instrumental role in setting the stage for cooperative action, policy formulation, and the formation of the REScoop Limburg cooperative. Additionally, they assumed a crucial role in informing local residents and holding meetings with ground owners, facilitating direct communication and involvement with the community.
- **Regional Energy Cooperatives Peel Energie, Weert Energie, Zuidenwind** These LECs contributed to the formation of REScoop Limburg, supporting the regional initiative for local wind energy development and broadening the scope of collaboration.
- **Local Residents, Landowners, and Advisory Groups:** These stakeholders were meticulously engaged from the project's inception, participating in information sessions, consultations, and as investors. They serve a dual function as both beneficiaries and those directly affected by negative externalities.

E.3.3. Formal Rules

European Policy

- **Environmental Impact Assessment (EIA) Decree**, also referred to as the 'Besluit Milieueffectrapportage (MER)' in Dutch, is a General Administrative Order based on the Environmental Management Act. An EIA/MER is prepared for activities and projects that could have significant adverse effects on the environment. Carrying out an environmental impact assessment (EIA) or milieueffectrapportage (MER) for projects that can cause significant harm to the environment is mandatory within the European Union (Ministerie van Infrastructuur en Waterschap, 2020).

National Policy

- **Spatial Planning Act (Wet Ruimtelijke Ordening (Wro))**: A critical law that governs energy transition and includes spatial planning procedures. It is crucial for all project phases and allows for provincial zoning plans for projects of provincial importance.
- **Basis for National Wind Energy Policy (Europese richtlijn 2009/28/EG)**: European Directive mandates 14% of energy consumption from renewable sources by 2020, supporting national wind energy policies.
- **Energy Report (Energierapport)**: Articulates Dutch government's ambitions for generating and utilising sustainable energy, emphasising opportunities for wind energy, particularly offshore.
- **National Energy Agreement (Nationaal Energieakkoord)**: The Energy Agreement was established to accelerate the production of sustainable energy. This agreement includes commitments between the government, provinces, and numerous societal organisations. The Province of Limburg has agreed with the national government to achieve a capacity of 95.5 MW of wind energy by 2020.
- **Decree on General Rules of Spatial Planning (The Besluit algemene regels ruimtelijke ordening (Barro))** which came into effect on December 30, 2011, provides the legal assurance for the national spatial policy. This Dutch regulation contains rules that limit the policy space of other governmental authorities concerning the content of spatial plans, in areas where national interests necessitate this restriction. All these rules must be taken into consideration when establishing search areas for large wind farms in the Structural Vision Wind Energy on Land (Structuurvisie Windenergie op Land). The aim of Barro is to protect and enforce national interests in spatial planning across different local and regional governance levels.
- **Structural Vision Infrastructure and Space (2012) (Structuurvisie Infrastructuur en Ruimte)**: Outlines the national spatial policy and strategy for large-scale wind energy locations.

- **Structural Vision Wind Energy on Land (Structuurvisie Windenergie op Land)**: Identifies locations for large wind farms; although Windpark Greenport Venlo is not included, it contributes to the 6000 MW wind energy goal.
- **Electricity Act (1998) (Elektricitepitswet)**: Projects exceeding 100 MW fall under the National Coordination Scheme, which mandates that the national government coordinates decision-making for significant energy projects. Provinces can transfer the authority for wind farms with a capacity greater than 5 MW to municipalities based on this law. In the case of this wind farm, the Province of Limburg has also transferred their authority to the municipality of Venlo.

Provincial Policy

- **Provincial Environment Plan Limburg 2009**: This updated plan accommodates new developments in the region, including provision for wind turbines alongside railways.
- **Provincial Environment Plan Limburg 2014 and Environment Regulation**: The 2014 plan focuses on wind energy and identifies preferred areas for wind turbine development.
- **Intent Agreement Wind Energy Clover 4 Area - 2016**: A 2016 agreement underlines the commitment to develop Windpark Greenport Venlo, with a focus on community participation and maximum energy yield.

Regional policy

- **Area Vision Klavertje 4 - 2006**: In 2006, the municipalities of Horst aan de Maas and Venlo, the former municipalities of Maasbree and Sevenum, and the Province of Limburg approved the development of the Klavertje 4 Area Vision. The Trade Port Noord - which includes the planned area - forms a significant part of this vision.
- **Master Plan and Strategic Business Plan Klavertje 4/Greenport Venlo - 2009**: The Provincial Environment Plan Limburg 2006 formed the basis for the development of the Klavertje 4 Master Plan. It focuses on green, water, and energy themes while reinforcing the existing and future main structure.

Municipal Policy

- **Strategic Overall Vision 2020 - 'Living in Leudal' (Strategische Overallvisie 2020 – 'Leven in Leudal'):** This vision outlines Leudal's long-term plans, emphasising sustainable energy and citizen participation. Adopted in 2007, it serves as a guiding framework for Leudal's future policy developments, encouraging cooperation with residents, businesses, the region, and the province, and promoting sustainable practices in homes and businesses.
- **Spatial Vision Leudal - Managing the Future (Structuurvisie Leudal – Regie op de toekomst):** This vision presents Leudal's intent to shape key future developments that enhance living and working conditions. It outlines the municipality's ambitions, threats, opportunities, and possible development criteria, positioning itself as an initiator and facilitator. It emphasises sustainability, with focus on preserving natural and cultural landscapes, while also seeking to enhance usability and experiential values for inhabitants and visitors.
- **Zoning Plan 'Repair and Sweep Plan Rural Area Leudal 2016' (Bestemmingsplan 'Reparatie- en veegplan Buitengebied Leudal 2016'):** This zoning plan, mainly designating the area for 'Agricultural with values - 4' and 'Nature', does not directly allow the proposed wind turbines due to their heights and requires an environmental permit for constructing roads. It emphasises sustainable development, renewable energy, and multi functional agriculture to support local farms.

E.3.4. Informal Rules

1. **Position Rules:** The position rules were clearly delineated across the various stakeholders involved. Each entity held distinct positions, leading to different levels of decision-making authority and influence in the project. Leudal Energie took on the role of initiator in this project. They crafted the initial proposal, sought collaborative opportunities with the municipality of Leudal, and identified potential locations for wind farm development. Additionally, Leudal Energie spearheaded the fundraising efforts that facilitated the project's financing. The Province of Limburg, while maintaining a less direct involvement in the project, occupied a vital role as both regulator and supervisor. The province worked closely with the municipalities in crafting the wind energy collaboration agreement and ensured that the municipalities identified appropriate areas for wind

energy development. The municipalities of Leudal, Nederweert, Weert, Peel, and Maas played dual roles as regulators and enablers. They actively participated in establishing policy guidelines, formulated a joint wind energy collaboration agreement, and processed permit requests for planning cooperation. Moreover, there was a clear structure of power dynamics, with both the provincial and municipal governments holding shared authority. This partnership facilitated the smooth progression of the project (Appendix E.5). These municipalities also played a crucial role in fostering the formation of LECs, indicative of their broader commitment to sustainable energy practices. REScoop Limburg adopted a supportive role by providing necessary assistance to LECs, such as Leudal Energie, in their development of wind energy. They also played an instrumental part in submitting a detailed request for planning cooperation on behalf of Leudal Energie. Moreover, there was a significant interaction between Leudal Energie and the municipal and provincial governments. The LECs application to build the wind farm was evaluated and ultimately approved by the local council. The LECs conduct was marked by continuous consultation and engagement with the government, demonstrating a collaborative relationship that shared authority. Local residents and landowners played distinct roles in the wind farm project. They engaged as beneficiaries, investors and those directly affected by negative externalities.

2. **Boundary Rules:** During the development of Windpark Kookenpan, the boundary rules for project participation were articulated through the participation criteria set by the Leudal Energie LEC. The initial invitation for participation was sent to the municipality of Leudal, setting the initial boundaries of who was allowed to participate in the project. The guidelines and conditions for local ownership, set after two to three years of discussions, represent a refinement of these boundary rules, defining more closely who could contribute to and benefit from the project. Boundary rules also determined the roles of different participants in the project. When the wind farm development project reached a stage where the plan appeared feasible, more community members were involved in the process. At this stage, ground compensation was organised for the area where the wind turbines would be located, with all residents of the area receiving an annual fee. This further expanded the participants involved, indicating a broadening of the boundary rules. An important aspect of the boundary rules in this project was the inclusion of stakeholders. Upon submission of the proposal, dialogues with the municipality were initiated and conditions in the pre-phase for the permit application were met. As the project advanced, consultations with the community were held, and the wider community was engaged through information meetings (Appendix E.5). This dynamic illustrates a broad, inclusive interpretation of boundary rules, which not only defines who participates but also how they participate in the process. Finally, the campaign to attract additional members to the LEC also represents an important aspect of the boundary rules. More than half of these new members contributed to the required budget, further underlining the idea that the boundary rules extended to the local community, not only defining who could participate but also what form that participation could take. These newly included members hence transitioned from being merely local residents to becoming active stakeholders in the Windpark Kookepan project.
3. **Scope Rules:** Leudal Energie initiated the project in 2015 by sending a request to the municipality of Leudal for cooperation in the development of a wind farm. This initiated the early stages of the project and set the tone for cooperative participation, aiming for a minimum of 50% but striving towards 100% community involvement. This early proposal set the scope of the project, emphasising cooperative involvement and community participation. Furthermore, in the joint policy established by the municipalities of Leudal, Nederweert, Weert, Peel, and Maas in 2016, the scope rules were set in terms of how the wind energy would be developed and managed. The policy stipulated active community involvement, maximised revenue returns to the local area, a robust spatial plan, and prevention of land speculation (Appendix E.5). This policy marked the legal and administrative boundaries within which the project would be conducted. The Wind Energy Collaboration Agreement concluded in 2017 between the Province of Limburg and the Mid-Limburg municipalities further clarified the scope rules. Both the provincial and municipal governments shared authority over the project, thereby setting the jurisdiction over the outcomes of the project. In terms of the finality of outcomes, this was seen in the approval process of the planning cooperation request, and in the construction and operation of the wind turbines. Once the request was approved by the municipal council and the wind farm constructed, these decisions were final and marked significant milestones in the project. Finally, the scope rules regarding the impact on the local community were set out in the compensatory measures that were implemented once the

wind farm began operation. These included establishment of the Kookepan Community Fund, annual land compensation fee, a neighbours' agreement for financial compensation, and incentives for sustainability measures in homes (HIER, 2020). The specificity of these measures defined the range and limit of outcomes that could be influenced by the project.

4. **Aggregation Rules:** The aggregation rules were demonstrated in the collaborative decision-making process among different stakeholders. The initial initiative came from Leudal Energie who submitted a plan to the municipality of Leudal. This instigated numerous consultations involving the municipality and concerned officials, leading to an emphasis on comprehensive information dissemination and involvement of all stakeholders to reduce resistance. This collaborative decision-making process expanded to include other municipalities as they collectively determined locations for sustainable energy development under pressure from the province. Thus, collective decisions were made through the joint policy established by municipalities including Leudal, Nederweert, Weert, and Peel and Maas, with significant input from LECs such as REScoop Limburg. Moreover, there was a significant interaction between Leudal Energie and the municipal and provincial governments. The LECs application to build the wind farm was evaluated and ultimately approved by the local council. The LECs conduct was marked by continuous consultation and engagement with the government, demonstrating a collaborative relationship that shared authority. Lastly, LECs were favored in sustainability initiatives when a municipality's policy indicated a preference for such initiatives. Despite this favoritism, LECs still had to submit a solid plan and bear any associated risks without support from the municipality (Appendix E.5).
5. **Information Rules:** From the project's onset, information sharing was crucial. Regular contact was established with stakeholders, ensuring timely updates on the project's progress. For instance, the LEC frequently communicated with the municipality, other LECs, and interested parties about the project's status and the discussions with residents (Appendix E.5). Moreover, the LEC prioritised transparency by sharing comprehensive details about the project's progression and the benefits it would bring to the community. This was carried out via various channels: recurring meetings with local residents and landowners, individual conversations for those interested, information dissemination through Leudal Energie's website and newsletters, and public information sessions. An essential component of the information sharing process was the creation of a communication plan, which placed a heavy emphasis on the wind farms' development. The co-creation process was also information-rich, with stakeholders given the opportunity to shape the project. This was facilitated through the establishment of a working group formed by local residents, tasked with preparing and managing a community fund. Similarly, residents and others were allowed to become LEC members, allowing them to directly invest in and benefit from the wind farms' revenue. To counter the common focus on potential negatives associated with wind energy, the LEC took active steps to ensure the benefits were well-articulated. The emphasis was on ensuring that as much as possible of the project's profits remained in the local area (Appendix E.5). The information exchange played a crucial role during negotiations about the wind farms' design and planning. The initiative stemmed from Leudal Energie, who developed and submitted the plan to the municipality. This step led to numerous discussions with the municipality and concerned officials, reinforcing the importance of keeping all parties well-informed to minimise resistance.
6. **Payoff Rules:** The costs and benefits associated with the wind farm project were distributed in a variety of ways to different actors within the action arena. Firstly, the wind farm project required a significant capital outlay, a cost that was borne partly by the 150 members of Leudal Energie LEC who raised €2.2 million within four months. These members then received a return on their investment in the form of interest, varying from 4% per year for a 5-year bond, 5% per year for a 10-year bond, and 6% per year for a 15-year bond. Additionally, the energy generated by the wind farm, a benefit from the investment, was partially allocated to these investing members, with the surplus sold to commercial entities. Secondly, local landowners within the search area for the wind farm were compensated with an annual land compensation fee while residents living within 1000 meters of the turbines were eligible for an annual financial compensated based on their proximity to the turbines. This equated to €250 for residents residing within 1000 and 900 meters, and €150 for each additional 100 meters. This payout system was established as a way to distribute the benefits of the project to those potentially impacted by it. Moreover, local community initiatives received financial benefits from the project. For instance, the Kookepan Community Fund was

created, with an annual contribution of €25.000 to €30.000 from Leudal Energie to fund local projects. A separate €200.000 fund was allocated for sustainability measures for homes within 1000 meters of the turbines, and a one-time €100.000 amount was given for the enhancement of local nature and landscape.In essence, the benefits from the wind farm project - in the form of monetary returns from energy sales and investment interests, community funds, compensation payments, and environmental enhancements - were strategically distributed among the investors, local landowners, residents, and the broader community. At this moment in time, the project did not yet face community opposition, underscoring the potential 'costs' of non-compliance with residents' expectations.

7. **Choice Rules:** Focusing on the choice rules, it can be seen how the interplay of various actors shaped the design and implementation of the project, revealing certain actions that actors in positions were required, forbidden, or permitted to take under different circumstances. In the initial stages, Leudal Energie requested cooperation from the municipality of Leudal for the wind farm's development. The LEC had to propose a plan that complied with local policy guidelines, demonstrating a significant action that actors were required to take ("We zijn gestart met het ontwikkelen van windmolens en na twee tot drie jaar overleg en discussie hebben we richtlijnen opgesteld, waaronder de voorwaarde voor lokaal eigendom", Appendix E.5). The LEC then had to secure the approval of the municipality, a step that, while not guaranteed, was permitted under the rules. This demonstrates the discretion that these actors held in these decision-making processes. Moreover, the LEC needed to interact with a project team established by the province showcasing the LEC's ability to operate in a multi-level governance setting. This shows how the actors' choices were bounded by the institutional arrangements within which they operate. Crucially, the LEC was required to engage with local community members and stakeholders in a comprehensive and transparent manner to minimise resistance and ensure the feasibility of the project. This highlights a critical aspect of Ostrom's framework, emphasising the importance of collective action and consensus-building in managing common-pool resources. Finally, while the municipality expressed a preference for LEC initiatives, the LEC was still required to submit a solid proposal and bear the risks of the project. This indicates that while the institutional context may favor certain types of actors, it does not absolve them of their responsibilities.

E.3.5. Biophysical/material conditions

- According to the Provincial Environmental Plan of Limburg 2014 (POL2014), the selection of the location was cautiously considered. Exclusion areas, for example, included nature reserves, as well as populated areas and surrounding sound circles. On closer examination, Kookepan, located in Neer alongside the drainage channel, was identified as the most suitable site for wind energy.
- The proposed site predominantly consisted of forested and agricultural plots. It also contained several roads and paths crossing the area. The vicinity mainly featured similar agricultural plots and forest areas. There was limited recreational use of the area, including a dog club, an extension area for a southeast camping site, and various walking and cycling routes. Furthermore, it was about 2.5 km south of the existing Windpark Neer.
- The decision fell upon an area that extended the existing four wind turbines. The Kookepan development envisaged a short, straight line that aligns well with the existing line (Windpark Neer) and future developments in the surrounding area.
- The three turbines, with a mast height of about 125 meters and a blade diameter of approximately 135 meters, were to produce about 30 million kWh per year.
- The first homes were about 500 meters away, and populated areas were more than 1 km away.

E.3.6. Attributes of the community

In terms of demographic features, the community consisted of diverse stakeholders, including Leudal Energie, the proactive initiator that led the project with both internal expertise and external consultants. The community's active involvement, primarily from interested locals attending information sessions, evidenced their shared enthusiasm for sustainable energy and the corresponding benefits. This demographic composition of engaged individuals, coupled with local landowners and the municipal government, contributed to the development of the cooperative project. Accepted norms, promoting LEC and inclusive policy activities, were apparent. Leudal Energie upheld transparency and community engagement, conducting numerous discussions with residents and the municipality. Although the message's focus leaned towards negative aspects, the LECs commitment to improving communication was apparent. Common understanding was fostered through persistent dialogue and informative sessions held by the LEC, focusing on transparency, LEC goals, and community benefits. The LEC sought to raise awareness, stimulate local energy consumption, and increase acceptance, showing a unified understanding of the project's objectives. Lastly, the community exhibited a homogeneous preference for sustainability. This was underscored by the municipal government's encouragement for such initiatives, allocating start subsidies and favoring LECs in policy frameworks. Also, the local community highly appreciated the idea of a citizen wind farm, keeping the revenue within Leudal. The membership of Leudal Energie, primarily comprising those attending information sessions, demonstrated this shared belief in local sustainable energy.

E.3.7. Interactions

The initial interactions present in this case can be characterised as primarily formal in nature. This was evidenced by structured meetings, documented agreements, and an organised process of negotiation and decision-making. The parties involved included Leudal Energie and the municipalities of Leudal, Nederweert, and Weert, with active participation from provincial authorities. The communication between the various entities was regular and formalised, revolving around the shared goal of establishing a wind farm. Crucial decisions, such as the development of policy guidelines and the selection of potential locations for the wind farm, were made through collective consultation. The formal dialogues also featured significant transparency, with the information being made available to all stakeholders. Informal interactions also existed, largely in the form of community meetings and public information sessions. These interactions were crucial in garnering local acceptance, fostering transparency, and discussing the LECs goals, donations, and member benefits. Despite their informal nature, these interactions played a vital role in disseminating information to the wider community and in attracting potential members and investors. This level of openness is suggested to have minimised resistance and fostered greater community acceptance of the wind farm project.

E.3.8. Outcomes

The overarching objective of this phase was to apply for a permit to build a wind farm in the Kookepan area. The process saw fruitful discussions that steered the realisation of a new wind farm. It eventually led to the formation of a new LEC comprising regional LECs. Among the applicants vying for the permit, LEC Leudal Energie emerged as the highest scoring entity and was subsequently granted an agreement of intent by the municipality. This initiated the early stages of the project and set the tone for LECs participation, aiming for a minimum of 50% but resulting in 100% community ownership. The permit application encompassed multiple rounds of dialogue and deliberation and an effective fundraising campaign that allowed the accumulation of the requisite capital for the construction of three wind turbines as outlined in the initial plans. The process spanned a duration of approximately two to three years, following in-depth deliberations and dialogues that paved the way for setting the guidelines. Among the critical conditions established was the requirement for local ownership. The entire process was characterised by significant community involvement and cooperation, underlining the LECs commitment to transparency and maximising returns to the local area.

E.3.9. Evaluative criteria

Firstly, the transparency in communication, evident from the well-conducted information sessions, played a crucial role in gaining community acceptance, which reduced resistance and eased the implementation process. The positive response from the community was further demonstrated through the successful campaign to raise 2.3 million euros. The attractive returns encouraged over half of the new members to contribute to the fund within four months in 2018 (Appendix E.5). This not only facilitated the construction of the three wind turbines but also underlined the community's willingness to invest in this wind project. The project's impact is also clear from the monetary benefits channeled back to the community. The establishment of the Kookepan Community Fund, the land compensation fee, the neighbors' agreement, and the initiative to incentives sustainability measures in homes within proximity of the turbines have collectively led to economic benefits for the community. These measures not only ensure a local distribution of revenue generated from the wind farm but also promote sustainable initiatives and improve living conditions in the surrounding area.

In summary, the outcomes of the Kookepan wind farm project demonstrated relationships between LECs effort, community engagement, transparent communication, equitable benefits distribution, and the successful realisation of the wind energy project. This intricate network of factors led to an efficient process that spanned approximately two to three years, from initiation to permit application. The smooth progression was largely due to the absence of filed objections which could have otherwise caused delays. Thus the project can be seen as highly successful during phase 1.

E.4. Phase 2: Objection/appeal and subsequent procedural progression

E.4.1. Action situation

The start of the second phase on March 6, 2018, was marked by the submission of a permit application by the license holder to construct three wind turbines in the Kookepan area. Upon submission of the application, the rules of the action situation allowed individuals to file objections, prompting strategic interaction between the LEC and the objectors. Despite the LECs efforts to mitigate these objections directly, opposition to the wind turbines persisted among certain community members (Gemeente Leudal, 2018a). Subsequently, two objectors opted to escalate the action situation by taking the matter to court. However, the court ruled that all steps in the process met the set requirements and dismissed the objections raised regarding the impact on nature and the visual and auditory impact on a nearby house. On August 29, 2018, the local council granted the permit, following the rules of the action situation (Limburg, 2019). However, the action situation became more complex as two residents, who lived approximately 1 km and 900 meters from the wind farm respectively, feared a disproportionate impact on their living environment and lodged an appeal. The administrative court's ruling on July 1, 2019, favored the wind farm, thereby creating a favorable outcome for Leudal Energie. Notwithstanding this ruling, the action situation progressed further as the objectors lodged an appeal with the Council of State. However, on April 8, 2020, the Council of State declared the objections unfounded, thereby validating the previous decisions made within the action situation (Windenergie-nieuws, 2020). Simultaneously, another resident living further away lodged an objection against his WOZ (property value) decision and managed to achieve a reduction in value, reflecting the variable outcomes possible in such an action situation. Finally, the construction of the wind farm began on August 31, 2020, and operation commenced in September 2021, marking the end of the second phase.

E.4.2. Participants

- **Province of Limburg:** The Province of Limburg, along with other municipalities in the region, maintained the strategic alignment between different governmental levels and shared authority with the existing municipal governments.
- **Municipalities Nederweert, Weert, Peel and Maas:** These municipalities collaborated with Leudal and shared the responsibilities of project management.
- **Council of State of province of Limburg:** the Council of State upheld the decision of the administrative court in Roermond. Their positive ruling about the environmental permit reaffirmed the support for the wind farm construction project.
- **Administrative Court in Roermond:** Acting as an impartial legal body, the administrative court played a decisive role in adjudicating the conflicts raised by the objectors and affirming the legality of the project.
- **Local Council of Leudal:** The local council acted as a regulatory body by granting the permit for construction of Windpark Kookepan
- **LEC Leudal Energie:** Leudal Energie initiated the second phase of the Windpark Kookepan project by submitting an application to construct the wind farm, effectively setting the action into motion.
- **Local Residents:** emerging as key participants following the wind farm construction application, expressed environmental and health concerns which escalated the situation to legal proceedings. Two proximate residents lodged an appeal against the construction, bringing the administrative

court and later the Council of State into the participant fold. Another resident, living farther away, lodged an objection against his property value decision.

E.4.3. Formal Rules

European Policy

- **Environmental Impact Assessment (EIA) Decree**, also referred to as the 'Besluit Milieueffectrapportage (MER)' in Dutch, is a General Administrative Order based on the Environmental Management Act. An EIA/MER is prepared for activities and projects that could have significant adverse effects on the environment. Carrying out an environmental impact assessment (EIA) or milieueffectrapportage (MER) for projects that can cause significant harm to the environment is mandatory within the European Union (Ministerie van Infrastructuur en Waterschap, 2020).

National Policy

- **Spatial Planning Act (Wet Ruimtelijke Ordening (Wro))**: A critical law that governs energy transition and includes spatial planning procedures. It is crucial for all project phases and allows for provincial zoning plans for projects of provincial importance.
- **Basis for National Wind Energy Policy (Europese richtlijn 2009/28/EG)**: European Directive mandates 14% of energy consumption from renewable sources by 2020, supporting national wind energy policies.
- **Energy Report (Energierapport)**: Articulates Dutch government's ambitions for generating and utilising sustainable energy, emphasising opportunities for wind energy, particularly offshore.
- **National Energy Agreement (Nationaal Energieakkoord)**: The Energy Agreement was established to accelerate the production of sustainable energy. This agreement includes commitments between the government, provinces, and numerous societal organisations. The Province of Limburg has agreed with the national government to achieve a capacity of 95.5 MW of wind energy by 2020.
- **Decree on General Rules of Spatial Planning (The Besluit algemene regels ruimtelijke ordening (Barro))** which came into effect on December 30, 2011, provides the legal assurance for the national spatial policy. This Dutch regulation contains rules that limit the policy space of other governmental authorities concerning the content of spatial plans, in areas where national interests necessitate this restriction. All these rules must be taken into consideration when establishing search areas for large wind farms in the Structural Vision Wind Energy on Land (Structuurvisie Windenergie op Land). The aim of Barro is to protect and enforce national interests in spatial planning across different local and regional governance levels.
- **Structural Vision Infrastructure and Space (2012) (Structuurvisie Infrastructuur en Ruimte)**: Outlines the national spatial policy and strategy for large-scale wind energy locations.
- **Structural Vision Wind Energy on Land (Structuurvisie Windenergie op Land)**: Identifies locations for large wind farms; although Windpark Greenport Venlo is not included, it contributes to the 6000 MW wind energy goal.
- **Electricity Act (1998) (Elektricitepitswet)**: Projects exceeding 100 MW fall under the National Coordination Scheme, which mandates that the national government coordinates decision-making for significant energy projects. Provinces can transfer the authority for wind farms with a capacity greater than 5 MW to municipalities based on this law. In the case of this wind farm, the Province of Limburg has also transferred their authority to the municipality of Venlo.

Provincial Policy

- **Provincial Environment Plan Limburg 2009**: This updated plan accommodates new developments in the region, including provision for wind turbines alongside railways.
- **Provincial Environment Plan Limburg 2014 and Environment Regulation**: The 2014 plan focuses on wind energy and identifies preferred areas for wind turbine development.
- **Intent Agreement Wind Energy Clover 4 Area - 2016**: A 2016 agreement underlines the commitment to develop Windpark Greenport Venlo, with a focus on community participation and maximum energy yield.

Regional policy

- **Area Vision Klavertje 4 - 2006**: In 2006, the municipalities of Horst aan de Maas and Venlo, the former municipalities of Maasbree and Sevenum, and the Province of Limburg approved the development of the Klavertje 4 Area Vision. The Trade Port Noord - which includes the planned area - forms a significant part of this vision.
- **Master Plan and Strategic Business Plan Klavertje 4/Greenport Venlo - 2009**: The Provincial Environment Plan Limburg 2006 formed the basis for the development of the Klavertje 4 Master Plan. It focuses on green, water, and energy themes while reinforcing the existing and future main structure.

Municipal Policy

- **Strategic Overall Vision 2020 - 'Living in Leudal' (Strategische Overallvisie 2020 – 'Leven in Leudal'):** This vision outlines Leudal's long-term plans, emphasising sustainable energy and citizen participation. Adopted in 2007, it serves as a guiding framework for Leudal's future policy developments, encouraging cooperation with residents, businesses, the region, and the province, and promoting sustainable practices in homes and businesses.
- **Spatial Vision Leudal - Managing the Future (Structuurvisie Leudal – Regie op de toekomst):** This vision presents Leudal's intent to shape key future developments that enhance living and working conditions. It outlines the municipality's ambitions, threats, opportunities, and possible development criteria, positioning itself as an initiator and facilitator. It emphasises sustainability, with focus on preserving natural and cultural landscapes, while also seeking to enhance usability and experiential values for inhabitants and visitors.
- **Zoning Plan 'Repair and Sweep Plan Rural Area Leudal 2016' (Bestemmingsplan 'Reparatie- en veegplan Buitengebied Leudal 2016'):** This zoning plan, mainly designating the area for 'Agricultural with values - 4' and 'Nature', does not directly allow the proposed wind turbines due to their heights and requires an environmental permit for constructing roads. It emphasises sustainable development, renewable energy, and multifunctional agriculture to support local farms.

E.4.4. Informal Rules

1. **Position Rules:** Leudal Energie position rules involve submitting the application for the wind farm, addressing objections, and negotiating with relevant regulatory entities. In addition, they adopt the role of a mediator within the community, attempting to alleviate opposition and facilitate a smoother project progression. Local residents who voiced their objections to the wind farm assumed another crucial role in this scenario. Their opposition was not limited to casual dissent, rather it transitioned into formal objections, leading to legal involvement. This reflects the power of local residents to influence the course of such projects. They can be seen as important stakeholders, exercising their right to lodge objections and appeal against decisions that potentially affect their living environment. The local council held the authority to grant or deny the construction permit for the wind farm. This entity possesses considerable authority and discretion, serving as the medium between the project's planning and execution phases. Their decision led to the actualisation of the wind farm project. The Administrative Court in Roermond, Council of State of the province of Limburg, and the province of Limburg themselves assumed the position of legal and administrative authorities in the scenario. Their responsibility was to consider the objections and appeals lodged by the local residents, and make impartial judgments based on the law and regulatory guidelines.
2. **Boundary Rules:** Leudal Energie initiated the application for the permit to build the wind farm, marking their entrance into the situation. They also assumed the responsibility of discussing and mitigating objections directly. The boundary rules allowed for the entry of local residents into the action scenario once the application was submitted. They could file objections, participate in negotiations, and ultimately, two of them took their issues to court. The Administrative Court in Roermond, Council of State of the province of Limburg, and the local council all entered their respective roles upon the application's submission, evaluating the permit request, hearing objections, and making judicial decisions. The residents living in the vicinity of the proposed wind farm were also able to engage within the boundary rules by voicing their concerns and filing appeals. The exit from the scenario came about as the project progressed, objections were addressed,

and legal challenges were resolved. The resident who lodged the objection against his property value successfully exited his role after managing to achieve some reduction in value. The exit of the objectors and residents occurred after their appeals were ruled on by the Council of State and their objections declared unfounded.

3. **Scope Rules:** The scope rules within this second phase were manifestly apparent through the judicial and administrative decisions made throughout the process. The local council granting the permit for the construction and operation of the wind turbines is an example of how an administrative decision had a significant impact on the outcome of the project. Similarly, the verdicts from the Administrative Court in Roermond and the Council of State directly shaped the wind farm's future. The court's ruling that the 'instantaneous noise level 3 to 5 dB above the annual average noise level' was not problematic directly influenced the final outcome, enabling the realisation of the wind farm as originally planned (Windenergie-nieuws, 2020). However, these outcomes were not final, as demonstrated by the appeals process, which allowed for further review and decision-making that could alter the initial outcome. The resident who lodged an objection against his property value decision and managed to secure a reduction in value represents an example of the flexibility within the scope rules. The resident's actions and the resulting adjustment in property value illustrate the dynamic nature of the outcomes within the project (Appendix E.5). Despite the litigation process prolonging the project timeline by an additional year, the overall project scope was not reduced or altered. The delay was purely in time and did not affect the turbine's tip height or other physical aspects of the project.
4. **Aggregation Rules:** Aggregation rules in this second phase of the project include the procedures and criteria employed by the local council in granting the permit for the wind farm's construction and operation. The council's decisions were presumably based on a thorough evaluation of the proposed project's compliance with specific regulations and its anticipated benefits. This decision-making process aligns with the aggregation rule as it demonstrates the collective agreement of the council members on the project's validity and importance. Further, the decision-making process employed by the administrative court in Roermond and the Council of State constitutes a higher level of aggregation rules. In each case, a collective decision was reached based on the legal merits and implications of the objections raised. In this instance, the aggregation rules dictated that despite two objectors continuously appealing the decisions, the councils ruled in favour of the wind farm project. Notably, their judgments were grounded in an interpretation of the law and regulation that considered the broader societal benefit and the sustainability goals of the community. The aggregation rules are also evident in the response of the LEC to the objections. While individuals were allowed to file objections, the LEC attempted to discuss and mitigate these objections directly.
5. **Information Rules:** One fundamental instance of information rules playing a pivotal role is evident in the permit application process. As per the established rules, once a permit application was submitted, it allowed individuals to file objections against the proposed wind farm project. This represents an essential information-sharing mechanism that invites various stakeholders to express their concerns based on their understanding and interpretation of the project. Another critical aspect of the information rules is how the LEC engaged with the objections raised. The LEC attempted to discuss and mitigate these objections directly, emphasising open communication (Appendix E.5). Moreover, the approach taken by the LEC to be transparent about their goals, donations, and benefits for members also signifies the role of information rules. This emphasis on transparency aimed to ensure that members had accurate and comprehensive information about the project, which could potentially mitigate opposition and increase support. The legal disputes that arose and the subsequent rulings from the administrative court in Roermond and the Council of State also demonstrate the influence of information rules. In these scenarios, the decisions were made based on the available evidence and legal principles, necessitating a rigorous examination of the information related to the project and its potential impacts.
6. **Payoff Rules:** The second phase of the Windpark Kookepan project provide numerous instances where payoff rules significantly influenced the dynamics and outcomes of the project. A critical manifestation of the payoff rules was in the context of the objections raised by nearby residents. When the permit for the construction of the wind turbines was applied for, two residents living near the area fort he wind farm filed appeals fearing an adverse effect on their living environment. While their appeals were ultimately unsuccessful, the payoff here was the considerable delay they

caused to the project timeline. The objections to the wind farm, which caused about a year and a half to two years delay, can also be viewed in the lens of payoff rules as this delay was not factored in the original planning. While these objections represented costs to the project in terms of time and resources spent in legal processes, they were a form of 'benefit' to the objectors, as they could express their concerns and delay the project. Another instance was the resident who lodged an objection against his property value decision, succeeding in achieving some reduction in value. The cost to him was in the potential devaluation of his property, and his successful objection represented a personal payoff (Appendix E.5). Additionally, the LECs choice to create a financial benefit for the local community showcases another implementation of payoff rules. This was established with the intention of offering some kind of compensation or advantage to those impacted by the wind farm's operations, thus allowing a portion of the project's benefits to be dispersed among the broader community. While not being the primary goal, this was also expected to mitigate opposition during the project's second phase. The fact that only a moderate number of objections were filed, compared to similar projects that tend to face a significantly higher number of objections, can be interpreted as an indicator of success. This outcome, seen as a "profit" in the context of the project's payoff rules, suggests that the environmental fund effectively fulfilled its intended purpose.

7. **Choice Rules:** Once an application for a permit to construct the wind farm was submitted, the project entered a phase where individuals had the option to file objections, as part of their choice rules. Specific choices were made by a select group of individuals who were opposed to the project. It was within their choice rules to take such actions under these circumstances. Even after the administrative court in Roermond ruled in favour of the wind farm, these objectors pursued the matter further, choosing to file an appeal with the Administrative Jurisdiction Division of the Council of State. Their appeal was ultimately dismissed as unfounded, a decision which further reaffirmed the legitimacy of the permit granted for the construction of the wind farm. An additional choice rule application can be seen in the case of a resident living near the turbines who decided to object to his property value decrease. This person effectively exercised a choice available under his given circumstances, demonstrating the ability to utilise choice rules for personal benefit.

E.4.5. Biophysical/material conditions

- The approved wind farm consisted of three wind turbines, each with specific material specifications. They were approved to have a maximum hub height of 132 meters, a maximum tip height of 200 meters, a maximum rotor diameter of 142 meters, and a minimum tip height of 58 meters. The energy capacity for each wind turbine ranged between 3.15 and 4.5 megawatts.
- As part of the material conditions, the wind turbines also had an auditory impact. Concerns were raised about the 'instantaneous noise level 3 to 5 dB above the annual average noise level' by the residents living near the proposed wind farm. This noise level, however, was not considered problematic by the administrative court, which ruled in favor of the wind farm. The court's decision indicated that the noise levels produced by the wind turbines fell within acceptable limits and would not have a disproportionate impact on the living environment of the nearby residents.

E.4.6. Attributes of the community

The objections to the project were filed by a small, vocal minority in the community (Appendix E.5). Their concerns revolved around the perceived negative impacts of wind turbines on health due to noise generation. These objectors were steadfast in their stance, appealing the wind farm's approval all the way to the Council of State. Despite the fact that these objections were ultimately deemed unfounded, their persistence led to a heightened level of caution within the local council towards similar projects. The presence of these objectors indicates a heterogeneity in the community's beliefs and preferences regarding wind energy projects. On one hand, there was a larger group of community members who supported such sustainable energy initiatives, as evidenced by the project's ultimate realisation. On the other hand, the objectors represented a faction within the community with strong opposing views, contributing to a polarisation between the supporters and opponents of the wind farm. The attempts of the LEC to communicate with the objectors and mitigate their concerns indicate an existing norm of dialogue and negotiation within the community. However, these efforts were not entirely successful, as the objectors seemed to focus on negative information, even questioning the validity of professional research conducted on the wind farm's impact.

E.4.7. Interactions

Formal interactions were notably evident within the legal domain. Following the local council's approval for the wind farm, two residents living close to the project site initiated formal legal proceedings against this decision. The interactions within this sphere were characterised by legally structured exchanges and rules that governed the discourse within the courts, from the administrative court in Roermond up to the Council of State. Concurrently, informal interactions unfolded as the project team sought dialogue with the objectors, striving to address their concerns. An instance of this was the project team's offer to enhance insulation in homes where noise was a primary concern (Appendix E.5). Although this offer was not mandated legally, it signified a proactive approach to foster understanding and identify pragmatic resolutions to the grievances expressed by the objectors. Further, the project team initiated a 'neighbors' agreement,' proposing a financial compensatory mechanism for those residing within a certain proximity of the wind farm. This agreement aimed to equitably balance the benefits and potential disturbances caused by the wind farm, thereby addressing some of the resistance encountered. While these formal and informal interactions might appear distinct, they were closely interconnected and mutually influenced each other. The sustained legal opposition from a subset of the community not only caused formal delays in the project timeline but also induced a shift in the local council's approach towards the project, affecting the community's informal dynamics. On the other hand, the efforts of the project team to interact with the objectors and offer methods to ease their concerns were important to the legal procedures and the court's considerations.

E.4.8. Outcomes

The primary goal of this phase was the attainment of the permit for the establishment of a wind farm with three wind turbines in the Kookepan area. Despite the objections and subsequent legal opposition, the goal was eventually achieved when the municipality granted a permit on August 29, 2018. The approval allowed the construction and operation of wind turbines with specified dimensions and power generation capacity. However, the application of the permit led to a prolonged litigation process as two residents appealed against the local council's decision. This legal process was not initially factored into the project timeline and resulted in a delay of approximately one and a half to two years, according to the project representatives. The Council of State eventually dismissed the objections on April 8, 2020 and ruled in favour of the environmental permit. Therefore, while the outcome was ultimately in favor of the project, the legal battles extended the timeline and added to the complexities of the process. The project, in its final form, was initiated on August 31, 2020. The delay did not result in any changes to the physical structure of the wind turbines, indicating that the project was executed as originally planned despite the extended timeline.

E.4.9. Evaluative criteria

Firstly, the project experienced an elongation of its timeline due to an unforeseen legal dispute. According to the representatives, the objections and ensuing court cases led to a delay of approximately one and a half to two years. This delay signifies an inefficiency in the project's execution, as it prolonged the intended duration and increased the resources spent on court proceedings. However, despite the challenges, the project achieved its fundamental goal - the construction and operation of three wind turbines. The relationship between the objections and the delay in the project's timeline suggests a potential area of improvement in the planning phase. While it was acknowledged that preventing such delays might be challenging due to the polarising nature of wind farms (Appendix E.5), more precise forecasting during the planning phase might have factored in the potential for such delays. Profits generated from the wind farm would significantly be reinvested into the community, funding initiatives such as home insulation improvements and combating energy poverty. This community-oriented approach not only exemplifies the sustainable use of profits but also ensures an equitable distribution of the project's benefits. The predominantly positive reactions from the community towards the project indicate a broad-based support for the wind farm. However, project representatives acknowledged an overemphasis on the negative aspects, such as the noise produced by the wind turbines (Appendix E.5). This negative portrayal, combined with the legal disputes and project delays, may have contributed to a more cautious and skeptical stance from the local council towards new initiatives of a similar nature. The local council's wariness, although understandable, may pose challenges to future renewable energy projects, emphasising the necessity for a balanced and comprehensive communication strategy. The suggestion to better communicate the benefits of the project underscores the need for improved public information strategies. In conclusion, the evaluative criteria applied to the Windpark Kookepan project underscore a successful yet somewhat inefficient outcome due to legal disputes and a protracted timeline. However, the project demonstrated an impressive time frame from initiation to completion. Key learnings from the evaluation emphasise the importance of enhanced time management, especially when anticipating potential delays in the planning phase. Furthermore, while beyond this study's scope, post-implementation communication strategies need refinement to better highlight the project's benefits to secure future projects.

E.5. Interviews

Due to strict privacy regulations, direct interview experts could not be included to ensure the protection of personal information. All names within the data have been anonymised to further safeguard individual identities. The credibility of the information presented in this research has been thoroughly vetted by the supervisory team at Delft University. For those wishing to access the data, please contact Rutger van Bergem at R.vanBergem@tudelft.nl. Please note that the data will be retained for a maximum duration of three years.

F

Robustness test for QCA

F.1. Consistency Check for QCA Test 1

The aim of this test was to assess the robustness of the initial consistency cutoff of 0.8 when subjected to a stricter threshold. Changes in consistency can result in the inclusion or exclusion of certain cases from the analysis, potentially leading to different combinations due to counterfactual considerations. In Test 1, the consistency threshold was increased by +0.10 to evaluate the solutions' robustness at the 0.80 score. Given that all solutions maintain a minimum consistency of 0.834237, and with the subsequent lowest value being 0.372703, it was not feasible to decrease the threshold. Hence, a consistency of 0.90 was adopted to identify any logical deviations.

Variations were observed in the resulting solutions, due to the inclusion of fewer truth table columns. Figure F.1 showcases the solutions derived with a 0.90 consistency threshold.

● A core condition that must be present in both the intermediate and parsimonious solutions ○ A core condition that must be absent in both the intermediate and parsimonious solutions ● A peripheral condition that must be present but only appears in the intermediate solution ○ A peripheral condition that must be absent but only appears in the intermediate solution Empty spaces denote irrelevance; it does not matter if a condition is either present or absent	Solution at 0.90 threshold consistency			
	Solution pathway 1	**Solution pathway 2**	**Solution pathway 3**	**Solution pathway 4**
Information	●	●	●	●
Payoff	●	●	○	●
Position		●	●	○
Choice	○	○	●	●
Aggregation	○		○	●
Consistency	1	0.92381	0.90625	0.962687
Raw coverage	0.260235	0.283627	0.211989	0.377195
Unique coverage	0.00584799	0.016082	0.0263159	0.121346
Cases	Battenoord, Nijmegen-Betuwe	Battenoord, Jaap Rodenburg II	Groene Delta	Oostzeedijk
Solution Consistency	0.888283			
Solution Coverage	0.476611			

Figure F.1: Robustness check QCA Test 1: solution pathways associated with Outcome at a 0.90 consistency threshold

For this robustness test, by elevating the consistency cutoff to 0.9, pathways exhibited enhanced consistencies in comparison to the initial test, signifying a more dependable association with the outcome. Yet, this heightened precision had the following drawbacks:

- **Coverage**:Coverage indicates the proportion of instances of the outcome explained by a particular pathway. In the original test with a consistency cutoff of 0.84375, the solution coverage was 0.847957. This suggested that a large proportion of cases were represented and explained by the pathways found in the test. However, with the stricter consistency cutoff in Test 2, the solution coverage dropped to 0.476611. This significant reduction meant that while the remaining pathways might have been very consistent, they explained fewer cases overall.

While a higher consistency threshold could provide more confidence in the identified pathways, it tended to come at the expense of explaining fewer cases. In other words, by being too stringent, we might have missed out on meaningful configurations that could have had substantive importance. In contrast, the original consistency cutoff of 0.8 offered a balance. It ensured a reasonable level of reliability in the identified pathways while still capturing a broader range of cases. In conclusion, the original cutoff of 0.8 was the correct choice as it captured more cases, offering a more holistic understanding, while still maintaining a good level of reliability.

F.2. Frequency Check for QCA Test 1

The second variation suggested by Parente & Federo is variation in the frequency threshold. The frequency was varied by 1 point and was set at “2” for this analysis (Parente & Federo, 2019). Varying the frequency threshold provided a way to test the sensitivity of the results to the inclusion/exclusion of less common configurations. If the core findings remain largely unchanged across different frequency thresholds, it provides added assurance about the validity and robustness of the conclusions drawn from the analysis (Parente & Federo, 2019). Figure F.2 presents the solutions derived with a frequency threshold of ”2”.

⬤ A core condition that must be present in both the intermediate and parsimonious solutions ◯ A core condition that must be absent in both the intermediate and parsimonious solutions ● A peripheral condition that must be present but only appears in the intermediate solution ○ A peripheral condition that must be absent but only appears in the intermediate solution Empty spaces denote irrelevance; it does not matter if a condition is either present or absent	Solution at 0.80 threshold consistency			
	Solution pathway 1	**Solution pathway 2**	**Solution pathway 3**	**Solution pathway 4**
Information	⬤			
Payoff	●			
Position	●			
Choice	●			
Aggregation	●			
Consistency	0.8586761			
Raw coverage	0.701758			
Unique coverage	0.701758			
Cases	Deil, Avri, Kookepan, Ospeldijk, Koningspleij			
Solution Consistency	0.888283			
Solution Coverage	0.476611			

Figure F.2: Robustness check QCA Test 1: solution pathways associated with Outcome at a Frequency Threshold of ”2”

The solution derived from this variation presented a coverage score of 0.476611, which was relatively low. Nonetheless, there was an improvement in consistency by 0.04 points. Notably, the principal finding, specifically pathway 1, remained consistent across various frequency thresholds. This consistency reinforced the pathway’s validity and robustness. A significant drawback, however, was the loss of many unique coverages due to the limited sample size, resulting in several cases not being represented. Given these considerations, a frequency threshold value of ”2” was deemed unsuitable for this research, whereas a threshold of ”1” was considered appropriate.

F.3. Consistency Check for QCA Test 2

The aim of this test was to assess the robustness of the initial consistency cutoff of 0.75 when increased to another threshold. In Test 1, the consistency threshold was increased by +0.10 to evaluate the solutions' robustness at the 0.85 score. Given that all solutions maintained a minimum consistency of 0.834237, and with the subsequent lowest value being 0.372703, it was not feasible to decrease the threshold. Hence, a consistency of 0.90 was adopted to identify any logical deviations. Variations were observed in the resulting solutions, due to the inclusion of fewer truth table columns. Figure F.1 presents the solutions derived with a 0.85 consistency threshold.

⬤ A core condition that must be present in both the intermediate and parsimonious solutions ◯ A core condition that must be absent in both the intermediate and parsimonious solutions ● A peripheral condition that must be present but only appears in the intermediate solution ○ A peripheral condition that must be absent but only appears in the intermediate solution Empty spaces denote irrelevance; in this context it does not matter if a condition is either present or absent	Solution at 0.85 threshold consistency	
	Solution pathway 1	
LEC	⬤	
Information	⬤	
Payoff	⬤	
Aggregation	○	
Consistency	1	
Raw coverage	0.239767	
Unique coverage	0.239767	
Cases	Nijmegen-Betuwe, Battenoord	
Solution Consistency	0.79726	
Solution Coverage	0.850882	

Figure F.3: Robustness check QCA Test 2: solution pathways associated with Duration at a 0.85 consistency threshold

In this robustness assessment, by raising the consistency threshold to 0.85, the test demonstrated improved solutions consistencies relative to the primary test, indicating a stronger and more reliable linkage with the outcome. However, this accuracy had the following drawbacks:

- **Coverage**: In the initial test with a consistency cutoff of 0.75, the solution coverage stood at 0.883045, pointing to a considerable number of cases being covered by the detected pathways. Conversely, with the more rigorous consistency threshold in the subsequent test, the solution coverage dropped to 0.850882. This decrease implies that, although the residual pathways may be highly consistent, they accounted for a reduced number of cases overall.
- **Exclusion Pathway**: The higher consistency threshold resulted in several cases failing to meet the criteria, leading to their exclusion. This is evident in the exclusion of pathway 2.

Raising the consistency threshold can enhance trust in the identified pathways but may reduce the cases addressed. The initial consistency cutoff of 0.75 was appropriate, capturing a broader array of cases while ensuring reasonable reliability.

F.4. Frequency Check for QCA Test 2

The frequency was varied by 2 point and was set at "3" for this analysis (Parente & Federo, 2019). This adjustment was chosen as a variation of 1 point, as in robustness test 1, would not have made different results. Figure F.2 presents the solutions derived with a frequency threshold of "2".

⬤ A core condition that must be present in both the intermediate and parsimonious solutions ◯ A core condition that must be absent in both the intermediate and parsimonious solutions ● A peripheral condition that must be present but only appears in the intermediate solution ○ A peripheral condition that must be absent but only appears in the intermediate solution Empty spaces denote irrelevance; in this context it does not matter if a condition is either present or absent	Solution at 0.75 threshold consistency	
	Solution pathway 1	
LEC	●	
Information	⬤	
Payoff	●	
Aggregation		
Consistency	0.827974	
Raw coverage	0.752928	
Unique coverage	0.752928	
Cases	Deil, Avri, Kookepan, Ospeldijk, Jaap Rodenburg II, Oostzeedijk, Koningspleij	
Solution Consistency	0.827974	
Solution Coverage	0.752928	

Figure F.4: Robustness check QCA Test 2: solution pathways associated with Duration at a frequency threshold of ”2”

From this variation, the solution yielded a coverage score of 0.752928 with an enhanced consistency of 0.827974, indicating a fairly high level of reliability. However, a notable downside was the exclusion of several unique coverages due to the restricted sample size, causing the exclusion of cases like Nijmegen-Betuwe and Battenoord. Additionally, while one pathway was excluded, another pathway demonstrated increased coverage, shedding light on its significance. Despite this, fewer pathways were comprehensively explained. Taking these factors into account, a frequency threshold of ”3” was not apt for this study. The original threshold of ”1” was deemed suitable.