Blueprinting the Decentralized Future: An Exploratory Study on Institutional Design Options for Local Energy Communities in the Netherlands

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Blueprinting the Decentralized Future: Institutional Design Options for Local Energy Communities in the Netherlands

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Executive Summary

The realization of renewable energy projects on land is slower than expected due to social resistance. Local skepticism about renewable energy technologies, due to their aesthetic, environmental, and economic impacts, delays or obstructs projects, hindering progress toward energy and climate goals. Research shows that energy communities can bolster social acceptance and reduce resistance to renewable energy projects.

The Dutch Climate Agreement aims for 50% local ownership of onshore solar and wind projects to enhance public acceptance and project feasibility. While technologies for establishing local renewable energy systems are widely available, institutions to govern them lag behind, and project initiators often lack the knowledge and resources to implement effective local energy systems. Scholars have identified multiple barriers impeding the development of local energy communities, including economic, institutional and organizational factors. Many studies have conducted on the drivers and barriers of local energy communities but limited knowledge exists about the internal governance structures of local energy communities. No prior research has explored the discrepancies between the formal rules that influence design choices and their practical application as rules-in-use for Dutch local energy communities. Therefore, the main research question underlying to this research is:

What institutional design options are available for local energy communities to realize the development of local onshore renewable energy projects in the Netherlands?

This study integrates the Williamson's four layer model and the IAD framework of Elinor Ostrom to examine the institutional design options for local energy communities in the Netherlands. The IAD framework will be used to analyze the governance structures of existing local energy communities, with particular emphasis on boundary, position, aggregation, and payoff rules. Additionally, the four-layer model of Williamson will be used to examine if there are any discrepancies between the rules-in-form (institutional environment) and the rules-in-use (governance level).

This paper has built on the results of Brouwer (2023) to enrich the understanding of the institutional design processes within the seven cases that are examined by Brouwer. It provides a comprehensive understanding of the internal governance structures and financing models of Dutch local energy communities and thereby contributes valuable insights to the academic literature on local energy communities, particularly within the Dutch context. Moreover, a framework is developed to help future local energy communities navigate the institutional design options.

Formal Rules and Regulations:

- European directives and Dutch legislation, including the forthcoming Energy Act and the Dutch Climate Agreement, provide a supportive regulatory framework for local energy communities.
- The Energy Act introduces energy communities as legal entities focused on providing environmental, economic, or social benefits, emphasizing democratic control and voluntary participation.

- Various legal entities are available for energy communities, the law does not prescribe a specific legal structure.

Governance Structures:

- Most local energy communities in the Netherlands are organized as cooperatives and often a separate legal entity (such as a private limited company, general partnership or foundation) is established for the development of the project and to manage the associated investment risks.
- Financing structures typically involve a mix of bank loans, subsidies, and local participation in the form of shares or bonds.
- Local energy cooperatives are often initiators of projects, leveraging partnerships to pool resources and expertise.

Discrepancies Between Rules-in-Form and Rules-in-Use:

- The regulatory framework offers flexibility, but the actual implementation varies based on project dynamics and stakeholder interactions.
- Community involvement and ownership are central in practice, with cooperatives playing a dominant role in employing community involvement.

Recommendations for Institutional Design:

- Organize local energy communities as cooperatives to benefit from their characteristics of open access, voluntary participation, and democratic control.
- Identify skill or knowledge gaps and seek partnerships with experienced energy cooperatives, local authorities or commercial developers to address them.
- Establish a separate project entity, a private limited company, to mitigate investment risks and ensure that the cooperative holds at least 50% of the shares.

The findings of this study provide valuable practical insights for stakeholders involved in future local energy community projects. By offering an overview of the institutional environment and a rough institutional design framework, the research equips future project initiators with the essential knowledge to establish a local energy community project.

Preface

This master's thesis, titled "Blueprinting the Decentralized Future: Institutional Design Options for Local Energy Communities in the Netherlands", has been written to fulfill the graduation requirements of the Master's program in Complex Systems Engineering and Management at the Faculty of Technology, Policy and Management. After seven years of studying, which included two six-month internships, gaining work experience alongside my master's program, various committee roles and participation in the faculty student council, this thesis officially marks the end of my academic journey at the TU Delft.

I would like to thank my thesis committee for their invaluable support. A special thanks to my first supervisor, Rutger van Bergem, for the brainstorming sessions at his office on Westplein in Rotterdam. Your insights were instrumental in shaping this research. I am also profoundly grateful to my second supervisor, Amineh Ghorbani, for her indispensable feedback and counsel, particularly regarding the theoretical aspects of this thesis. Your straightforward approach and deep knowledge provided valuable insights and ensured productive and meaningful progress meetings.

Furthermore, I would like to extend my gratitude to all of my colleagues at Docklab for providing a pleasant and supportive work environment while I was working on my thesis. I thoroughly enjoyed being part of the ILSA.tech team. Lastly, I would like to thank everyone who participated in the interviews for this research. Your willingness to share your time and information was crucial for the development of this report.

M. Vink
Rotterdam, June 2024

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Nomenclature

Translations

English	Dutch
Administrative Law Act	Algemene wet bestuursrecht (Awb)
Administrative Office Foundation	Stichting Administratiekantoor (STAK)
Appeal	Beroep
Climate Agreement	Klimaatakkoord
Collaboration Agreement	Samenwerkingsovereenkomst
Community fund	Gebiedsfonds
Council of State	Raad van State
Dutch Wind Energy Association	Nederlandse WindEnergie Associatie (NWEA)
Electricity Act	Elektriciteitswet
Energy Agreement	Energieakkoord
Environmental Impact Assessment	Milieueffectrapportage (Mer)
Environmental Fund	Omgevingsfonds
General Assembly of Members	Algemene Ledenvergadering
General Partnership	Vennootschap onder firma (vof)
House of Representatives	Tweede Kamer
Local Energy Cooperative	Energiecoöperatie
Major shareholder	Directeur en Grootaandeelhouder (DGA)
Nature Conservation Act	Wet Natuurbescherming
Netherlands Chamber of Commerce	Kamer van koophandel (kvk)
Objections	Bezwaren
Participation Guide	Participatiewaaier
Privat Limited Company	Besloten Vennootschap (BV)
Public Limited Company	Naamloze Vennootschap (NV)
Views	Zienswijzen

Abbreviations

Abbreviation	Defenition
ANBI	Algemeen Nut Beogende Instelling
AOF	Administrative Office Foundation
CEC	Citizen Energy Community
CEP	Clean Energy Package
EIA	Environmental Impact Assessment
IAD	Institutional Analysis and Development
IEG	Innovatie- en Energiefonds Gelderland
IPKW	Industriepark Kleefse Waard
LEC	Local Energy Cooperative
MW	Megawatt
MWp	Megawattpiek
NEWECOOP	Nederweerter Energie Coöperatie
NMG	Natuur en Milieu Gelderland
NWEA	Nederlandse WindEnergie Associatie
REC	Renewable Energy Community
RED II	Revised Renewable Energy Directive
REIJE	Rijn en IJssel Energie Coöperatie
SCE	Subsidieregeling Coöperatieve Energieopwekking
SDE++	Stimulering Duurzame Energieproductie en Klimaattransitie
TWh	Terawatthours
WML	Waterleiding Maatschappij Limburg
WPN	WindpowerNijmegen

Introduction

One of the primary objectives outlined in the Dutch Climate Agreement is a substantial reduction of greenhouse gas emissions. The government has formulated the ambitious goal of emitting 55% less in 2030 than in 1990 and reaching climate neutrality in 2050 (Rijksoverheid, n.d.). In pursuit of this objective, the agreement stipulates that 35 terawatt-hours (TWh) must be generated from solar and wind farms on land by 2030 (Klimaatakkoord, 2019). In 2022, solar energy contributed approximately 16.8 TWh, while onshore wind generated 13.2 TWh (Willigenburg et al., 2023). Therefore, a substantial increase in onshore renewable energy capacity nationwide is required in the coming years to meet the target of 35 TWh by 2030.

Although solar and wind-based electricity generation has significantly lower greenhouse gas emissions than electricity production based on fossil fuels, it is also associated with considerable negative externalities (Mattmann et al., 2016). Wind power, in particular, generates various uncompensated side effects, including visual impacts, noise pollution and adverse effects on wildlife (Droës & Koster, 2016; Mattmann et al., 2016; Zerrahn, 2017). Mattmann et al. (2016) conducted a literature review which highlighted that negative visual impacts on the landscape and noise pollution are the primary reasons for public opposition to wind power development. These negative effects also contribute to an additional adverse impact on residents living near wind turbines: a decrease in property values. Droës & Koster (2016) showed that housing prices fall by 1.4% when a wind turbine is installed within a two-kilometer radius of a house. Similarly, the development of solar parks also faces local resistance due to anticipated adverse effects on the surroundings, mainly due to concerns about negative visual and environmental impacts (Van den Berg & Tempels, 2022).

The shift towards local and clean energy sources like solar and wind has profound implications for the local physical environment, emphasizing the critical need for local support and acceptance (Germes et al., 2021). According to Van den Berg & Tempels (2022) the level of community acceptance is influenced by the type and magnitude of negative externalities associated with renewable energy projects, including aesthetic, environmental, and economic impacts. Moreover, rural communities often feel that they bear the brunt of the risks and consequences of projects aimed at supplying energy to urban areas, while commercial developers reap the economic benefits (Van den Berg & Tempels, 2022). This perception of an unequal distribution of costs and benefits has a significant impact on the level of local opposition.

Local energy communities have emerged as a promising solution for addressing these challenges (Koirala et al., 2018; Nagpal et al., 2022). These communities are defined as bottom-up citizen initiatives with various local actors who jointly invest in renewable energy technologies to generate, consume and/or sell renewable energy together (Germes et al., 2021; Fouladvand et al., 2022). Shared ownership will enhance collaboration, allow the local community to exert influence in the decision-making process of the projects and have a share in the distribution of the profits (Anfinson et al., 2023). Research shows that community engagement and utilizing community benefits increases the acceptance for local renewable energy projects and therefore accelerates the energy transition (Anfinson et al., 2023; Koirala, 2017; Van den Berg & Tempels, 2022). As a result, the Dutch government, recognizing the

significance of local participation, has inserted the aspiration of 50% local ownership for large-scale solar and wind parks on land in the Dutch Climate Agreement (Klimaatakkoord, 2019).

1.1 Problem definition

The realization of renewable energy projects on land is proceeding more slowly than anticipated. This is partly due to social resistance to renewable energy projects. Local communities are often skeptical of renewable energy technologies due to their aesthetic, environmental, and economic consequences for the surrounding (Droës & Koster, 2016; Mattmann et al., 2016; Zerrahn, 2017). A quarter of Dutch people is against large-scale renewable energy production in their neighborhood (Rijnveld & Van Schie, 2019). As a result, this delays, or even obstructs the realization of these projects, which is problematic in the light of meeting energy and climate targets (Van den Berg & Tempels, 2022). Policymakers and developers have come to the consensus that local participation in renewable energy projects can increase local acceptance. This is also endorsed by academic literature (Lagendijk et al., 2021; Liu et al., 2019). This is one of the main drivers for the development of local energy communities. The Dutch Climate Agreement (2019) highlights the importance of local participation and acceptance for the spatial integration of the renewable energy transition and thus for its feasibility. This is translated into the aspiration of 50% local ownership for the development of onshore solar and wind energy projects.

Although technologies to realize local energy systems based on renewable energy are widespread, the institutions to govern these local energy systems are still lagging behind (Koirala & Hakvoort, 2017; Lammers & Hoppe, 2019). Initiators and developers of local energy initiatives often lack the knowledge and resources to find out what is possible and useful in their specific situation. There are no clear frameworks yet on how to build local energy systems, and how citizens and local businesses can effectively cooperate in it (Topsector Energie, 2023).

Existing literature observes a large variety in local energy communities in the Netherlands (Di Nucci et al., 2023; Proka et al., 2018; Van Summeren et al., 2020). Current projects have different objectives, legal structures, financing strategies and organizational structures (Lupi et al., 2021) and the selection of organizational models and funding mechanisms are far from reaching a state of stability (Horstink et al., 2020). The lack of coordination among existing communities makes it hard to compete with the dominant energy regime and widespread implementation has not occurred thus far (Proka et al., 2018). A comprehensive institutional design, including available legal entities and possible partnerships, is necessary to accelerate the large-scale implementation of distributed renewable energy projects and thereby achieving target of 35 TWh of onshore solar and wind generation by 2030 (Koirala, 2017).

1.2 Literature review and knowledge gap

Prior research has extensively explored the numerous benefits associated with citizen engagement in energy projects. The significance of local ownership and local benefits are highlighted as key factors influencing public acceptance (Di Nucci et al., 2023; Ghorbani et al., 2020; Horstink et al., 2020; Teladia & Van der Windt, 2024; Venray & Sebi, 2020). Additionally, a vast amount of research has been conducted on the drivers for local energy initiatives (Di Nucci et al., 2023; Ghorbani et al., 2020; Horstink et al., 2020; Lupi et al., 2021; Neska & Kowalska-Pyzalska, 2022; Seyfang et al., 2014; Teladia et al., 2023). Recent

literature has provided a comprehensive understanding of the conditions in which local energy initiatives occur and thrive and identified various motives, ranging from environmental to economic and social ones (De Lotto et al., 2022; Hoppe et al., 2015; Horstink et al., 2020; Lupi et al., 2021).

Many researchers emphasize that local energy communities can bolster social acceptance and reduce resistance to renewable energy projects (Berka & Creamer, 2017; Bauwens et al., 2016; Brummer, 2018; Lagendijk et al., 2021; Kooij et al., 2018; Liu et al., 2019; Vasileiadou et al., 2016, Wirth, 2014). Consequently, energy communities are anticipated to have a pivotal role in the transition towards a zero-carbon society (Berka and Creamer, 2018; Di Nucci et al., 2023; Ghorbani et al., 2020; Vernay & Sebi, 2020). However, multiple studies argue that energy communities are still playing a marginal role in the energy transition and have yet to reach their full potential (Gorroño-Albizu et al., 2019; Proka et al., 2018; Van Summeren et al., 2020; Venray & Sebi, 2020). Scholars have identified multiple barriers impeding the development of local energy communities, including economic, institutional and organizational factors (Brummer, 2018; Horstink et al., 2020; Mirzania et al., 2019; Venray & Sebi, 2020). It is argued by Kooij et al. (2018) that most energy communities need external support to be successful. Despite extensive research on the drivers and barriers of local energy initiatives, limited knowledge exists about the internal structures of local energy communities and the way external support is structured in partnership models (Teladia et al., 2023; Venray & Sebi, 2020).

Researchers claim that the complexity in socio-technical systems is especially due to the positions, relations and behavior of the parties that are involved (Ghorbani et al., 2010). Nevertheless, most literature is focused on the outcomes of community energy projects, rather than the process towards realizing these outcomes. Mirzania et al. (2019) emphasize the importance of understanding the processes that differentiate local energy communities and their organizational structures. They recommend that future research should also take these processes into account. Some studies focused on the process and applied the strategic niche management theory to explain the emergence of community energy initiatives (Hoppe et al., 2015; Seyfang et al., 2013). In addition, Ghorbani et al. (2020) have explored the formation process of local energy initiatives using an agent-based simulation modelling approach. Brouwer (2023) utilized the Institutional Analysis and Development (IAD) framework of Ostrom to explore the interplay between local energy communities and commercial developers of wind energy projects. The findings revealed that the involvement of the local environment positively impacts the durations for project realizations. Building on the results of Brouwer (2023), this study aims to further enhance the understanding of the institutional design processes within the local energy community projects analyzed by Brouwer (2023). This study makes a significant contribution to academic literature by gaining a better understanding of the internal governance structures of onshore local energy community projects in the Netherlands.

While some studies have focused on the organizational structures, business and financing models (Gorroño-Albizu et al., 2019; Horstink et al., 2020; Kubli & Puranik, 2023; Mirzania et al., 2019; Seyfang et al., 2013), to my knowledge, no studies have investigated the discrepancies between the rules-in-form that influence the design choices and their practical application in the form of rules-in-use for Dutch local energy communities.

1.3 Research scope

The aim of this research is to address the aforementioned knowledge gap and to explore institutional design options for local energy initiatives in the Netherlands. The scope of this study is limited to onshore projects as they have profound implications for the local physical environment. These projects typically face the most public resistance due to significant negative externalities like aesthetic, environmental and economic impacts (Van den Berg & Tempels, 2022). Local participation in the form of local energy communities could help to internalize these impacts (Klimaatakkoord, 2019). Offshore wind projects and rooftop solar projects are excluded from this research because they require different orders of magnitude of investment and have far fewer negative externalities (Schröder, 2020).

1.4 Research questions

This research employs an exploratory qualitative study. First, desk research is applied to examine the formal institutional framework which deploys the initial design space. Subsequently, several case studies are analyzed using Elinor Ostrom's Institutional Analysis and Development (IAD) framework as a theoretical tool to examine how the formal rules are translated into practical rules-in-use that are exploited by existing local energy communities. The focus will be on the boundary, position, aggregation, and payoff rules, to delve deeper into the diverse governance design configurations. The research thereby aims to answer the following main research question:

What institutional design options are available for local energy communities to realize the development of local onshore renewable energy projects in the Netherlands?

This study defines institutional design options as the set of formal and informal rules that regulate interaction between different actors. Specifically, it examines the governance frameworks pertaining to local energy communities and potential collaborators involved in the realization of local energy projects. The research will focus on legal entities for local energy communities and potential collaborations. Moreover, the four-layer model of Williamson (2000) will be used to examine if there are any discrepancies between the rules-in-form and the rules-in-use.

In order to dissect the overarching research question, the following four sub-questions have been formulated:

SQ 1: What formal rules are in place which delineate the institutional design options for local energy communities in the Netherlands?

SQ 2: What governance structures are currently utilized by local energy communities in the Netherlands?

SQ 3: What are the differences in the rules-in-form and rules-in-use regarding the institutional design options for local energy communities in the Netherlands?

SQ 4: How can the formal rules and their practical application be translated into institutional design options for local energy community projects in the Netherlands?

This study will provide insight into the institutional design options for local energy communities to realize renewable energy generation projects in the Netherlands. The aim of this study is to investigate the formal rules that are currently in place and the rules-in-use that are utilized by projects that have been realized.

By integrating Ostrom's IAD framework and the Williamson's four-layer model, this study establishes a robust analytical framework for investigating the institutional design options for local energy communities. The IAD framework identifies critical governance structures, while the four-layer model provides a practical toolkit for comparing the rules-in-form and the rules-in-use. This approach also addresses the gap between theoretical insights and practical solutions, as highlighted by Kubli and Puranik (2023). Ultimately, the goal is to gain insights for contributing towards the development of more sustainable and effective community energy systems in the Netherlands.

1.5 Relevance research

1.5.1 Societal relevance

This objective of this research is to explore the institutional design options for local energy communities in the Netherlands, aiming for a comprehensive understanding of the diverse legal entities and governance structures available. The study aims to accelerate the transition to distributed renewable energy sources on land and establish efficient community energy systems by providing a comprehensive overview of the institutional design options. This research endeavors to provide stakeholders with the required knowledge for navigating the complexities of energy community design, thereby streamlining forthcoming energy projects and significantly contributing to the achievement of the ambitious climate targets. Additionally, it is hoped that these local energy communities will also help alleviate congestion problems stemming from the transition to distributed renewables by incorporating smart grids, battery storage, or peer-to-peer energy trading in the future. The study concentrates on local energy communities utilizing renewable energy generation capacity. Nonetheless, once the institutional design for a local energy community is established, transitioning to the management of electricity consumption and distribution becomes a minor endeavor.

1.5.2 Academic relevance

Besides the societal relevance, this study will also make a significant contribution to academic literature. As described in Section 1.2, the contribution of this research paper to academic literature is twofold. The institutional designs of the cases studied by Brouwer (2023) will be analyzed, focusing specifically on boundary, position, aggregation, and payoff rules aiming to get a better understanding of the institutional design options for local energy communities in the Netherlands. Furthermore, the Williamson four-layer model will be applied to explore the formal institutional framework and its application in the form of governance structures adopted by local energy communities in the Netherlands.

1.5.3 Relation to MSc Complex Systems Engineering and Management

The Complex Systems Engineering and Management master program focuses on designing interventions in socio-technical systems. Local energy communities can be considered as socio-technical systems since they consist of both technical and social aspects (Ghiani et al., 2019; Ghorbani et al., 2010; Koirala & Hakvoort, 2017; Petrovics et al., 2022, Teladia et al., 2023). The technical system typically involves various components such as generation facilities, distribution grids, storage units and energy management systems. The institutional design of local energy systems is complex due to the involvement of multiple stakeholders (Koirala & Hakvoort, 2017). This research aims to explore institutional design options for local energy communities and is thereby directly related to the design-oriented aspect of the master program.

1.6 Report structure

The introduction contextualizes this research by articulating a problem definition, identifying knowledge gaps through a literature review, and formulating research questions, thereby setting the stage for subsequent chapters. Chapter 2 delves into the theoretical underpinnings of institutions, introducing both Williamson's Economics of Institutions framework and Ostrom's Institutional Analysis and Development framework. Chapter 3 delineates the methodological approach employed in this study, elucidating the procedures and techniques utilized for data collection. Chapter 4 scrutinizes the institutional environment level, aligning with the second level of Williamson's four-layer model, to provide a comprehensive understanding of the formal rules. In Chapter 5, the focus shifts to the governance level, corresponding to the third level in Williamson's model, where the IAD framework of Ostrom will be utilized to analyze several case studies. These case studies will be used to get insight into the practical implementation of rules-in-form and governance structures, with particular emphasis on boundary, position, aggregation, and payoff rules as delineated by Elinor Ostrom. Chapter 6 undertakes a comparative analysis between the institutional environment and the governance level. Chapter 7 contains a thorough discussion, synthesizing the findings from earlier chapters in a design framework and providing recommendations for future research. Finally, Chapter 8 wraps up the study by summarizing key insights and their practical implications. A visual representation of the thesis structure is presented in Figure 1, the Research Flow Diagram.

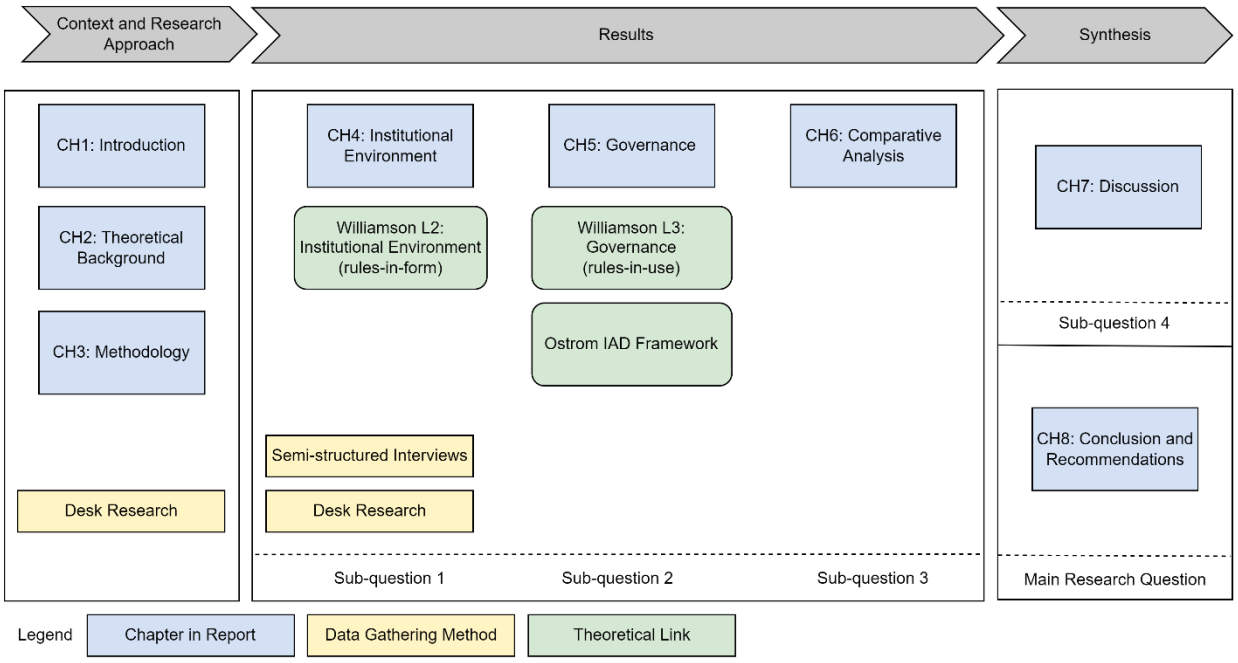

Figure 1. Research Flow Diagram

2. Theoretical background

This chapter explores the key theoretical frameworks for this research and definitions relevant to local energy communities. Section 2.1 provides an argument for the definition of local energy communities as used in this paper. Section 2.2 explains the concepts of institutions and institutional design. Section 2.3 introduces the Williamson's Economics of Institutions framework, detailing its four levels of institutional analysis and discussing the rationale for applying this framework. Section 2.4 presents Ostrom's Institutional Analysis and Development (IAD) framework, focusing on rules-in-use and their impact on the action situations. Finally, Section 2.5 justifies the approach of combining Williamson's four-layer model and Ostrom's IAD framework for analyzing institutional design options for local energy communities.

2.1 Different definitions

In academic literature, various terms are utilized to describe local energy initiatives, encompassing citizen initiatives, local community initiatives, local energy communities, community energy, and renewable energy communities (Germes et al., 2021; Fouladvand et al., 2022). In this thesis the terms local energy communities and local energy initiatives are used interchangeably, both defined as bottom-up citizen initiatives with various actors who jointly invest in renewable energy technologies to generate, consume and/or sell renewable energy together to provide environmental, economic, or social benefits for its members (Germes et al., 2021; Fouladvand et al., 2022). Local energy communities may encompass diverse actors, including households, companies, associations, and local authorities, collaborating to produce and distribute renewable energy (Bonfert, 2024).

2.2 Institutions and Institutional Design

Institutions refer to established and prevalent rules and norms that structure human interactions within a society or a specific context (Hodgson, 2006). They regulate interaction between actors through both formal and informal rules (Fouladvand et al., 2022; North, 1991). By providing a framework for organizing and regulating human activities and their consequences, institutions contribute to the stability and functionality of a society or community. Institutional design refers to the process of deliberately creating, modifying, or adapting these structures and rules to achieve specific goals (Klijn & Koppenjan, 2006).

2.3 Williamson's Economics of Institutions Framework

Williamson (2000) introduced a four-level model to classify various institutional arrangements based on their frequency of change and the potential for purposeful change to enhance economic effectiveness and efficiency (see Figure 2). The model categorizes institutions into four distinct levels: embeddedness, institutional environment, governance and resource allocation.

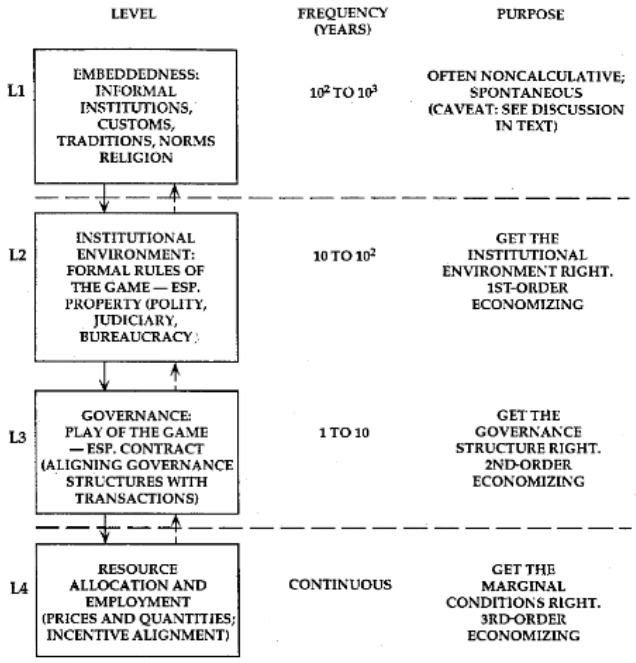

Figure 2. The Economics of Institutions Framework (Williamson, 2000)

- Level 1, called "embeddedness," comprises predominantly informal institutions inherited from society and culture, such as norms, values, and customs. These institutions change very infrequently, often once in a century or even a millennium, and are largely non-calculative to economic reasoning.
- Level 2, the "institutional environment" encompasses formal institutions like laws, political and governmental arrangements which provide the so-called "rules of the game". These institutions are relatively stable, with changes occurring every 10 to 100 years.
- Level 3, labeled "governance," involves translating and operationalizing the rules from the first two levels into specific governance structures such as contracts, firms, or agreements.
- Level 4 deals with short-term resource allocation based on the existing governance structures at third level. At this level, decisions are made to accomplish narrowly defined objectives, such as profit maximization.

2.3.1 Rationale for the Application of Williamson's Model

The four-layer model of Williamson (2000) provides a structured approach for analyzing institutional arrangements and their impact on the behavior of actors and potential outcomes (Koppenjan & Groenewegen, 2005). By considering both formal and informal institutions across different levels, it offers a comprehensive framework for understanding the multilayered dynamics of institutional environments, providing a systematic way to categorize

and assess various aspects of institutional design. Furthermore, this framework highlights the complexity of multi-actor systems and underscores the importance of designing effective governance structures to achieve desired economic outcomes. In the context of this research, which is focused on local energy initiatives in the Netherlands, the application of Williamson's model helps to understand the complex institutional environment in which these initiatives operate in. The structuring based on the four-layer model of Williamson fits the intersection of diverse stakeholders, regulatory frameworks, and community dynamics within local energy communities. The model allows researchers to analyze the institutional arrangements at different levels, where this study focuses on the institutional environment (level 2) and governance structures (level 3). This comprehensive approach enables a holistic understanding of the institutional landscape surrounding local energy communities.

Moreover, by delineating different institutional layers, it can be systematically examined how different aspects of institutions interact and influence each other and how the rules-in-use may vary from the rules-in-form. In this way potential design options for local energy communities can be identified. Overall, the application of Williamson's 4-layer model provides a robust analytical framework for exploring institutional design options for local energy initiatives in the Netherlands, offering a structured approach to understanding the complex interplay of factors shaping institutional arrangements in this context.

2.4 Ostrom's Institutional Analysis and Development Framework

The Institutional Analysis and Development (IAD) Framework, developed by Elinor Ostrom (2005), is designed to explore a variety of institutional settings (Ostrom, 2010). Moreover, it can be used to examine the structure and functioning of institutions in governing common pool resource systems. These systems typically generate a highly predictable but limited supply of one specific type of resource units within a designated time frame. Another characteristic of common pool resources is open access, allowing everyone to enter the resource and harvest these resource units (Ostrom, 2002). Utilizers of this resource are presumed to be homogeneous, short-term thinking, profit-maximizing actors with complete information. They acquire property rights solely to the resource units they harvest, subsequently selling it on the open market. All utilizers operate independently, without communication or coordination among themselves.

However, in practice, most common pool resources exhibit significantly high levels of complexity than the aforementioned theory assumes (Ostrom, 2002). Instead of acting entirely independent based on autonomous decision, individuals often find themselves embedded in communities where rules and norms have a significant impact on the situational framework (Ostrom, 2011). This statements also applies to community energy systems. Without specific agreed-upon rules and funding for both the initial construction and ongoing maintenance of these local energy systems, none of them will operate effectively (Ostrom, 2014). Rules can be defined as "shared understandings among those involved that refer to enforced prescriptions about what actions are required, prohibited, or permitted" (Ostrom, 2011). Rules are specific guidelines that dictate acceptable behavior within a given context and can be seen as a subset of institutions (Klijn & Koppenjan, 2006).

The framework revolves around the concept of the action situation, wherein participants occupy specific positions allowing them to choose particular actions. The action situation is "a conceptual space in which actors inform themselves, consider alternative courses of action, make decisions, take action, and experience the consequences of these actions" (Fouladvand et al., 2022). External variables, including biophysical conditions, community attributes, and rules-in-use, influence the action situation and shape the interaction between actors and the possible outcomes (see Figure 3). The biophysical conditions refer to the physical environment or resources that are relevant to the action situation. The community attributes define the social and cultural context in which an action situation is located. Lastly, the rules-in-use include both formal and informal norms and regulations that guide the behavior and actions of the participants within the action situation.

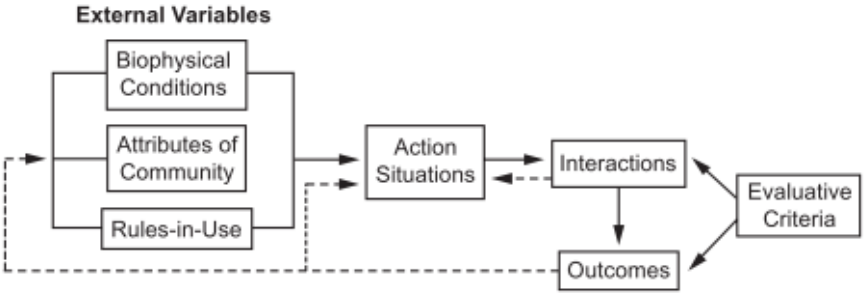

Figure 3. The Institutional Analysis and Development Framework (Ostrom, 2011)

Ostrom (2010) has outlined seven types of rules-in-use that can have an impact on an action situation (see Figure 4): boundary rules, position rules, choice rules, scope rules, aggregation rules, information rules and payoff rules.

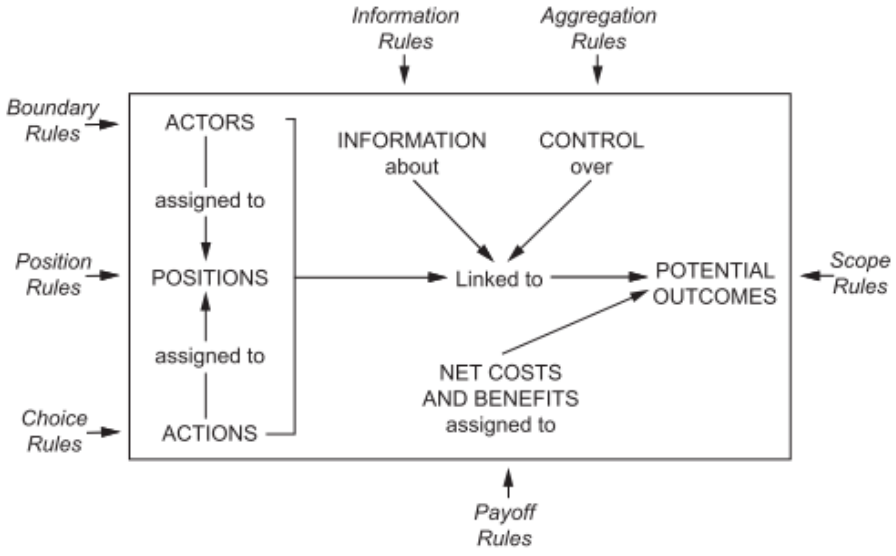

Figure 4. The Influence of Rules on the Action Situation (Ostrom, 2011)

According to Ostrom (2011), boundary rules influence the number of participants and their resources. They also address whether new participants can join through entry fees or initiation and what the conditions for exiting are. Position rules define the roles of participants within the action situation. Choice rules allocate sets of actions for actors indicating what is

mandatory, authorized, or forbidden. Scope rules outline the potential outcomes that can be influenced, shaping the actions linked to specific results. Aggregation rules impact the level of control a participant in a position holds over selecting an action. Information rules affect the knowledge-dependent information sets of participants and whether the information is confidential. Payoff rules determine the benefits and costs assigned to specific combinations of actions and outcomes, establishing incentives and deterrents for action. These rules can be analyzed across three levels: the operational, the collective choice, and the constitutional choice level. These levels, like the levels presented in the Williamson model, correspond to different timeframes: day-to-day activities fall within the operational level, collective choices are reviewed every a 5 to 10 years, and the constitutional level structures the process of collective choice over a long-term period (Ghorbani et al., 2010).

Furthermore, Ostrom (2010) distilled eight design principles for governance of commons: clearly defined user and resource boundaries, proportional benefits and costs, collective decision making, effective monitoring, graduated sanctions, conflict resolution mechanisms, the right to self-organization, and nested enterprises. These principles contribute to the robustness of user driven governance.

2.4.1 Rationale for Application of Ostrom's IAD Framework

Ostrom's IAD framework offers insights into how prevailing rules-in-use shape the behaviors of actors within a specific action situation. The framework facilitates the structured assessment and comprehension of the impact of rules-in-use on the outcomes of different action situations, and their change over time (Ostrom, 2014; Lammers & Hoppe, 2019; Milchram et al., 2019).

The IAD framework is renowned for its application for research on collective action and self-governance within socioecological systems (Fouladvand et al., 2022; Koirala & Hakvoort, 2017). More recently the framework has increasingly been applied in the energy research (Brouwer, 2023; Lammers & Hoppe, 2019) and has even been specifically employed in the research on community energy systems (Brouwer, 2023; Fouladvand et al., 2022; Milchram et al., 2019). Local energy communities can be considered as a form of collective action, where individuals collaborate to attain common objectives in addressing a common-pool resource dilemma (Fouladvand et al., 2022). This study aims to conduct a comprehensive examination of the institutional complexities influencing the involvement of local energy communities. The adaptability of the IAD framework facilitates this exploration, providing deep insights into governance structures of the studies cases (McGinnis & Ostrom, 2014; McGinnis, 2011).

2.5 Rationale for Combining Williamson's four-layer model and Ostrom's IAD framework.

The Williamson model and the IAD framework have effectively explained behavior and interpreted global outcomes across various contexts, such as economics, organization, and policy analysis in numerous studies (Ghorbani et al., 2010, Koppenjan & Groenewegen, 2005). This dual approach ensures that both the high-level institutional context and the detailed operational rules are considered, leading to a more robust analysis and better-informed recommendations for designing and implementing effective governance structures in local energy communities. Therefore, by applying both frameworks together, a thorough understanding of the complexities involved in local energy communities can be gained (Ghorbani et al., 2010).

3. Research Methodology

This chapter outlines the research methodology used to investigate institutional design options for local energy communities in the Netherlands. Section 3.1 details the general research approach. Section 3.2 describes the case study approach, including the selection method for the cases and the action situation. Section 3.3 explains the data collection methods, comprising a literature review, desk research, and interviews.

3.1 Methodological Research Approach

The objective of this research is to explore the institutional design options for local energy communities in the Netherlands. The study integrates the Williamson's (2000) four-layer model on the economics of institutions and the IAD framework of Ostrom (2005) to provide a comprehensive understanding of the regulatory framework and the governance structures that apply to existing local energy community projects in the Netherlands. The focus is thereby on the second and third level of the Williamson's schema. Moreover, several case studies will be used to study the rules-in-use and practical applications of the institutional environment in real projects, with specific emphasis on the position, boundary, aggregation and payoff rules as introduced by Elinor Ostrom. The research process consists of the following essential steps:

1. Providing a synopsis of the formal rules of the institutional environment for local energy projects in the Netherlands.
2. Analyzing rules-in-use of selected cases by applying a case study approach and using the Ostrom's IAD framework as a theoretical lens to explore the institutional dynamics.
3. Contrasting the formally established rules (second layer of Williamson's model) and their practical implication in terms of governance structures (third layer of Williamson's model).

The main goal of this study is to investigate different institutional design options for realizing local energy generation project at minimal costs. This is translated into several tangible evaluative criteria, namely: the duration of the project, from project initiation to the start of the construction, and the number of views and appeals that have been lodged from the surrounding area.

The scope of this study is limited to onshore wind and solar parks since these projects typically experience the most public opposition. These renewable energy projects are an important part of achieving climate-neutrality in 2050 but often experience high levels of public resistance due to their expected negative external effects on the local environment (Van den Berg & Tempels, 2022). Projects that invest in solar panels on rooftops are deliberately excluded from this research, because local acceptance plays a significantly smaller role in these cases and they require much smaller initial investments than wind and solar farms (Schröder, 2020).

3.2 Case Study Approach

To delve deeper into the practical application of the institutional environment and the specific governance structures of local energy communities, a case study approach is adopted. According to Schoor & Scholtens (2015), a case study approach is valuable tool for providing an in-depth exploration of institutions of specific projects. In this research multiple cases will

be analyzed to study the practical applications of the institutional environment in existing projects. Thereby the main focus will be on the position, boundary, aggregation and payoff rules as described by Elinor Ostrom (2005).

This study builds on the previous work done by Brouwer (2023), which examined fourteen case studies of Dutch onshore wind projects to investigate the differences between the development by commercial parties and projects where local energy communities were involved. Cases were selected based on similar project characteristics: comparable biophysical conditions, community attributes, and regulatory environments. Parameters that were used to select the cases were the number of wind turbines (ranging from 3-5 turbines of approximately 4 MW), the distance to closest residential zone (maximum of 2.5 km) and a consistent level of support or opposition from the surrounding area.

3.2.1 Case Selection

The fourteen cases selected by Brouwer (2023) provided an initial list for this research (see Table 1). This list provided a starting point, because of their similar properties and the availability of relevant data.

Table 1. Initial list of case studies (Brouwer, 2023)

Case	Province	Percentage LEC (%)	Number of Turbines	Average Capacity (MW/ turbine)	Distance to First Residential Area (m)	Repowering
Kookepan	Limburg	100	3	4.5	2000	No
Ospeldijk	Limburg	50	4	4	2500	No
Greenport Venlo	Limburg	0	9	4.5	1800	No
Nijmegen-Betuwe	Gelderland	95	4	2.5	900	No
Koningspleij	Gelderland	50	4	3	720	No
Deil	Gelderland	36	11	4.2	2000	No
Avri	Gelderland	25	3	3.6	1500	No
Bijvank	Gelderland	0	4	4.4	1500	No
Groene Delta	Gelderland	0	2	3.6	480	No
Oostzeedijk	Zeeland	100	3	5.7	2000	Yes
Jacobahaven	Zeeland	0	3	4.2	750	Yes
Battenoord	South Holland	50	6	3.6	2000	No
Oude Maas	South Holland	0	5	3.6	750	No
Jaap Rodenburg II	Flevoland	20	10	3.8	1600	Yes

The projects without any involvement of a local energy cooperative were excluded, because of the research objective. Furthermore, projects where turbines were replaced, so-called “repowering” projects, were also excluded due to the differences in community attributes when there were already wind turbines on the project location in the past. Another distinction has been made in the Suyderlandt and Blaakweg projects, which were originally presented as one project in the Battenoord case. After further researching the governance structures of the Battenoord case it was decided to consider the projects as separate cases, since different actors were involved in the development of both wind farms. These selection choices have resulted in the final selection of seven cases with similar project characteristics, which is presented in Table 2.

Table 2. Project details of the final list of selected cases.

Case	Province	Percentage LEC (%)	Number of Turbines	Average Capacity (MW/ turbine)	Distance to First Residential Area (m)
Kookepan	Limburg	100	3	4.5	2000
Ospeldijk	Limburg	50	4	4	2500
Nijmegen-Betuwe	Gelderland	95	4	2.5	900
Koningspleij	Gelderland	50	4	3	720
Avri	Gelderland	25	3	3.6	1500
Suyderlandt	South Holland	50	3	3.6	2000
Blaakweg	South Holland	50	3	3.6	2000

As explained in the previous section, these case studies were used to examine the governance structures that are currently used by existing local energy communities and thereby corresponding to the third layer of the Williamson´s Model.

3.2.2 Selection of the Action Situation

Renewable energy projects typically adhere to a structured process of four main stages: pre-development, development, construction, and operation and maintenance (Wattcrop, n.d.). In the pre-development stage, the project initiators identify suitable sites for solar and/or wind projects, conduct feasibility studies, assess environmental impacts, along with preliminary engineering and design work. Once the pre-development stage is complete and the project is deemed feasible, the development stage commences. During this phase, detailed engineering and design work is finalized, financing is secured, contracts are negotiated, and final permits are obtained. This stage often involves extensive stakeholder engagement. The construction stage entails the physical implementation of the project and lastly, the operation and maintenance stage begin when the project is in operation and starts generating electricity.

Given the scope of this research and the purpose of the case studies, the action situation focuses on the period from project initiation to the start of the construction, equivalent to the first two stages of (pre-)development. Crucial decisions related to various aspects of the project's institutional design are made during these phases, which influence the overall trajectory. These decisions encompass determining legal entities, partnership models, establishing governance structures, including payoff rules to secure the necessary funding for realization of the project. By focusing on this particular phase and selecting the (pre-)development stage as action situation, valuable insights into the institutional design process are gathered to answer the main research question. This selection is also related to the aforementioned evaluative criteria of project duration and the number of views and appeals.

3.3 Data Collection

3.3.1 Literature review

The literature review primarily focuses on exploring existing literature on local energy communities with a particular emphasis on the IAD framework and its intersection with the energy transition. The databases of ScienceDirect, Scopus and the TU Delft repository were used to search for relevant studies. Both English and Dutch studies were included without specific restrictions on publication dates. Examples of keywords used in the search include "Local Energy Community," “IAD Framework,” “Williamson” “Institutions,” “Institutional

design," "Energy Cooperatives," "Local Energy Initiative," AND "Local Acceptance". Duplicate studies were excluded, followed by a screening process to eliminate articles that did not have open access, pertinent title or abstract, or limited relevance in the conclusions. Additional literature was included using the snowball method.

3.3.2 Desk Research

Desk research is utilized to present a comprehensive outline of the regulatory framework concerning local energy communities at both European and national level. Information is sourced from various documents and government websites such as wetten.overheid.nl. In terms of European legislation, key focus is placed on the Clean Energy Package (CEP), particularly the Directive on common rules for the internal electricity market (EU 2019/944) and the Renewable Energy Directive (EU 2018/2001). At the national level, significant attention is given to the proposed bill (July 2022 version) for the New Energy Act, which holds paramount importance for the advancement of local energy communities. Additionally, to gain a more comprehensive understanding of current policies and legislation, the guidelines and objectives outlined in the Dutch Climate Agreement are examined, along with resources like the Participation Guide (in Dutch: participatiewaaier). The consolidation of this information provides a clear overview of the existing formal framework pertinent to the progress of local energy communities, thereby delineating the second layer of Williamson's model.

3.3.3 Interviews

The interview data collected by Brouwer (2023), Broekman (2023) and De Vogel (2023) served as the primary data source for the seven case studies. These data were utilized with the consent of the participants, provided that the researchers adhered to the original consent form regarding the purpose of the study and confidentiality. Moreover, an additional interview was conducted with a board member of the energy cooperative involved in the Suyderlandt and Blaakweg projects. This interview was necessary for gaining a deeper understanding of the governance structures of both projects and for applying the IAD framework to each project individually. The insights from these interviews, along with findings from the literature review and desk research, served as input for the case studies, which were analyzed with the IAD framework.

In addition to the interview regarding the selected projects in South Holland, five more interviews were held with board members from other energy cooperative for informative purposes. These interviews provided valuable knowledge and input for this research beyond the selected projects for the case studies. All interviews were semi-structured of nature, allowing respondents to freely articulate their perspectives and insights, offering the flexibility to elaborate further as necessary (Obinna et al., 2016). The participants signed a consent form (see Appendix I) prior to the interview, and the interviews were transcribed using Microsoft Teams.

4. Institutional Environment

This chapter explores the formal rules for local energy communities. Section 4.1. discusses the European Clean Energy Package and relevant directives. Section 4.2 examines the Dutch Energy Act, outlining proposed regulations for energy communities. Section 4.3 reviews the Dutch Climate Agreement. Section 4.4 introduces the Participation Guide, detailing various participation options. Moreover, Section 4.5 provides an overview of the legal entities available in the Netherlands for establishing local energy communities and Section 4.6 explores the possibility of changing or combining legal structures. Finally, Section 4.7 discusses different funding types for local energy initiatives.

4.1 European Legislation

In the Clean Energy Package (CEP) of 2019, the European Commission recognized that citizens can play an active role in the energy transition and the concept of local energy communities was introduced (Boulanger et al., 2021; Neska & Kowalska-Pyzalska, 2022; Anfinson et al., 2023; Teladia & Van der Windt, 2024). The CEP defines two types of energy communities: Citizen Energy Communities (CECs) in the Directive on Common Rules for the Internal Electricity Market 2019/944 and Renewable Energy Communities (RECs) in the Revised Renewable Energy Directive (RED II) 2018/2001 (Boulanger et al., 2021; Di Nucci et al., 2023). RECs refer to communities comprised of local stakeholders working together to collectively generate, consume, store or sell renewable energy. CECs engage in similar activities but may include non-local participants and provide additional electricity efficiency and charging services using non-renewable sources (Bonfert, 2024).

The legal framework enables local energy communities and their members to legally participate in energy generation, distribution, supply, consumption, storage, aggregation, and sharing activities (Lode et al., 2022). Local energy communities are defined as legal entities based on open and voluntary participation, autonomy, and effective control by shareholders or members located in the proximity of the project (Neska & Kowalska-Pyzalska, 2022; Di Nucci et al., 2023). The primary purpose of these communities is to generate social, environmental and economic benefits for the community (Ghiani et al, 2019).

Despite containing crucial elements for the implementation of local energy communities, the European legal framework remains somewhat ambiguous and subject to interpretation by the Member States (Horstink et al., 2020). National governments have the freedom to determine the specifics of how they support the establishment of energy communities. Furthermore, they need to determine what kind of legal entities energy communities can have. This must clearly distinguish energy communities from other forms of citizen participation in the energy market. Furthermore, Member States need to define what the proximity principle means for renewable energy communities in their country (Bonfert, 2024; Van Hulst, 2023).

4.2 Dutch Regulation: Energy Act

Currently, energy communities are not yet regulated in Dutch law. However, they will be included in the new Energy Act, which will replace the current Electricity Act (1998). In July 2022, a new version of the Energy Act was published and sent to the Council of State (in Dutch: Raad van State). They provided their feedback in February 2023 (Veen et al., 2023). The bill for the new Energy Act was formally submitted to the House of Representatives (in Dutch: Tweede Kamer) on in June 2023. It is still unclear when the new Energy Act will come

into force. The analysis in this thesis primarily relies on the July 2022 version. The legislative proposal defines the energy community as a new entity and does not distinguish the terms CEC and REC as the European directives do (Van Hulst, 2023). Key aspects include that the control over the energy community lies with the members, partners, or shareholders, ensuring an open and voluntary nature, and allowing members and shareholders to exit the energy community. These regulations must be included in the statutes or, in the case of a general partnership, in the founding agreement of the energy community. Additionally, the law provides the possibility for an energy community developing a renewable energy project to ensure in its statutes that its members or shareholders can only be natural individuals, local authorities or small or medium-sized enterprises in the vicinity of the renewable energy project (Veen et al., 2023).

In the legislative proposal energy communities are defined as "legal entities that carry out activities on the energy market and whose main objective is to provide environmental, economic or social benefits for its members, associates or shareholders or to the local area in which it operates, and is not aimed at profit making". This means that an energy community must first and foremost be a legal entity whose establishment is legally defined. Furthermore, the main purpose of energy communities is not to make a profit, as is usually the case for regular commercial project developers, but to offer other types of benefits to the participants in the community or to the environment where the community is active.

4.3 Dutch Climate Agreement

The Dutch Climate Agreement (2019) highlights the importance of local participation and acceptance for the spatial integration of the renewable energy transition and thus for its feasibility. This is translated into the aspiration of 50% local ownership for the development of onshore solar and wind energy projects (Overbeek, 2023). Local ownership plays a crucial role in strengthening the energy transition by ensuring that the benefits of a project remain within the region, thereby benefiting the surrounding community (Participatiecoalitie, 2020).

However, local energy communities typically experience two major barriers. Firstly, there is a lack of knowledge. Secondly, pre-financing costs are a major obstacle for starting initiatives. The Ministry of Economic Affairs and Climate Policy has investigated whether provinces and municipalities can give autonomous energy cooperatives access to a scheme to finance the research and project support needed for a successful permit application. This explicitly does not involve financing the required project capital. When the project reaches financial close, these funds are refunded, creating a revolving fund (Klimaatakkoord, 2019).

The initiator of a renewable energy project undergoes a process to achieve a desirable and feasible form of participation. The so-called Participation Guide (in Dutch: participatiewaaier) describes four types of participation: process participation, financial participation, financial bonds, ownership participation, an environmental fund, or a combination thereof. The competent authority ensures that market parties and the local community engage in discussions on this matter. Agreements with the community are documented in an Environmental Agreement, forming the basis for creating a project plan describing how participation will be optimally structured within the project (Klimaatakkoord, 2019). In areas with potential and ambitions for renewable generation, the goal is for the community and market parties to collaborate equally in the development, construction, and operation of projects for the construction and operation of renewable energy on land. The local ownership

ratio goal of 50% is a general target for 2030, with room for local deviations due to local project-related reasons. This also takes into account the special position of water boards, which are both local developers and decentralized authorities with a sustainability mandate for their own business processes (Klimaatakkoord, 2019).

4.4 Participation Guide (in Dutch: participatiewaaier)

The Dutch Participation Guide (2019) describes four options for participation: co-ownership, financial participation, environmental fund and local residents' scheme. There is no prioritization and it is also possible to combine them, depending on the needs of a specific project. However, stacking options is not the goal, as applying multiple forms of participations does not equal more acceptance. A distinction exists between active and passive financial participation. In passive financial participation, part of the proceeds from a renewable energy project is used to benefit the environment. Conversely, active financial participation involves an entrepreneurial element, making it risk-bearing for the participants.

4.4.1 Co-ownership

Individual citizens or local residents have the opportunity to become co-owners or full owners of onshore wind or solar projects. This can be facilitated through associations or cooperatives, or by collectively establishing wind farms, turbines, or solar projects within the community. This requires co-investment, pre-investment in studies, and taking financial risks. An important prerequisite is therefore to have an active community willing to participate financially and make decisions collaboratively, as well as support from the government and project initiators for shared local ownership. Co-ownership does not only mean financial ownership but also control over the project and the distribution of its benefits (Participatiecoalitie, 2020).

4.4.2 Financial participation

Residents can also participate in a project by assuming financial risks, such as through shares, share certificates, or bonds. Financial participation involves individuals taking on the risk associated with the wind project, typically through investments in shares or bonds. In the case of bonds (subordinated loans), participants do not become co-owners but receive interest on their investment. Bonds entail lower financial risks compared to shared ownership. Another option is participating via shares. This option is suitable when there is sufficient interest within the local community to invest directly and bear financial risks.

4.4.3 Environmental Fund

The third option is an environmental fund, where a portion of the revenue generated is used to support community initiatives in the area. This allows residents who cannot invest themselves to still benefit from the project. Decision-making regarding the allocation of funds is made by the community. To manage the collective fund, an independent board is required, with representation from local residents, ensuring that the fund's resources directly benefit the surrounding neighbourhood. This option can be pursued through discussions between the project initiator and the community, with the aim of enhancing the liveability of the area. The fund can be earmarked for specific purposes such as economic or ecological development, recreation, sustainability, or energy conservation.

In case of wind energy projects, the Code of Conduct Acceptance & Participation Onshore Wind Energy commits NWEA members to some basic principles of involving the surrounding

area for structural participation. The NWEA gives a guideline of €0.40 to €0.50 per produced MW to fill the environmental funds (NWEA, 2020).

4.4.4 Local Residents Scheme

A neighbourhood scheme is designed specifically for residents living in the vicinity of wind turbines. It may include initiatives like subsidizing home insulation, providing discounted green electricity, offering free solar panels, or providing other forms of financial compensation. The decision to implement this option typically arises from discussions between the project initiator and local residents, often as part of negotiations to mitigate any potential disturbances caused by the project. As part of these agreements, direct benefits are often extended to residents living near the turbines.

4.5 Available Legal Entities in the Netherlands

The proposed bill for the New Energy Act includes that energy communities need to be legally established entities. However, the law does not prescribe what type of legal entity (Winters & Van der Veen, 2023). There are various legal entities available in the Netherlands, but in this research the design options are limited to legal structures with legal personality, to avoid personal liability for the debt of the energy community. The available legal structures with legal personality are foundation, association, cooperative, public limited company and private limited company.

4.5.1 Foundation

A foundation is formed with the primary objective of pursuing a specific idealistic goal, devoid of profit-driven motives. Its earnings are exclusively dedicated to realizing its stated objectives. Diverging from other organizational frameworks, a foundation lacks members, although it may attract donors or volunteers. Governance within a foundation rest with its board, typically composed of its founding members, granting them the autonomy to guide the initiative according to their vision (HIER, 2019). A foundation functions as a non-profit entity, relying on various funding sources such as donations, loans, subsidies, and legacies. Its core mission is to advance a social or non-profit cause, even though it might engage in commercial activities. However, any profits generated must be reinvested in furthering the foundation's mission (Netherlands Chamber of Commerce, 2024a).

4.5.2 Association

An association represents an alternative legal entity suitable for the establishment of a local energy community. Operating as entities primarily dedicated to non-profit pursuits, associations often revolve around coordinating social engagements (Netherlands Chamber of Commerce, 2024b). With a membership-based framework, the governance lies in the hands of its members, typically administered through the General Assembly of Members (in Dutch: Algemene Ledenvergadering). While any revenues generated by the association can be utilized to advance its objectives, it is paramount to recognize that profit distribution among members should not be the association's primary aim (HIER, 2019). Unlike companies with shareholders, associations derive their funding from member contributions, including donations and fundraising activities (Netherlands Chamber of Commerce, 2024b).

4.5.3 Cooperative

A cooperative is formally established as a cooperative association through a notarial deed, with its core objective outlined in its articles of association. It aims to address specific material needs of its members through agreements made with them in the conduct or

management of its business on their behalf (Netherlands Chamber of Commerce, 2024c). Recognized for its democratic and transparent organizational structure, it operates for and by its cooperative members. Control lies with the members and is exercised by the General Assembly of Members (in Dutch: Algemene Ledenvergadering), which appoints a board to oversee the cooperative's operations. The board enters into agreements with and for its members, with all members holding voting rights (Netherlands Chamber of Commerce, 2024c).

Members can contribute funds to the cooperative through individual member accounts, with this member capital being non-tradable, unlike shares in a private limited company. Compared to a private limited company, a cooperative typically offers greater flexibility in delineating the rights of its participants (Netherlands Chamber of Commerce, 2024c).

4.5.4 Public Limited Company (in Dutch: naamloze vennootschap or NV)

A public limited company is another distinct legal structure operating independently from its owners. It offers limited liability protection to its shareholders, typically confined to their investment in the company. In order to start a public limited company a starting capital of 45.000 euros is required (Netherlands Chamber of Commerce, 2023). Equity in a public limited company is divided into shares owned by shareholders, who hold ultimate authority. It is by law required to hold a general meeting of shareholders at least once a year. However, daily operations are overseen by the board of directors, who are appointed by the shareholders (Netherlands Chamber of Commerce, 2023).

4.5.5 Private Limited Company (in Dutch: besloten vennootschap or BV)

A private limited company, like a public limited company, offers limited liability protection to its shareholders, shielding their personal assets in case of business debts or legal issues, with their liability limited to their investment in the company (Netherlands Chamber of Commerce, 2024d). The private limited company is structured with its equity capital divided into shares. Unlike a public limited company, it operates as a closed entity due to its non-transferable shares. Control within the private limited company lies with the general meeting of shareholders (HIER, 2019). A private limited company is required to hold a general meeting of shareholders at least once a year. This meeting serves as the platform for making final decisions and approving financial statements (Netherlands Chamber of Commerce, 2024d).

In smaller private limited companies, it is common for the director to also be the sole shareholder, assuming the roles of both director and major shareholder (in Dutch: Directeur en Grootaandeelhouder or DGA). Alternatively, multiple directors may be appointed to distribute responsibilities, although there is no legal requirement regarding the number of directors for private limited companies (Netherlands Chamber of Commerce, 2024d).

4.5.6 Administrative Office Foundation (in Dutch: Stichting Administratiekantoor or STAK)

An Administrative Office Foundation (AOF) serves the specialized function of managing and certifying shares. When shares are certified, the shareholder transfers their shares to the AOF, which then issues depositary receipts of the shares to the former shareholder. Depositary receipts for shares serve to divide the control and profit rights of a share (Chamber of Commerce, n.d.). Following certification, the AOF becomes a shareholder of the underlying private limited company, thereby possessing the entitlement to vote in the general meeting of shareholders. The voting rights associated with the shares are exercised by the board of the AOF.

While depositary receipt holders (former shareholders) no longer hold voting rights, they retain the profit rights to the shares. Dividends are received by the depositary receipt holders, not by the AOF itself or its board. This also applies to any proceeds from the sale or discontinuation of the underlying enterprise.

4.6 Changing or Combining Legal Structures

Organisation and legal forms can evolve over time. A local energy initiative may have no status at the start, then become a foundation or association and then a cooperative. Many initiatives also choose a combination of legal forms, for example a cooperative with a private limited company 'hanging under' it. When financially projects are carried out, the choice is often made to set up a private limited company. This removes the financial risk from the cooperative members (HIER, 2019).

4.7 Different Types of Funding for Local Energy Initiatives

Community energy projects often require diverse financing mechanisms to fund their development and implementation. The diverse range of financing options available for renewable energy projects enables project developers to access the necessary capital to realize their initiatives. The various types of financing for renewable energy projects are described in this section.

4.7.1 Equity capital

Equity capital involves raising funds by selling shares in the project. Shares represent ownership in a company and are typically issued to investors in exchange for capital contributions. The participants earn back their investment by annual payments, but there is no repayment obligation (HIER, 2022a).

Certificates of shares, also known as share certificates, are documents that represent ownership of shares in a company. Similar to shares themselves, certificates of shares represent equity ownership in the company and are not considered debt capital. They serve as evidence of ownership and may be issued to shareholders as proof of their investment in the company. While certificates of shares still represent ownership in the company, they may not confer the same voting rights and privileges as direct share ownership (HIER, 2022a).

4.7.2 Bank Loan

Bank loans are a common source of financing for renewable energy projects, offering capital for upfront expenses like equipment purchases and construction costs. By securing a bank loan, project developers can leverage the financial resources needed to initiate and complete their projects. These loans are usually repaid through future revenue generated from selling the energy that is being generated.

4.7.3 Bonds

Bonds are debt securities issued by organizations to investors, typically offering a fixed interest rate for a specified period. Bondholders lend money to the issuer, who agrees to repay the principal amount at maturity, along with periodic interest payments (HIER, 2022a). Bonds represent a form of debt capital for the issuer, as they involve borrowing money from investors.

4.7.4 Subsidies

Government subsidies play a crucial role in incentivizing renewable energy development by offsetting project costs and reducing financial barriers. Specifically, subsidies such as the

SDE++ subsidy and SCE subsidy provide financial support for the preliminary process of developing renewable energy projects, including feasibility studies, permitting, and environmental assessments (Rijksdienst voor Ondernemend Nederland, 2024a, 2024b). In a number of provinces, there is a subsidy for energy cooperatives or other local energy initiatives. The target group, objective and conditions of the subsidy may differ from province to province (HIER, 2023).

4.7.5 Funds

Almost all provinces have a regional energy or climate fund. An energy fund is used to finance sustainable energy projects. The difference with a subsidy is that the money must also be repaid to the fund. Funds come in various forms. The conditions for financing vary per provincial fund, which affects the possibilities for energy cooperatives to make use of them. The most common forms are loans, guarantees, and participations. These loans have a predetermined interest rate, which is usually lower than the interest rates at the bank. There are also subordinated loans, which means that they are placed behind other loans in case of bankruptcy. Guarantees are a way to attract other financiers. The fund then guarantees, for example, a loan from the bank, in case the energy cooperative cannot repay it itself. This makes it easier for the cooperative to borrow money from the bank. The third option is participation. This involves a share in the project to be realized. Energy funds offer this in almost all cases, often up to a maximum of 50%. This means that the fund participates in the project's risks (De Jong, 2023). Examples of funds that apply in several provinces in the Netherlands are the Development Fund (in Dutch: Ontwikkelfonds) and the Realization Fund (in Dutch: Realisatiefonds) (Energie Samen, n.d.).

5. Governance level

This chapters provides an overview of the comprehensive case study on seven local energy initiatives in the Netherlands. Section 5.1 covers the Kookepan project in Limburg, Section 5.2 discusses the Ospeldijk case, Section 5.3 the Nijmegen-Betuwe project in Gelderland, Section 5.4 covers the Koningspleij project, Section 5.5 focuses on the Avri project, the Suyderlandt project in South Holland will be discussed in Section 5.6 and Section 5.7 will cover the Blaakweg project. Each section is structured in a similar way, first providing a brief summary of the action situation, then discussing the governance structures, followed by a description of the boundary, position, aggregation and payoff rules linked to these structures and finally a reflection based on the evaluative criteria.

5.1 Kookepan in Limburg

5.1.1 Brief description of Action Situation

The action situation began in January 2015 when LEC Leudal Energie initiated discussions with the Municipality of Leudal about the development of a wind farm (BRO, 2018). The municipality tasked a working group from the LEC with scouting potential sites. This endeavor involved engaging various stakeholders, including landowners, residents, and interest groups, through a series information sessions held from May 2016 to November 2017. By September 2017, the Municipal Council formalized the planning cooperation, continuing public involvement efforts and establishing preliminary compensatory measures for local residents. In March 2018, the LEC submitted a permit application for the construction of three turbines in the Kookepan area. Despite significant efforts made by the LEC to address objections, opposition to the wind turbines persisted among certain community members, the Council of State dismissed the appeals in April 2020. Leudal Energie raised 2.2 million euros thorough a fundraising campaign, which was needed to meet the financial requirement of 15% own equity. Ultimately, construction of the wind farm commenced in August 2020, resulting in three turbines with a total installed capacity of 13.5 MW.

5.1.2 Governance Structures

Leudal Energie established the Burger Windpark De Kookepan B.V., which is a private limited company, for the development and construction of the Kookepan wind farm. The private limited company is 100% owned by the local energy cooperative Leudal Energie, as shown in Figure 5.

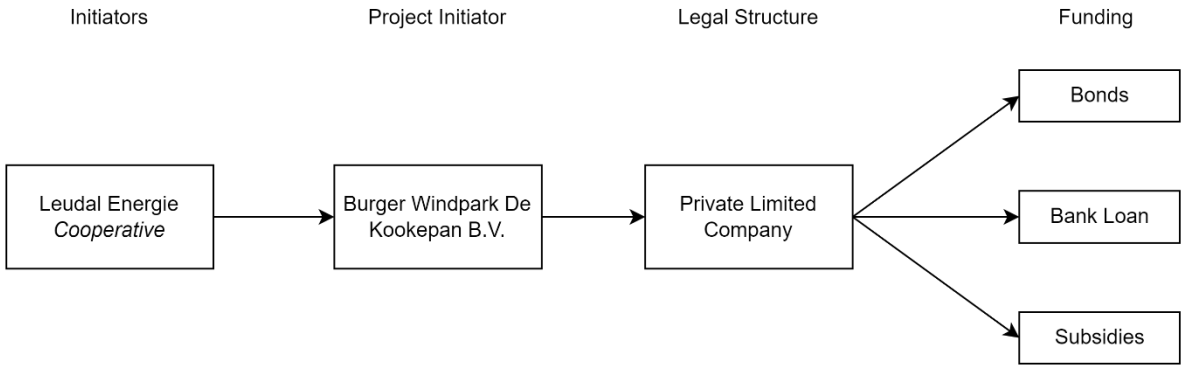

Figure 5. Governance Structure Kookepan Project

5.1.3 Rules-in-Use

Boundary Rules

Throughout the development of Windpark De Kookepan, Leudal Energie established guidelines for project involvement through specific participation criteria. Initially, the Municipality of Leudal was invited to participate, setting the initial parameters for project involvement. The subsequent two to three years were used to refine the guidelines for local ownership and participation, defining who could contribute to and benefit from the wind park. As the project progressed and its feasibility was confirmed, more community members got involved, and compensation arrangements were extended to all residents in the surrounding area. Additionally, a campaign to enlist more LEC members highlighted the importance of these boundary rules, as new members significantly contributed to the wind farm's budget, transitioning from local residents to active project participants.

Position Rules

The division of roles among the stakeholders in the Kookepan project was clearly defined by the position rules. Leudal Energie served as the initiator of the project, establishing Burger Windpark De Kookepan B.V. and creating the initial proposal. It collaborated with the Municipality of Leudal, identifying potential sites and leading fundraising efforts. The Province of Limburg played a crucial regulatory and oversight role, sharing authority with the municipal governments. REScoop Limburg assisted the LEC Leudal Energie with their request. Significant interaction occurred between Leudal Energie and municipal and provincial governments, with the Local Council evaluating and approving the LEC's wind farm application, demonstrating a collaborative relationship with shared authority. Local residents and landowners participated as beneficiaries, investors, and individuals potentially affected by the project.

Aggregation Rules

The aggregation rules were reflected in the collective decision-making process among various stakeholders. Initially, Leudal Energie led the effort by presenting a plan to the Municipality of Leudal, initiating extensive consultations with the municipality and relevant authorities. This process highlighted the importance of comprehensive information sharing and stakeholder engagement to minimize resistance. As collaborative decision-making progressed, other municipalities joined in, collectively identifying locations for sustainable energy development under provincial pressure. Joint policies were formulated by municipalities like Leudal, Nederweert, Weert, and Peel and Maas, with significant input from local energy cooperatives. There was substantial interaction between Leudal Energie and both municipal and provincial governments, with the Local Council evaluating and approving the wind farm construction application. This collaborative dynamic demonstrated shared authority between the LEC and the government. Although LECs received preference in municipal sustainability initiatives, they were required to submit robust plans and independently manage associated risks without municipal support.

Payoff Rules

The wind farm project involved various costs and benefits, distributed among different stakeholders. Financing the project required a substantial investment, partly covered by 150 members of the LEC Leudal Energie, who collectively raised €2.2 million in four months. These investors received annual returns on their investment, with interest rates ranging from

4% to 6% depending on the bond duration. Members benefit from the energy generated by the wind farm, with any surplus sold to commercial entities.

The landowners received annual compensation fees and residents living near the turbines received financial compensation based on their proximity, ranging from 250 euro for those within a 900 to 1000 meter radius and 150 euro for each additional 100 meters. This compensation aimed to distribute benefits among those potentially affected by the project.

Additionally, the project contributes to local community initiatives, through the Kookepan Community Fund, which receives annual contributions of 25.000 to 30.000 euros from Leudal Energie. A separate fund of 200.000 euros 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 enhancement projects.

5.1.4 Evaluative Criteria

Regarding the Kookepan project, 4 views were submitted concerning the turbines' visual, auditory, and environmental impact. Despite these views the Local Council granted a permit by August 2018. Subsequently, two local residents then filed an appeal to the Council of State, which declared their appeals as unfounded in April 2020. The views and appeals significantly delayed the project, with the complete process of (pre-)development of the wind farm lasting from January 2015 until August 2020, resulting in a total duration of 5 years and 8 months.

5.2 Ospeldijk in Limburg

5.2.1 Brief description of Action Situation

The action situation of the Ospeldijk project began in 2015 when the Municipalities of Leudal, Weert, and Nederweert sought potential sites for wind energy generation. This effort led to the establishment of REScoop Limburg, fostering collaboration among regional energy entities and highlighting the favoring of cooperative approaches. Participation from WML and NEWECOOP, initially pursuing separate initiatives, merged in October 2017 under the institutional framework promoting cooperation (HIER, 2022b). Community engagement remained crucial throughout the project's development, despite challenges from varying community reactions (Niens, 2020). The initial permit application was filed on January 31, 2018. The key actors in this scenario included WML and the LECs, who proposed and planned to operate the wind farm, the local community, which was given an opportunity to review and provide feedback on the draft environmental permits, and the Municipality of Nederweert, which processed the feedback and granted the permit. The interplay among these actors, each with distinct interests, eventually resulted in the approval of environmental permits, the dismissal of an appeal by the Council of State, and the commencement of the wind park construction in June 2020.

5.2.2 Governance Structures

NEWECOOP and WML initiated a project plan for the Ospeldijk wind farm. NEWECOOP, a relatively new cooperative, sought guidance from the more experienced LEC Zuidenwind, which provided mentorship and financial support. Together the initiators established the Burgerwindpark Ospeldijk B.V., this private limited company was used to develop the Ospeldijk project, which is presented in Figure 6.

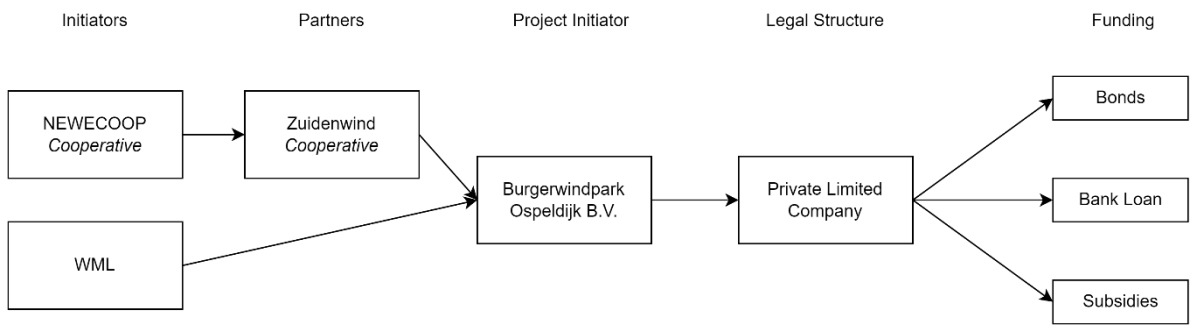

Figure 6. Governance Structure Ospeldijk Project

5.2.3 Rules-in-Use

Boundary Rules

The initial involvement of stakeholders occurred when the Municipalities of Leudal, Nederweert, and Weert collaborated on exploring wind energy initiatives in 2015. Key participants during this early phase included the provincial and municipal governments, local residents, and potential project developers. The scope of stakeholder engagement expanded further when the Local Council sanctioned the development of new wind energy projects in 2016, enabling LECs to contribute to the creation of cooperative wind farms, benefiting the community. Concurrently, six essential guidelines for wind farm development were established, delineating the roles of stakeholders and the parameters of participation. Community engagement activities like discussion meetings, energy cafes, and neighborhood association gatherings facilitated direct involvement from local residents and stakeholders, enabling them to engage in decision-making processes and enhance collective efforts. Project planners invited developers to submit proposals for potential wind farms, resulting in thirteen proposals, indicating an open invitation for participation in the action arena while the local authorities maintained control over conditions and means of participation. From these proposals, the Windpark Ospeldijk project emerged as a primary contender. The boundary of stakeholder involvement remained dynamic and adjusted continually throughout the planning process. To manage the influx of proposals effectively, an acceleration team composed of participation and financing experts was formed in 2017, playing a significant role in refining proposals and decision-making. The initial permit request was submitted on January 31 in 2018, marking the Municipality of Nederweert's exit from the action situation as environmental permits were granted, signaling the conclusion of their primary role in the s approval phase. The relatively swift process, despite the involvement of numerous stakeholders, suggests efficient management of stakeholder entry and exit, likely facilitated by factors such as the structure of project initiators' organization and support from the provincial acceleration team.

Position Rules

The Windpark Ospeldijk case involved a diverse range of stakeholders who played important roles in the planning and development of the project. These stakeholders included the provincial government, Local Councils, energy cooperatives, residents, and regulatory bodies, each contributing unique perspectives and functions to the decision-making process. The provincial government of Limburg played a guiding role by encouraging municipalities to propose renewable energy initiatives aligned with national sustainability objectives. Municipalities like Leudal, Nederweert, and Weert collaborated to advance wind energy

initiatives. NEWECOOP and WML were key players, jointly presenting the wind farm project. NEWECOOP, a fledgling cooperative, sought guidance from the more experienced LEC Zuidenwind, which provided mentorship and operational expertise. Local residents and stakeholders influenced decision-making through participation in community engagement efforts organized by WML and the LECs, offering feedback on permit content and environmental concerns. The Municipality of Nederweert served as a regulatory authority, overseeing permit applications and ensuring compliance with environmental regulations. Additionally, an individual advocating for the protection of the Blauwe Kiekendief species raised ecological concerns through legal channels. The Council of State acted as a legal arbiter, ultimately dismissing the appeal and affirming the project's regulatory approval.

Aggregation Rules

The aggregation rule applied in this case was deeply collaborative, centered on co-creation and coalition building, showcasing an adaptive form of governance. A multitude of key actors participated in the decision-making process, including provincial and municipal governments, LECs, and project developers. Although each party wielded influence over the final decisions, their individual agency was integrated into a broader collective effort. The project's inception stemmed from the provincial government's challenge to generate 95.5 megawatts of sustainable energy sources, prompting municipalities to propose renewable energy ventures in response to the government's support for local initiatives. This initial application of the aggregation rule emphasized collaborative decision-making between different governmental bodies. The establishment of REScoop Limburg, a cooperative umbrella organization, further exemplified this democratic approach to decision-making, aiming to position wind farms in suitable locations with community support and minimal disruption. Guidelines were formulated to govern wind farm development, incorporating cooperative project management, maximizing community benefits, selecting suitable locations, and preventing land speculation, reflecting a shared understanding of collaborative engagement rules. In the case of the Windpark Ospeldijk project, decision-making involved both individual and collaborative efforts. While WML and NEWECOOP initially submitted independent proposals, they later decided to collaborate, illustrating the adaptive and fluid nature of the aggregation rule. Decision-making throughout the project was anchored on co-creation and consensus-building rather than being binding, as demonstrated by the involvement of an acceleration team convened by municipalities to review and improve project plans. Final decisions regarding project approval prioritized cooperative nature over commercial interests, adhering to democratic control principles, notably in financing arrangements where NEWECOOP members also became Zuidenwind members. Community engagement activities such as discussion meetings and energy cafes facilitated feedback gathering, reinforcing the commitment to shared decision-making. The permit application phase, overseen by the Municipality of Nederweert, marked a crucial stage, showcasing aggregation rules despite being seemingly made by a single actor, as it incorporated various expert inputs. The public review period allowed community participation, with received comments influencing decision-making, highlighting the participatory nature of aggregation rules. The granting of environmental permits on July 16, 2018, endorsed by the Municipality of Nederweert, represented a binding decision, subject to appeal, ultimately dismissed by the Council of State on February 27, 2019. The commencement of construction on June 25, 2020, signaled the execution of collective decisions, expedited due to the streamlined effect of aggregation rules

in the absence of significant objections or appeals, contrary to the longer durations seen in other projects.

Payoff Rules

The project's financing was orchestrated through contributions from members of LECs Zuidenwind and NEWECOOP, with Zuidenwind covering 90% of the initial expenses. This distinctive arrangement aimed to uphold democratic control over the wind farm's operations by those members of NEWECOOP who had invested in the venture. Nevertheless, the project encountered challenges, notably in structuring the wind farm's revenues, wherein two-thirds were designated for the local community's benefit, while the remaining third went to the members. Additionally, the cooperative project model afforded local residents the opportunity to participate and invest in the venture, ensuring democratic control regardless of the investment size. To further bolster the community's welfare from the wind farm, an environmental fund was established to finance sustainable initiatives over 15 years, with one euro per kWh being allocated to the fund instead of the standard compensation rate of 50 cents per megawatt-hour. This initiative would result in approximately €45,000 being annually available for such projects (SWECO, 2018). In essence, the application of the pay-off rule to Windpark Ospeldijk revealed various cost and benefit scenarios. Despite the incurred costs, both financial and temporal, the establishment of an environmental fund, opportunities for local resident involvement, and the equitable distribution of the project's earnings underscored the advantages associated with this endeavor. Furthermore, the transparency and fairness ensured through the pay-off rule played a pivotal role in securing the permit application's success without encountering significant delays or obstacles.

5.2.4 Evaluative Criteria

A total of 9 views were submitted based on the draft environmental permit, according to the Municipality of Nederweert (2018). The duration of the development of the Ospeldijk project spanned from April 2016 (project initiation) to the end of June 2020, when the construction of the turbines started. The total duration was thereby 5 years and 2 months, which was faster than anticipated. This was mainly because of the absence of significant appeals. Only one appeal was filed, regarding the impact on the Blauwe Kiekendief bird species, but this appeal was dismissed by the Council of State.

5.3 Nijmegen-Betuwe in Gelderland

5.3.1 Brief description of Action Situation

The action situation unfolded in 1996 with the initiation of plans for wind turbines in Nijmegen, coinciding with the municipality's commitment to providing sustainable energy to Waalsprong area residents. Evelop (later Eneco) emerged as a potential developer in 2006. Despite initial Municipal Council support in 2009, setbacks emerged in April 2012 when the Council of State nullified the zoning plan due to procedural errors in the EIA process, leading to Eneco's withdrawal. In December 2012, Natuur en Milieu Gelderland (NMG) and Izzy Projects proposed a community wind park, leading to an intention agreement in May 2013. This sparked the establishment of the Wiek-II Foundation and the WindpowerNijmegen (WPN) cooperative. An EIA reaffirmed the location's suitability in January 2014. Drafting of the zoning plan followed, with a public review period from March 2014 to May 2014, culminating in municipal council approval in October 2014. The zoning plan's irrevocability was confirmed by the Council of State on May 6, 2015. Concurrently, the environmental permit process commenced, with an application submitted on March 4, 2015, eventually

granted by the municipality on May 28, 2015, and upheld by the Council of State on October 21, 2015. Construction activities commenced in April 2016, marking the conclusion of the action situation.

5.3.2 Governance Structures

In the Nijmegen-Betuwe case the initiators NMG and Izzy Projects established the LEC WindpowerNijmegen (WPN). The Municipality of Nijmegen lacked confidence in granting authorization to develop a wind park to a cooperative without a proven record. The municipality therefore demanded that a separate legal entity was created to develop the project. As a result, the Wiek-II foundation was established. The cooperative WPN got assistance of the professional development foundation Wiek-II, which dealt with day-to-day project development and worked closely with the board of the cooperative. The foundation was led by the director of the Gelderland Nature and Environment Federation (NMG), the director of Izzy projects and the chair of the WPN cooperative (WindpowerNijmegen, 2015). The governance structure is displayed in Figure 7.

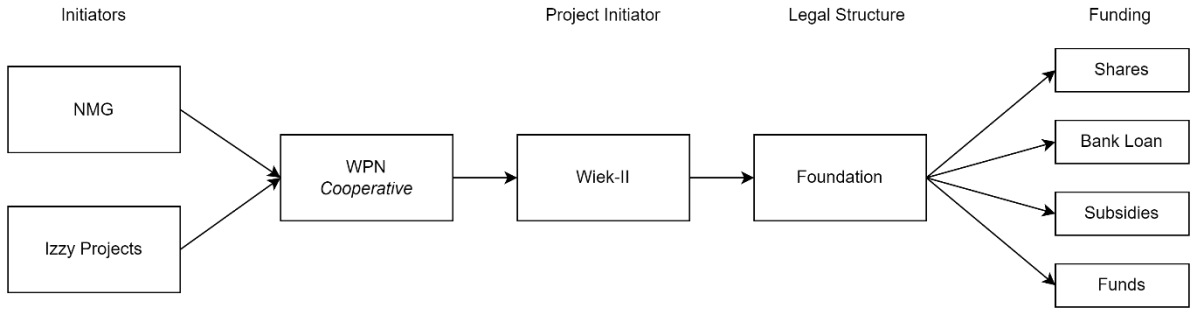

Figure 7. Governance Structure Development Nijmegen-Betuwe Project

The operation of the wind farm is housed in another legal entity, called Windpark Nijmegen-Betuwe B.V., which is a private limited company. A supervisory board was installed to oversee the management of the Windpark Nijmegen-Betuwe BV company. One of the supervisory directors was appointed by WPN, one by IEG and together they appointed a third supervisory director. The day-to-day management of the company and the supervisory board are accountable to the shareholder, in this case the local energy cooperative WPN, which is shown in Figure 8.

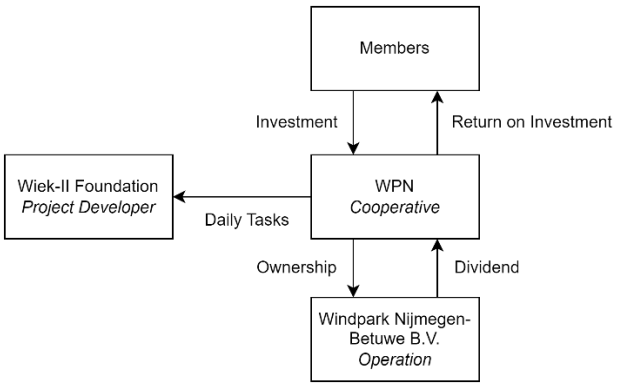

Figure 8. Governance Structure Nijmegen-Betuwe Operational Phase

In case of a bankruptcy of Windpark Nijmegen-Betuwe B.V., legally preferential creditors, such as the bank and the tax authorities, will be repaid first. If any funds are still available from the estate, this will be paid to the LEC.

5.3.3 Rules-in-Use

Boundary Rules

The action situation of the (pre-)development phase delineates its boundary rules as determinants of entry and exit for involved parties. Initially, Eneco initiated the situation, drawing in the Municipalities of Nijmegen and Overbetuwe through its project proposals (RVO, n.d.). Residents entered at the outset, culminating in intervention by the Council of State. Upon the nullification of the zoning plan by the Council of State, Eneco exited the situation (RVO, n.d.). Subsequently, NMG and Izzy Projects entered as new initiators, having previously engaged with Eneco but were preempted by its withdrawal following the Council of State's ruling. Following this, the establishment of Wiek-II and WindpowerNijmegen marked their entry into the situation, prompted by municipal requirements (RVO, n.d.). Upon initiation of the zoning plan procedure, the Municipality of Nijmegen and residents re-entered, allowing for objections and appeals (Windpark Nijmegen-Betuwe, n.d.-a). Eventually, efforts to involve the Province of Gelderland further were rebuffed. Wiek-II (with NMG and Izzy Projects), the LEC WPN, and the municipality of Nijmegen entered the action situation through environmental permit applications. Residents and stakeholders joined when afforded the opportunity to submit objections and appeals regarding permits and zoning (Windpark Nijmegen-Betuwe, n.d.-b). The Council of State adjudicated on these matters, while the Innovatie- en Energiefonds Gelderland (IEG) entered to aid project financing and eventually became a minority co-owner.

Position Rules

The action situation delineates distinct position rules among various stakeholders with differing power dynamics. Eneco served as the primary initiator, wielding influence in determining the project's nature (RVO, n.d.). Subsequently, the competent authorities, represented by the Municipalities of Nijmegen and Overbetuwe, held sway over political decisions within the context of this situation (RVO, n.d.). Residents, possessing the power to voice objections and appeals, played a pivotal role, with the Council of State ultimately wielding authority to nullify Eneco's plans (RVO, n.d.). NMG and Izzy Projects emerged as secondary initiators, exercising their power to shape the project's direction (Windpark Nijmegen-Betuwe, n.d.-a). Following this, the Municipality of Nijmegen regained authority over political decisions (RVO, n.d.). Notably, the municipality held the foremost authority in making political decisions concerning the wind park, while Wiek-II and the LEC WPN possessed decision-making positions regarding the park's specific layout. Within the cooperative, working groups enabled members to contribute to pertinent issues, with general meetings facilitating decisions on park-related matters. Although residents had the option to join the cooperative, they opted against it, yet retained the ability to submit objections and appeals, which they exercised (Windpark Nijmegen-Betuwe, n.d.-b). Finally, the Council of State wielded authority in rendering the zoning plan and environmental permit irrevocable (Windpark Nijmegen-Betuwe, n.d.-b).

Aggregation Rules

The action situation illustrates its aggregation rules as the collaborative efforts guiding decision-making throughout the phase. Initially, collaboration occurred between Eneco and

the Municipalities of Nijmegen and Overbetuwe when they agreed to cooperate on Eneco's plans. Later, NMG and Izzy Projects collaborated to initiate the community wind park, leveraging their prior interactions and shared goals. NMG had previously collaborated with residents near the wind park on other sustainability initiatives, fostering a rapport with local residents. Additionally, the initiators (NMG and Izzy Projects) had connections within the Municipality of Nijmegen, facilitating project approval. Within the development foundation Wiek-II, collaboration persisted between NMG and Izzy Projects, extending to cooperation with the energy cooperative WPN during wind park development. Residents from Nijmegen and neighboring areas collaborated within the cooperative, participating in decision-making processes. Moreover, Wiek-II and the WPN cooperative collaborated closely with the Municipality of Nijmegen to address all necessary matters for wind park realization, including permits.

Payoff Rules

Eneco faced significant costs as the project initiator, particularly in the event of losing the permit application. Eneco did not want to risk losing the money invested in the procedure again, prompting their decision to halt the project after the Council of State ruling. Subsequently, the new project initiators, including NMG, Izzy Projects, and LEC WPN, assumed the costs of the pre-project phase, relying on various financing methods due to insufficient equity.. NMG and Izzy Projects did invest some of their own money, but they also relied on subsidies. Political support for the wind park was strong; the entire voted in favor, and the municipality deferred payment until financial close, effectively providing a subsidy. The municipality also covered the costs of the environmental impact assessment. These costs were reimbursed to the municipality when the wind park was actually developed, but that is beyond the scope of this action situation.

While the potential negative effects were uncertain, residents invested time in reviewing the wind park plan. Ultimately, the permit application advanced the initiators' goal of realizing the wind park. Additionally, Wiek-II and the LEC WPN covered part of the investment costs, with significant contributions from shareholders and financial support from other parties, including subsidies from the municipality. In total, the cooperative raised 2 million euros from 1013 shareholders within the cooperative. The province did not directly provide subsidies, but the initiators received financial assistance from Oost NL (now Innovatie- en Energiefonds Gelderland or IEG). This amounted to four hundred thousand euros. Oost NL is a development agency of Gelderland and Overijssel, and ultimately, IEG also became a 5 percent owner of the wind park (RVO, n.d.).

Initially, the revenues were allocated to repay the bank loan. The cooperative decided that the proceeds would then go to a community fund at one euro per MWh. The remaining funds would then be distributed to the cooperative's shareholders as returns. If this exceeded a 7 percent return, half of the additional returns would go to a sustainable energy fund, and the other half to the shareholders. There were objections to the decision to allocate one euro per MWh to the community fund, as the Wind Energy Code of Conduct of NWEA specifies that 40 to 50 cents per MWh should go to the community fund. Ultimately, the shareholders were also not paid out twice, but this falls outside of this action situation. The advantage of the community fund is that it has led to several worthwhile initiatives. Additionally, the cooperative set aside additional funds for residents of Reeth, which generated considerable goodwill, and some members of the Reeth Residents' Association put the money into a

neighborhood fund to establish a solar park. However, this falls outside of this action situation. Furthermore, the interviewee from the Municipality of Nijmegen found it somewhat perverse that the cooperative promised residents money if they won the procedure.

5.3.4 Evaluative Criteria

For the purpose of this study, the initiation of the project is considered to be December 2012, when NMG and Izzy Projects proposed a community wind park. The (pre-)development phase concluded in April 2016, coinciding with the commencement of construction, resulting in a total duration of 3 years and 5 months. It is noteworthy that Evelop (later Eneco) had already conducted significant preliminary work, providing a head start for the project initiators. Only 4 views were submitted on the draft permit, and one local resident filed an appeal (Windpark Nijmegen-Betuwe, z.d.-c), which was subsequently dismissed by the Council of State (Windpark Nijmegen-Betuwe, z.d.-a.

5.4 Koningspleij in Gelderland

5.4.1 Brief description of Action Situation

The pre-development phase of Windpark Koningspleij began in 2010 when OutSmart initiated discussions with the Municipality of Arnhem on wind energy. Feasibility and environmental studies in 2011 identified the Koningspleij area as suitable location for wind turbines. The establishment of the Rijn en IJssel Energy Cooperative (REIJE) in 2012, followed by Pleij BV as the development company in 2013, laid the foundation for the development phase. Municipal facilitation of wind turbine market initiatives in 2013 prompted REIJE and Pleij BV to propose a cooperative wind park. Following the 2014 municipal elections and coalition agreement, wind consultations in 2014 and ecological assessments led to intensified efforts. REIJE's member participation decisions in December 2016, alongside the initiation of preliminary work, marked progress. Early 2017 saw the submission of an environmental permit application, followed by volunteer meetings and information sessions. Approval by the Municipal Council in July 2017 allowed for the renewal of zoning plans and environmental permit issuance, with continued public inspection and appeals until September 2017. Changes in ownership and permit applications continued in 2018, including a water permit. Key decisions by the Council of State in 2019 and zoning plan improvements in May 2019 marked significant progress. Final review and approval of permits in December 2019 and April 2020 concluded the second action situation. Construction of the wind park commenced in February 2021, signaling the conclusion of the action situation.

5.4.2 Governance Structures

Rijn en IJssel Energie Coöperatie (REIJE) is a local energy cooperative which was founded in 2012. One of their projects was the development of the Koningspleij wind farm. For this purpose, the independent project company Pleij BV was established, which acquired the land rights and developed the project together with REIJE. REIJE entered into cooperation agreements with Pleij BV, including the right to acquire two-thirds of the wind farm's shares. These agreements have been detailed with the current owner of Pleij BV, the company Prowind Holding BV. Prowind Holding BV acquired all the shares of Pleij BV from the previous owners in 2018 and placed these shares in a holding company Koningspleij BV. The company Pleij BV conducts all operational activities around the Koningspleij wind farm. Pleij BV concludes contracts and provides financing for the project. Once the wind turbines were up and running, Pleij BV got responsible for the financial and technical management. The execution of maintenance has been outsourced to Prowind.

The Koningspleij Wind Farm has several owners. Also, various components (permits, subsidies, financing, ownership) are housed in different companies for operational and financial reasons. The project initiators have built four turbines in the Koningspleij project. One of the turbines in the wind farm is owned by Pure Energie (formerly Raedthuys), and the other three are owned by the Pleij BV Furthermore, they established a holding company named Koningspleij BV, where REIJE has two-thirds of the shares. Koningspleij BV is the 100% owner of the project development company Pleij B.V (Rijn en IJssel Energie Coöperatie, 2020). REIJE has no direct relationship with Pure Energie, the third initiator. However, there is a partnership within the wind farm through Pleij BV under the name VOF Windpark Koningspleij. This structure was necessary in the development phase to jointly develop a wind farm. Ownership of the wind turbines lies with each partner individually. The VOF includes agreements with the Municipality of Arnhem and Liander and several permits. Ordinary decisions are taken by majority vote, with REIJE having two-thirds of the votes. Major decisions require unanimity, or shareholder approval through the General Assembly.

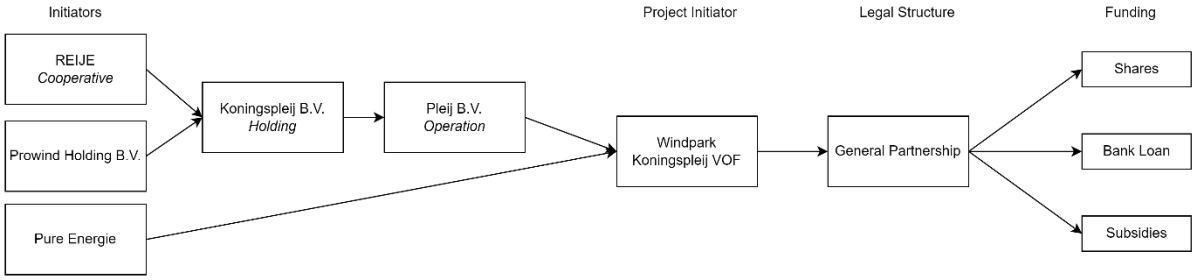

Figure 9. Governance Structures Koningspleij Project

5.4.3 Rules-in-Use

Boundary Rules

During the (pre-)development phase of the project diverse actors allowed themselves or other parties to enter or exit the action arena. Initially, OutSmart introduced the concept of the wind park to the Municipality of Arnhem, establishing its presence in the situation. Subsequently, the establishment of the Rijn en IJssel Energy Cooperative and Pleij BV introduced new entities (De Keijzer, 2016). Meanwhile, the Kleefse Waard Industrial Park (IPKW) approached Pure Energie, marking their entry as the third initiator. Residents were inherently involved due to the project's impact on their surroundings, with efforts made by Pure Energie and the Municipality of Arnhem to engage them actively. Information dissemination through sessions further engaged stakeholders (Windpark Koningspleij, 2017). When Pleij BV sold its shares to Prowind, Prowind entered and OutSmart exited the situation (Rijn en IJssel Energiecoöpratie, 2019). The involvement of the Council of State arose for ruling on opinions and appeals. Upon the finalization of decisions, both the Council of State and the municipality withdrew, while the initiators geared up for construction. Residents remained engaged throughout, some submitted their opinions and filed appeals (Windpark Koningspleij, 2017i).

Position Rules

The position rules delineate the power dynamics through the roles and authority of various stakeholders involved in the Koningspleij project. The three initiators, OutSmart, Pure Energie, and the Rijn en IJssel Energy Cooperative, wielded significant power in shaping the project proposal. The Kleefse Waard Industrial Park (IPK) acted solely as the landowner, without substantial decision-making authority. Competent authorities, such as the Municipality of Arnhem and the Council of State, held considerable power due to their ability

to make political decisions and rulings on appeals (Windpark Koningspleij, 2017i). With the transfer of authority from the Province of Gelderland to the Municipality of Arnhem, the latter gained power to grant permits, among other responsibilities. The initiators further solidified their influence when permits and zoning plans were deemed irrevocable, enabling them to proceed with construction preparations. Conversely, residents primarily exerted their power through the submission of opinions and appeals, without direct decision-making authority (Windpark Koningspleij, 2017i).

Aggregation Rules

Pure Energie engaged in a collaboration with IPKW following their outreach. Seamless cooperation between initiators and the landowner (IPKW) proved crucial, given the substantial investment at stake. Moreover, Pure Energie entered a partnership with fellow initiator Pleij BV, who, in turn, collaborated with the energy cooperative REIJE, forming a collective alliance. Together, Pure Energie, Pleij BV, and REIJE opted to pursue a permit application by the phase's conclusion. Given their shared background in the wind energy sector, the initiators' familiarity facilitated fluid information exchange and alignment of goals. Subsequently, the aggregation dynamics shifted with Prowind replacing Pleij BV, forging a new collaboration alongside Pure Energie and REIJE. This intensified partnership demanded uniformity in wind turbine specifications and dimensions. Additionally, the initiators collaborated closely with the municipality to navigate permit-related procedures and other necessary arrangements for park realization. While residents held advisory roles within the environmental council and sounding board group, they maintained a consultative rather than collaborative relationship with the initiators, offering input and guidance.

Payoff Rules

During the (pre-)development phase, initiators shouldered the costs associated with initiating and planning the wind park. Pure Energie assumed responsibility for one wind turbine, while Pleij BV and REIJE undertook the other three. As the approval of the wind park was uncertain at this stage, no costs were incurred due to potential adverse effects. Residents might have invested time familiarizing themselves with the wind park plan, representing a potential cost. However, the permit application yielded benefits for initiators, bringing them closer to realizing the Koningspleij wind park. They bore investment costs, with Pure Energie, Prowind, and REIJE responsible for respective turbines and subsequently receiving proceeds. Residents could still benefit from the wind park through participation with a membership certificate (Windpark Koningspleij, 2017d). REIJE needed €2.6 million in equity to finance the purchase of shares in Koningspleij BV. To raise this amount, REIJE issued project participations for the acquisition amount with a possible additional margin for unforeseen project costs, with a total maximum value of €2.86 million, the target capital, offering participants a return on their investment of 6.5%. In the agreements made by REIJE at the start of activities to develop a wind park in Arnhem with Pleij BV, it was stipulated that REIJE had the right to purchase 2/3 of Pleij BV's shares upon realization. Koningspleij BV started with equity of €4 million, which is the value of the acquisition of shares from the development company Pleij BV. Koningspleij took out a bank loan worth €18.65 million to finance the construction of the wind park. This brought the total balance sheet at the start of the operational phase at the end of 2021 to €22.7 million, with 17.6% financed by equity. Ultimately, the province and municipality also benefited as the wind park aligned with their sustainable objectives.

5.4.4 Evaluative Criteria

The entire (pre-)development process spanned from 2010 (first initiation) to the end of February 2021 (start of construction), thus the project duration was approximately 11 years. Resistance of the local residents has been expressed in a total of 154 views submitted in response to the zoning plan (De Geer & Reesink, 2017). Eventually, 5 appeals were submitted to the Council of State.

5.5 Avri in Gelderland

5.5.1 Brief description of Action Situation

The action situation for Windpark Avri was initiated in March 2015 with the execution of a development agreement between government authorities and a consortium of developers comprising Prodeon, Yard Energy, Winvast, Raedthuys, and Betuwewind. This pivotal agreement marked the outset of the wind farm's development journey, setting the stage for subsequent actions. Over the ensuing months, an extensive community engagement process was launched, involving informative sessions and dialogues to address various concerns and considerations surrounding the project's advancement. Notably, on November 7, 2015, the municipalities of Geldermalsen and Neerijnen made a significant decision to progress with amending the zoning plan and securing a building permit for Windparks Avri and Deil, influenced by positive feedback from local residents and stakeholders. Transitioning into its second phase on October 26, 2016, the Local Council of Geldermalsen authorized coordinated management of the zoning plan and environmental permit for Windpark Avri. This phase marked the inception of endeavors to tackle concerns raised by the public, encompassing health-related issues, aesthetic considerations, and procedural matters. Despite encountering challenges and opposition from groups like "Tegenwind," Betuwewind showcased a dedication to resolving issues through constructive dialogue and advocacy. The culmination of the action situation came with the irrevocable validation of the permit by the Council of State, affirming the project's legality. Subsequently, Betuwewind's complete acquisition of the remaining stake in the wind park and the onset of construction represented significant milestones, underscoring the advancements achieved during this phase of the project. Following a period of negotiations, consultations, and meticulous planning, the commencement of construction in July 2019 denoted the conclusion of the (pre-)development phase and therefore the action situation.

5.5.2 Governance Structures

The project developers were LEC Betuwewind, Winvast and Yard Energy. The LEC initially owned a 25% in the Burgerwind Molenblok B.V. (presented in Figure 10) but acquired the shares from Winvast and Yard Energy in June 2018. Thereby, the LEC became 100% owner of the Avri wind park.

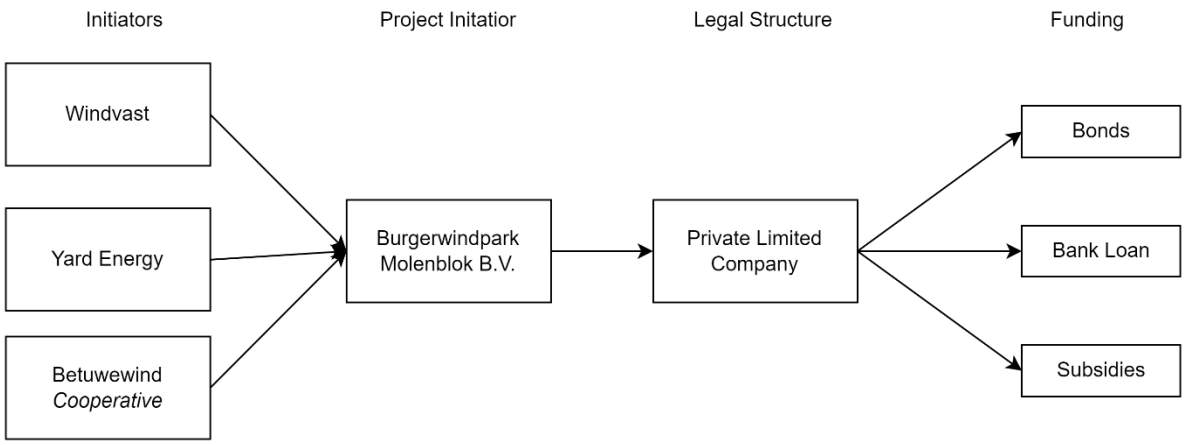

Figure 10. Governance Structure Development Avri Project

5.5.3 Rules-in-Use

Boundary Rules

The implementation of the wind vision in 2013 laid the groundwork for involving various stakeholders, from developers to local municipalities, shaping boundary rules by developers securing land positions in Econo-Brundel and Avri, leading to concurrent wind farm development despite challenges. Discussions on fund allocation among developers, the municipality, and the province defined participant flux and interests, evolving with the merger of municipalities and the province's co-leadership due to the project's impact, showcasing flexible boundary rules. The LECs, initially Geldermalsen and later Betuwewind, exemplified this adaptability, starting with participation and support and eventually co-owning half of the turbines, illustrating how boundary rules evolved with the project's dynamics, influencing participation and exit conditions for various actors. In the initial phase, key participants included the Municipal Council of Geldermalsen, developers (Betuwewind, Winvast, and Yard Energy), and the broader public, focusing on the permit application for three turbines. Entry conditions were inclusive, allowing public engagement, resulting in 19 public views addressing procedural, health, and visual concerns. Despite initially owning a 25% stake, Betuwewind actively engaged in decision-making, addressing concerns and enhancing the wind park's conditions. Their role expanded significantly upon acquiring the remaining stake from development partners, assuming full ownership of the project, marking a notable shift in boundary rules. Procedures for exiting the decision-making process were outlined, evident when opposition groups like 'Tegenwind' escalated concerns to the Council of State. Despite objections, the Council rendered the permit irreversible, signifying the departure of dissenting stakeholders from the formal decision-making process.

Position Rules

In the (pre-)development phase of Windpark Avri, multiple project developers strategically acquired land positions and initiated discussions with the municipality. The catalyst for this park development was the Province of Gelderland's push for the Municipality of Geldermalsen to explore wind energy opportunities. The strategic positioning of these developers played a crucial role in prompting the formulation of a local wind vision policy, fostering broader regional acceptance of renewable energy. Specifically, the Avri area was earmarked for development primarily due to the interest expressed by these developers,

highlighting how land position distribution influenced wind energy spatial planning. Additionally, the roles played by local authorities, such as the Municipality of Geldermalsen, alongside the Province of Gelderland, were pivotal in steering this project from inception to realization. The municipality granted wind farm permits, while in cases involving projects with significant impacts, provincial leadership took charge. This oversight by provincial authorities was crucial in coordinating diverse stakeholders and streamlining the development process. The appointment of a process supervisor by the province played a key role in ensuring all stakeholders felt heard and satisfied with the collaborative efforts. The involvement of the LEC, initially known as Geldermalsen in Neerijnen and later renamed Betuwewind, was also notable. Initially holding a 25% stake in the wind farm's development, Betuwewind was instrumental in both planning and execution. This role significantly expanded when Betuwewind acquired the remaining stake from development partners Winvast and Yard Energy, resulting in sole ownership of the project. This entity was entrusted with facilitating participation and garnering support for the project, strategically aligning itself with local residents to foster participation and collaboration. Public participation was vital in the decision-making process, allowing the general public to express concerns and objections through formal channels, thus shaping the project's trajectory. The LEC's proactive communication and advocacy efforts underscored the significance of public input. Another critical stakeholder was the Council of State, whose involvement became prominent amidst project opposition. Discussions and objections were escalated to this level, with the Council holding the authority to declare the wind farm permit irrevocable, thus validating the project's legal standing.

Aggregation Rules

The project's decision-making process involved key stakeholders, including project developers, local municipalities, the provincial government, and a citizen wind corporation, operating within a shared decision-making model that prioritized inclusivity and collaboration over majority rule. A designated process supervisor appointed by the province oversaw proceedings, ensuring stakeholder satisfaction and preventing dominance by any single entity. This cooperative approach was evident in agreements allowing pre-financing of the project and the LEC's substantial 25% ownership stake, despite lacking land positions, indicating decision-making based on collaboration rather than land control alone. External factors like political pressure and public demand for wind energy also influenced decisions, as seen in the province's encouragement prompting municipalities to explore wind energy potential. The Local Council of Geldermalsen coordinated the development of Windpark Avri, reflecting collective decision-making, with involvement from developers, governmental bodies, and the wider community. Stakeholders' proportional influence over project outcomes fostered shared decision-making, while extensive discussions with opposing groups like "Tegenwind" showcased the incorporation of diverse perspectives into final decisions. The decision-making process involved negotiation and conflict resolution rather than relying solely on majority-based decisions. The three objections submitted to the Council of State were addressed, leading to the permit being deemed irrevocable, demonstrating the binding nature of decisions within this framework.

Payoff Rules

The (pre-)development phase of Windpark Avri encountered unique challenges related to project expenses, particularly concerning technical requirements for foundational work on an old landfill site, impacting the timeline and costs. The payoff rules aimed for equitable

distribution of benefits and costs, with discussions extending to all landowners for inclusive decision-making. The province's assumption of project leadership and cost coverage further promoted fairness. The involvement of Betuwewind ensured shared benefits, with half of the turbines owned by the LEC. The establishment of wind farms brought multiple benefits, offsetting costs, satisfying stakeholders, and ensuring smooth execution. Membership in the LEC allowed individuals to invest up to €20,000 with returns of 4 to 10% over 15 years, fostering a sense of ownership and participation. Additionally, the wind farms aimed to provide locally sourced renewable energy, potentially meeting 60% of the municipality's electricity consumption and aligning with regional sustainability goals. Profits were reinvested in future sustainable projects, empowering Betuwewind members to propose and vote on initiatives during general meetings. Transparency in negotiations was crucial, minimizing disputes and leading to agreeable outcomes. Options to address negative impacts were available throughout, with public consultations identifying and mitigating nuisances. Regular updates to councils and public engagement ensured project acceptability. The smooth project progression, minimal obstacles, and low costs reflect successful community engagement and professional processes. The project spanned 26 months, with Betuwewind contributing over €4.6 million, addressing objections and demonstrating commitment to sustainable energy. Windpark Avri features three turbines generating 3.6 MW each, contributing to cleaner energy. The cooperative structure ensured equitable distribution of benefits, initially with Betuwewind holding a 25% stake. Following Winvast and Yard Energy's exit, Betuwewind expanded its ownership to 100%, enhancing benefits for its members. Proactive communication strategies were employed to address local objections, fostering a balanced distribution of costs and benefits. Efforts extended beyond mitigating bird mortality to enhance conditions for avian species, demonstrating a commitment to address environmental concerns.

5.5.4 Evaluative Criteria

The entire (pre-)development process spanned from March 2015 (first initiation) to the end of July 2019 (start of construction). Thereby amounted the total duration to 5 years and 5 months. Furthermore, a total of 22 views were submitted and a total of 3 appeals were filed by the Council of State (Gemeente Geldermalsen, 2017)

5.6 Suyderlandt in South Holland

5.6.1 Brief description of Action Situation

The action situation for Windpark Suyderlandt commenced in 2006 with a land agreement between Deltawind and a local landowner, marking the outset of the project's development journey. This pivotal agreement established a 50:50 partnership, with the landowner contributing the land and Deltawind undertaking the role of developer. However, initial progress was hampered by the reluctance of the local municipality to further wind energy development until 2013, citing previous cooperation and a lack of willingness to accommodate additional projects. The merger of four municipalities in 2013 into the Municipality of Goeree-Overflakkee brought about a renewed focus on renewable energy targets. With the provincial mandate for significant wind energy installation, the municipality embarked on its own environmental assessment process to determine suitable locations for wind turbines. This process culminated in the identification of concentration areas, including the site between Oude-Tonge and Nieuwe-Tonge, where Windpark Suyderlandt would later be established.

The formal development process of Windpark Suyderlandt was initiated with the establishment of the 'Partial revision regional structure vision Goeree-Overflakkee on Wind Energy' on June 19, 2015, which designated specific areas for wind energy projects, including Battenoord. Despite facing opposition reflected in over 2,000 petitions primarily concerning the proliferation of wind turbines, the project advanced. The agreement between Deltawind and Peijnenburg BV, as well as strategic partnerships with local stakeholders, facilitated the development of Windpark Suyderlandt. Following a period of public consultation in 2017, the project received official approval with the ratification of the zoning plan and the granting of the environmental permit. Legal challenges ensued, with appeals lodged by stakeholders, yet on April 3, 2019, all appeals were dismissed by the Council of State, paving the way for construction. The subsequent acquisition of partial permits encountered minimal resistance, leading to the commencement of construction activities in March 2020.

5.6.2 Governance Structures

The initiators Deltawind and Peijnenburg B.V. both own 50% of the shares of Windpark Suyderlandt B.V., the private limited company responsible for the development of the Suyderlandt wind farm (see Figure 11).

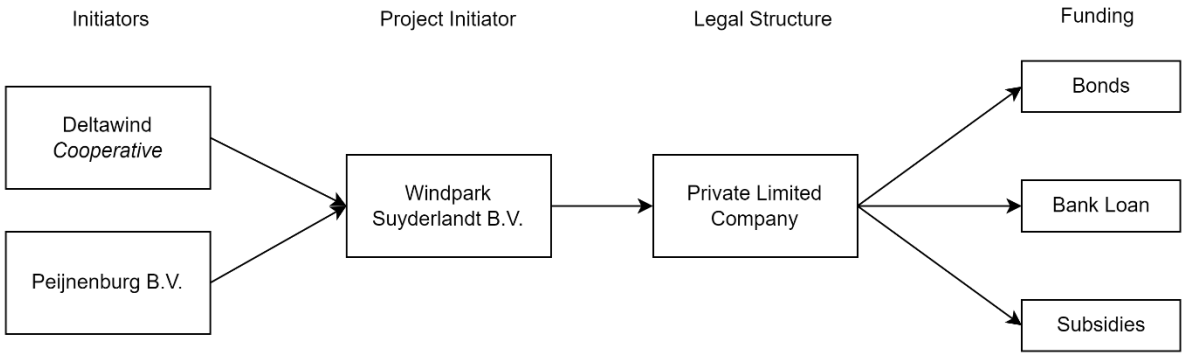

Figure 11. Governance Structure Suyderlandt Project

5.6.3 Rules-in-Use

Boundary Rules

Initially, as the project initiators, Peijnenburg B.V. and Deltawind held the role of project initiators, being the primary parties involved. However, their involvement diminishes as Lighthouse Projects take over responsibilities for development, contracting, and construction, marking the end of their central role. The province initially contributed by identifying potential wind locations, with the municipality also helping at this stage and later in the environmental permit and zoning plan processes. While the province exited the action situation early, the municipality remains engaged in the ongoing phase. Residents became involved due to anticipated inconveniences arising from construction and operational impacts, particularly concerning shadow flicker, noise, and visual pollution. They have the opportunity to appeal wind turbine construction post-permit issuance. Stichting Mallemolens shares the residents' objective of preventing wind turbine construction, maintaining involvement throughout the entire action situation. The court and the Council of State intervened during the appeal process concerning the environmental permit and zoning plan but exited the action situation after their rulings.

Position Rules

The Windpark Suyderlandt project involved a multitude of stakeholders, each fulfilling crucial roles in its conceptualization and realization. These actors included the provincial and municipal authorities, Peijnenburg and Deltawind, each contributing unique insights and efforts to the decision-making process. Peijnenburg aims for green energy for cost-saving/profit and greening of production, while Deltawind aims to achieve the goals of its members. The Province of South Holland set the regulatory framework, encouraging municipalities to pursue renewable energy projects aligned with national objectives. Municipalities like Goeree-Overflakkee navigated this framework, identifying suitable sites for wind energy projects like Windpark Suyderlandt. Deltawind and Peijnenburg BV played instrumental roles in project initiation and execution, with Peijnenburg providing land and having a stake in the ownership. Local residents participated actively, offering feedback and concerns through community engagement initiatives facilitated by Deltawind. The local residents and Stichting Mallemolens can be seen as opponents within this action situation. They are the actors who have submitted opinions and appealed against the various required documents Regulatory oversight was provided by the Municipality of Goeree-Overflakkee, which processed permit applications and monitored environmental compliance. Legal matters were addressed through interventions such as appeals to the Council of State, which ultimately upheld project approval, affirming its regulatory legitimacy. Through collaborative efforts and regulatory adherence, Windpark Suyderlandt exemplified the synergy among diverse stakeholders in advancing renewable energy initiatives.

Aggregation Rules

The aggregation rules encompassed clearly defined boundaries established among project stakeholders, including Deltawind, Peijnenburg, and local residents, to delineate roles, responsibilities, and decision-making authority within each project's scope. Collective choice arrangements were enacted through joint decision-making processes, forming partnerships, and participating in collaborative planning efforts to align with community interests and project objectives. Firstly, the partnership between Peijnenburg B.V. and Deltawind signifies a notable collaboration in the renewable energy sector, with 50% ownership held by an energy cooperative, reflecting collective ownership and shared decision-making. This cooperative arrangement demonstrates a commitment to collective choice and mutual benefit among stakeholders. Additionally, the development process of Windpark Suyderlandt was characterized by collaboration and negotiation among diverse stakeholders, including local landowners, municipalities, and provincial authorities, emphasizing the importance of collective decision-making and cooperation in achieving regional renewable energy goals. The involvement of multiple stakeholders in the decision-making process, from the establishment of land agreements to the acquisition of permits and resolution of legal challenges, underscores the importance of inclusive governance structures and collaborative approaches to resource management. Furthermore, the resolution of conflicts and legal challenges through transparent and participatory processes reflects the principles of monitoring, enforcement, and conflict resolution outlined by Ostrom. Overall, the aggregation rules derived from the text highlight the importance of collective action, collaboration, and adaptive governance in the development and management of common pool resources like wind energy projects.

Payoff Rules

The payoff rules underscore the equitable distribution of benefits and costs within the Windpark Suyderlandt project. Co-owned by Peijnenburg B.V. and Deltawind, with 50% ownership by an energy cooperative, the project reflects a balanced sharing of economic benefits among stakeholders. The 2006 agreement between Deltawind and a local landowner further solidified this fairness, establishing a 50:50 partnership between the developer and the landowner. Financial sustainability was ensured through a combination of member investments, loans, and subsidies, with Deltawind relying on bank loans to fund Suyderlandt, totaling around 12 million euros. Their track record, spanning from their founding in 1991 with a 50% equity commitment to more recent projects with 10-15% equity contributions, highlights their commitment to member support. In 2018, Deltawind decided to convert these member loans into bonds issued by the cooperative. So now their members hold bonds in the cooperative. Additionally, they also hold bonds in certain projects. However, this is not the case in Suyderlandt and Blaakweg. This is because in these two projects, the co-initiators/investors are covering 50% of the financing and did not require this form of funding, making it financially and organizationally too complex to arrange. However, they did offer project bonds to their members in other projects, where they were responsible for more than 50% of the investments. Additionally, the project contributes to an environmental fund, demonstrating a commitment to equitable benefit sharing and community support. The establishment of the wind fund as a separate entity with its own board emphasizes transparency and accountability in distributing benefits to the community. Overall, these payoff rules prioritize equitable distribution, partnership collaboration, and minimizing resistance among stakeholders.

5.6.4 Evaluative Criteria

The first initiation of the project took place in 2006 and the construction of the turbines only began in March 2020. Therefore, the (pre-)development process in total lasted approximately 19 years, mainly because of opposition from local authorities and residents. In total 353 views have been submitted to the zoning plan for the Battenoort wind site, which includes both the Suyderlandt and the Blaakweg wind projects. Furthermore, 7 appeals were lodged against both wind parks by Stichting Mallemolens and local residents. On April 3 of 2019, the Council of State declared all appeals as unfounded.

5.7 Blaakweg in South Holland

5.7.1 Brief description of Action Situation

The action situation surrounding Windpark Blaakweg initiated in 2012 when Deltawind, an esteemed cooperative in wind energy, partnered with Eneco to streamline local wind energy endeavors, establishing a 50/50 agreement to share locations. Despite numerous proposed initiatives on the island, only a fraction materialized. The merger of four municipalities into the Municipality of Goeree-Overflakkee in 2013 coincided with a provincial mandate to install 300 MW of wind turbines, prompting the municipality to conduct its own MER, resulting in the identification of suitable areas, including one between Oude-Tonge and Nieuwe-Tonge. Collaborative efforts with Eneco proved beneficial, with Eneco handling technical aspects and Deltawind focusing on finances, supported by bank loans and member contributions to an environmental fund. Community engagements highlighted concerns regarding the proliferation of wind turbines, particularly in light of Windpark Krammer's construction, leading to protests and the cancellation of some turbines. Despite opposition

evidenced by over 2,000 petitions, the project persevered, receiving approval during a public consultation in 2017 and subsequent legal challenges, ultimately dismissed by the Council of State in April 2019. Following approval, construction commenced in March 2020, aiming to realize three turbines with an installed capacity of 3.6 MW each.

5.7.2 Governance Structures

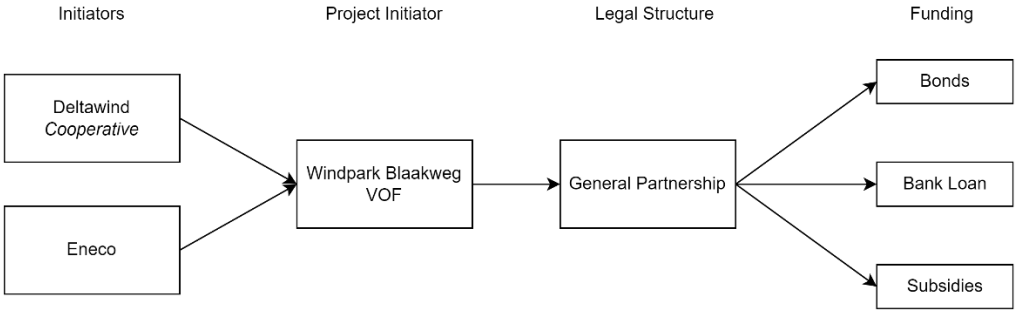

Figure 12. Governance Structure Blaakweg Project

5.7.3 Rules-in-Use

Boundary Rules

Boundary rules within the Windpark Blaakweg project context are delineated by the collaborative agreement between LEC Deltawind and Eneco, establishing a 50/50 arrangement to select and develop wind turbine locations, fostering cooperation and preventing conflicts over site selection. Regulatory oversight is governed by the actions of the Province of South Holland and the Municipality of Goeree-Overflakkee, with the province setting the regulatory framework and the municipality conducting environmental assessments to determine suitable sites for wind turbines, ensuring compliance with regulatory standards and objectives. Community engagement and opposition are evident through the involvement of local residents and groups like Stichting Mallemolens, who actively participate in community engagements and oppose wind turbine construction, expressing concerns and engaging in decision-making processes. Legal interventions by the court and the Council of State establish boundary rules regarding legal proceedings and appeals, reviewing appeals and rulings concerning environmental permits and zoning plans to ensure adherence to legal standards and procedural fairness. The boundary rule governing project progression and construction involves the acquisition of permits and the initiation of construction activities, overseen by regulatory bodies and stakeholders, ensuring adherence to established regulatory processes and timelines while facilitating the project's progression.

Position Rules

The Windpark Blaakweg project, similar to the Windpark Suyderlandt initiative, engaged various stakeholders in pivotal roles throughout its inception and execution. These key actors included provincial and municipal authorities, as well as Deltawind and Eneco, each contributing distinct insights and efforts to drive the project forward. Eneco, a company active in renewable energy projects, partnered with LEC Deltawind, a cooperative with extensive experience in wind energy, to streamline local wind energy initiatives. Together, they agreed on a collaborative approach, sharing locations in a 50/50 arrangement to maximize efficiency. Provincial and municipal authorities, particularly the Municipality of Goeree-Overflakkee, played regulatory roles, guiding the project within the broader framework of renewable

energy objectives. Deltawind and Eneco assumed crucial responsibilities, with Eneco focusing on technical aspects and Deltawind handling financial matters, including funding through bank loans and member support initiatives. Community engagement initiatives, spearheaded by Deltawind, provided a platform for local residents to voice feedback and concerns, shaping the project's trajectory. Within this action situation, local residents and concerned groups emerged as stakeholders expressing opposition, influencing decision-making processes through petitions and appeals. Regulatory oversight by municipal authorities, supported by legal interventions such as appeals to higher administrative bodies like the Council of State, ensured compliance and legitimacy throughout the project's development. Through collaborative efforts and regulatory adherence, Windpark Blaakweg underscored the collective commitment of diverse stakeholders towards advancing renewable energy goals in the region.

Aggregation Rules

Aggregation rules within the Windpark Blaakweg project context are established to consolidate resources, expertise, and decision-making authority among stakeholders, facilitating effective project development and implementation. The collaboration between Deltawind and Eneco exemplifies aggregation, as both entities pool their respective strengths in wind energy experience and technical expertise to streamline project processes and achieve shared objectives. The 50/50 arrangement between Deltawind and Eneco further aggregates resources, ensuring equitable distribution of responsibilities and benefits. Regulatory authorities play a crucial role in aggregation by consolidating legal frameworks and permitting processes, providing a standardized approach to project development and environmental compliance. Community engagement initiatives led by Deltawind aggregate local knowledge and perspectives, enabling stakeholders to collectively address concerns and contribute to project decision-making. Legal interventions by the court and the Council of State aggregate authority in resolving disputes and ensuring compliance with regulatory standards. Through these aggregated efforts and resources, the Windpark Blaakweg project optimizes collaboration, efficiency, and accountability to achieve its renewable energy objectives while balancing stakeholder interests and regulatory requirements.

Payoff Rules

The payoff rules within the action situation define the distribution of benefits and costs among stakeholders based on their contributions, investments, and interests. Deltawind and Eneco, as project partners, adhere to a 50/50 arrangement, implying an equal distribution of financial investments, risks, and rewards. Deltawind's reliance on bank loans to fund the project with a 10-15% equity contribution indicates a proportional sharing of financial burdens and potential returns. In 2018, Deltawind decided to convert these member loans into bonds issued by the cooperative. So now their members hold bonds in the cooperative. Additionally, they also hold bonds in certain projects. However, this is not the case in Suyderlandt and Blaakweg. This is because in these two projects, the co-initiators/investors are covering 50% of the financing and did not require this form of funding, making it financially and organizationally too complex to arrange. However, they did offer project bonds to their members in other projects, where they were responsible for more than 50% of the investments. Additionally, the project contributes to an environmental fund, demonstrating a commitment to equitable benefit sharing and community support. The establishment of the wind fund as a separate entity with its own board ensures transparent and accountable distribution of benefits to the community, aligning with the principle of fairness in payoff distribution. Regulatory

authorities may enforce payoff rules by stipulating conditions for project approval, such as community benefit agreements or revenue-sharing mechanisms, ensuring that stakeholders receive fair compensation for any adverse impacts or inconveniences caused by the project. Ultimately, adherence to payoff rules promotes fairness, equity, and social responsibility in the distribution of benefits and costs associated with the Windpark Blaakweg project.

5.7.4 Evaluative Criteria

The (pre-)development phase of the Blaakweg project extended from 2012 until March 2020, leading to a duration of approximately 9 years. A total of 353 were submitted to the zoning plan for the Battenoort wind site, of which the Blaakweg project is part of, and 7 appeals were lodged. The appeals were declared void by the Council of State in April 2019.

6. Comparative Analysis

This chapter provides a comparative analysis of rules-in-use of the seven cases in Section 6.1. Section 6.2 gives a synthesis of the legal entities being used in these projects, followed by a synthesis of the funding structures in Section 6.3 and the local participation mechanisms in Section 6.4.

6.1 Comparing of the Rules-in-Use of the Different Cases

6.1.1 Boundary Rules

The examination of boundary rules in the seven cases shows the evolvement and shift in project dynamics that shape the project trajectories and outcomes. In the Nijmegen-Betuwe case, Eneco originally initiated the project, but withdrew after the zoning plan was nullified by the Council of State, leading to the involvement of NMG and Izzy Projects. Similarly, in the Avri wind park, Winvast and Yard Energy initially participated, with local energy cooperative Betuwewind owning 25% of the shares. However, halfway through the development phase, the commercial initiators withdrew and Betuwewind acquired full ownership of the project. In many cases, municipalities imposed guidelines for community involvement and ownership. Community engagement initiatives facilitated by project initiators allow stakeholders, including local residents and interest groups, to voice concerns, provide feedback, and influence project outcomes. Legal interventions, such as appeals to the Council of State, represent formal mechanisms for stakeholders to challenge project decisions. Another remarkable change in boundary rules occurred in the Ospeldijk case, where WML and NEWECOOP initially had separate plans but merged efforts for a joint project. This underscored the flexibility and evolvement of the boundary rules and demonstrated that actors allowed themselves or other parties to enter or exit the action arena.

6.1.2 Position rules

In each of the cases examined, the local energy cooperatives played an active role as initiators from the project's initial inception, except for the Nijmegen-Betuwe case, where the cooperative WindpowerNijmegen was established by the former initiators Izzy Projects and Natuur en Milieu Gelderland. Collaborative partnerships were utilized in almost all cases to leverage expertise and resources and propel projects forward. Only the Kookepan project was entirely realized and funded by the local energy cooperative Leudal Energie. Another, less frequent observed partnership occurred in the Ospeldijk case, where the newly established local energy cooperative NEWECOOP sought guidance from the more experienced energy cooperative Zuidenwind. Throughout all cases, significant emphasis was placed on involving the local community. The position rules elucidate the distribution of power among stakeholders, highlighting the influence wielded by project initiators, regulatory authorities, landowners, and community groups. While project initiators often hold significant decision-making authority, regulatory bodies such as municipal and provincial authorities play a crucial role in overseeing the permitting process and ensuring compliance with environmental regulations. The provinces typically delegated the regulatory responsibilities to the municipalities for handling permits, with some instances of shared authority.

6.1.3 Aggregation rules

Aggregation rules play crucial role in shaping collaborative decision-making and resource management strategies across the various projects. For instance, the collaborative agreement between Deltawind and Eneco in the Blaakweg project demonstrates the effectiveness of

combining expertise to streamline project processes and achieve common goals. Similarly, in the Nijmegen-Betuwe project, collaboration initially involved Eneco and the Municipalities of Nijmegen and Overbetuwe, later expanding to include NMG and Izzy Projects. This collaboration capitalized on previous interactions and shared objectives. Notably, NMG's prior engagement with local residents on sustainability initiatives fostered community trust. Moreover, in the Ospeldijk case, a deeply collaborative approach prioritized cooperation over commercial interests, emphasizing co-creation and coalition building. The collaboration between WML and NEWECOOP further illustrates the adaptive nature of aggregation rules, showcasing the effectiveness of collective efforts in advancing project objectives.

6.1.4 Payoff rules

The analysis of payoff rules across the seven projects reveals a consistent focus on equitable distribution of benefits and costs among stakeholders. In each case, various mechanisms were employed to ensure fairness in the allocation of the project benefits. Notably, initiatives like the environmental fund established by Deltawind in the Blaakweg and Suyderland projects set a progressive precedent. This led to the inclusion of a standard contribution of 40 to 50 cents per MWh in the Code of Conduct for Onshore Wind Energy by the NWEA. Moreover, in three other cases (Nijmegen-Betuwe, Kookepan and Ospeldijk) the benefits of the wind park allocated to an environmental or community fund, exceeded the standard contribution and amounted to 1 euro per MWh.

It is notable that while the local energy cooperative Deltawind (Blaakweg and Suyderlandt) has been progressive in establishing an environmental fund, demonstrating a commitment to equitable benefit sharing and community support, they did not enable local ownership by their members in the projects themselves. This was because in these two projects, the co-initiators/investors were covering 50% of the financing and did not require this form of funding, making it financially and organizationally too complex to arrange. However, local residents could benefit by being member of the Deltawind cooperative but could not financially participate in the specific projects.

The Nijmegen-Betuwe case is also interesting when it comes to payoff rules. Here Evelop (later Eneco) faced significant costs by losing the permit application. As a result, Evelop decided to stall the project. After that, NMG and Izzy projects took their turn as project initiator. They relied on various funding types, due to insufficient equity means. Part of the costs were covered by their own money, but they also relied on political support in the form of a revolving subsidy. The municipality deferred payment until financial close and they covered the costs of the environmental impact assessment. These costs were reimbursed to the municipality when the wind park was eventually realized and generating revenue. Oost NL (now Innovatie- en Energiefonds Gelderland) also assisted by funding 400.000 euros and becoming a 5 percent owner of the wind park.

In case of the Avri project, Betuwewind decided to reinvest the profit, after paying back the bonds of the members, in future sustainable projects, empowering the members of the cooperative to propose and vote on initiatives. The project initiators of the Kookepan project choose to provide financial compensation to local residents based on their proximity. This compensation structure aimed to distribute project benefits among those potentially affected.

6.2 Legal Entities Project Initiators

The case studies showed many projects combine multiple legal entities. Especially when collaborative partnerships are involved. The rules-in-form (New Energy Act) do not prescribe a specific type of legal entity for establishing a local energy community, thus giving freedom to the initiators. However, energy cooperatives are the predominant legal structure in the Netherlands to enable local ownership in renewable energy projects (Maqbool et al., 2023). In most cases a private limited company was set up to cover the project risks for the participating actors. However, there were also two cases in which a general partnership was used to develop the wind farm, and in the Koningspleij case a foundation was established for the development of the project. Conversely, in the Nijmegen-Betuwe and Koningspleij cases, several separate entities were set up to develop a wind farm project.

6.3 Project funding

All project cases relied primarily on bank loans for funding their projects. However, in the case of Nijmegen-Betuwe, the Municipality of Nijmegen took on the costs of the environmental impact assessment, which were later reimbursed. Furthermore, part of the investment (in total 14.8 million euros) was borrowed from Innovation and Energiefonds Gelderland (IEG) in the form of a so-called subordinated loan, which required an equity of 10% (≈ €1.5 million). In return, IEG received 5% of the shares for five years. Thereafter, the project company took back these shares. The aim of the investment was that eventually the cooperative would become the sole shareholder and thus owner of the wind farm (WindpowerNijmegen, 2015). The project company pays dividends to the cooperative, which in turn pays out returns to its members.

The Ospeldijk case study even showed a different financing structure. In this case, funding was raised by members of two local cooperatives, Zuidenwind and Nederweerter Energie Coöperatie (NEWECOOP). The more experienced and mature local energy cooperative Zuidenwind accounted for most of the funding at 90%. In the coming years, NEWECOOP will buy out Zuidenwind. Members of NEWECOOP who have invested in the wind farm are also members of Zuidenwind and therefore have democratic control over the wind farm (HIER, 2022b).

6.4 Local participation

The Dutch Participation Guide (2019) describes four options for local participation: co-ownership, financial participation, environmental fund and a local resident's scheme. There is no prioritization, and it is also possible to combine them, depending on the needs of a specific project. All of the studied cases included the creation of an environmental fund. In three of the seven cases, the standard contribution of 40 to 50 cents per MWh, as stipulated in the Code of Conduct for Onshore Wind by the Dutch Wind Energy Association (2018), was even exceeded. In the Nijmegen-Betuwe, Kookepan and Ospeldijk projects, the contribution to the environmental or community fund amounted to 1 euro per MWh. The Dutch government stated that stacking of the different participation options is not the goal, since applying multiple forms of participations does not equal more acceptance. However, in all case different types of participation were combined and the Kookepan project even combined all four of them.

7. Discussion

Section 7.1 will present a critical reflection on the application of the Williamson and IAD frameworks in this study. In Section 7.2 recommendations for institutional design of future local energy communities are discussed and finally, the limitations of this study are presented in Section 7.3, followed by recommendations for future research.

7.1 Reflection on Applying Williamson and IAD Framework

The integration of the Williamson and IAD framework provided a comprehensive approach to analyzing institutional design options and governance structures of local energy communities. The combination of the two frameworks was particularly insightful for comparing formal rules (rules-in-form) with their practical application (rules-in-use), providing a multi-level analysis and holistic understanding of the institutional context. Williamson's framework, with its focus on different institutional levels, helped distinguish between the formal aspects of governance and its actual implementation. Ostrom's IAD framework was particularly effective in mapping the processes involved in setting up local community energy projects. It helped identify the actors involved, the rules they followed and the outcomes of their interactions. This structured approach clarified the roles and strategies of different stakeholders and shed light on the complexity of project development.

Another option would have been to analyze the rules based on the operational, collective and constitutional levels of choice, as defined by Elinor Ostrom (Ghorbani et al., 2010). In my opinion, using Williamson's model made a clearer division into the different levels and allowed the IAD framework to focus on the selected cases, providing a clear structure for the purpose of this study. By drawing on the strengths of both frameworks, this research provides a more comprehensive and insightful analysis of the governance structures and institutional dynamics of local energy communities.

7.2 Institutional Design Recommendations

Building on the insights from the previous chapters, a rough institutional design for initiating local energy projects can be outlined. Figure 13 presents a decision tree that visualizes the key decisions involved. While this serves as a guideline for future local renewable energy initiatives, it is important to recognize that the decision tree does not encompass all possible institutional design options for local energy communities. The flexibility of the Dutch legislation ensures numerous possibility and institutional designs vary significantly based on the specific context of each project. Nonetheless, this framework offers a general guide to help navigate the complexities associated with the institutional design of local energy communities.

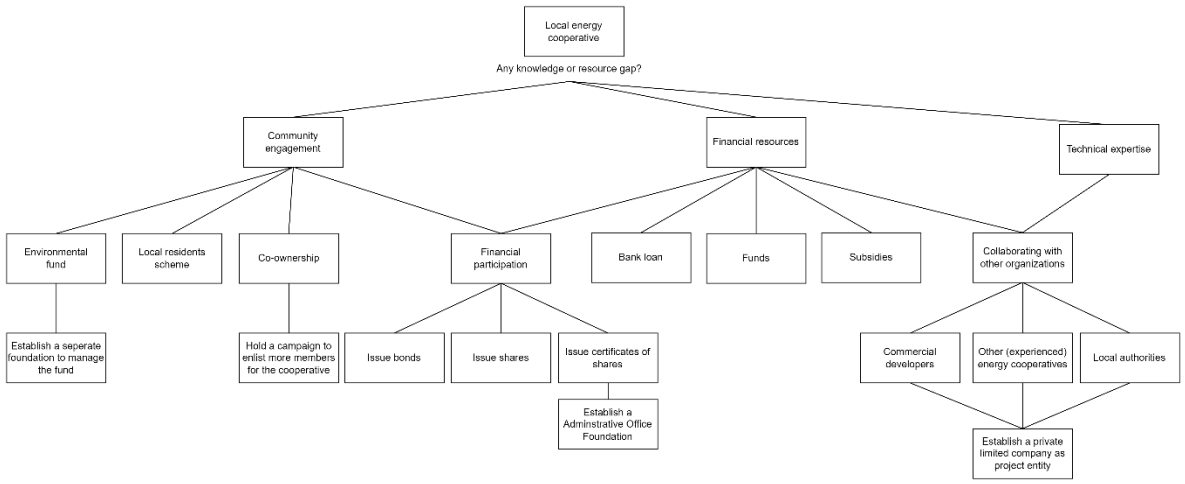

Figure 13. Design Tree for Local Energy Communities

Building on the findings in this paper, it is recommended that local energy communities organize themselves as cooperatives because of the principles of open access, voluntary participation, autonomy, and effective member control. This legal structure fits well with the Energy Act, as it required that energy communities must be effectively controlled by natural individuals, local authorities or small or medium-sized enterprises in the vicinity of the project. Moreover, the main objective must be to provide environmental, economic or social benefits for its members or to the local area. This matches well by the democratic and transparent organization structure of a cooperative.

Starting energy cooperatives should identify areas where they lack necessary skills or knowledge, such as technical expertise, financial resources, or community engagement. Identifying these gaps allows them to explore potential partnerships to enhance their capabilities. In most cases local energy cooperatives need to collaborate with partners, such as experienced energy cooperatives, local authorities, and commercial developers, to combine resources and expertise effectively.

To mitigate investment risks associated with renewable energy projects, it is recommended to establish a separate private limited company as project entity. The local energy cooperative should hold at least 50% of the shares to meet the target of 50% local ownership and to ensure their significant influence in voting matters. The directors, appointed by the project initiators, should manage the day-to-day operations and be accountable to the shareholders, ensuring proper governance and oversight. The project company pays dividends to the cooperative, from which the cooperative pays out returns to their members or uses (part of) the incomes to initiate new projects. To maintain operational efficiency, it is recommended that the cooperative itself issues shares or bonds for projects. This approach helps to keep the number of shareholders within the private limited company manageable, facilitating a decisive project entity. Furthermore, it is important that the local energy cooperative is used to start future projects, empowering their members to propose and vote on new project initiatives.

Establishing an environmental fund is advised, where a portion of the project revenue is reinvested locally providing benefits to residents who may not be able to directly invest. This fund should be managed by an independent board with local representation, this ensures transparent and accountable distribution of benefits to the community. Creating a distinct foundation run by local residents will enhance transparency and foster community trust.

7.3 Limitations and Recommendations for Future Research

An important limitation of this research is that the selection of case studies included only successful project cases, potentially neglecting valuable insights from unsuccessful ones. It is recommended to also include unsuccessful cases in future research, as it would provide a more balanced and comprehensive analysis. It would allow for the identification of institutional design choices that might hinder project realization, offering a more nuanced overview of the impact of institutional design choices for specific governance structures, partnerships and financial models of local energy initiatives.

Reusing the interview data from Brouwer (2023), Broekman (2023) and De Vogel (2023) has implications for the research outcomes. Since the original interview questions were designed for a different research purpose, relevant information might be missing. Previous interviewers may not have asked sufficiently detailed questions to fully capture the internal governance structures. Additionally, the quality of the interview data may vary due to the involvement of different interviewers, each potentially introducing their own biases.

It is therefore recommended that future researchers gather their own data to ensure comprehensive and unbiased information. Furthermore, the semi-structured nature of the interviews used in this study might have limited the depth of data collected. While at least two interviews were conducted per case, involving more interviews with all project initiators could have provided broader insights. While reusing interview data offers efficiency, researchers should be mindful of potential limitations in data depth, quality, and bias. Gathering fresh data and ensuring thorough questioning can enhance the richness and reliability of findings in future studies.

In the Netherlands, there are numerous legal entities available for establishing project organizations. This research, however, focused exclusively on legal entities with legal personality to avoid personal liability. Consequently, legal entities like general partnerships were not considered within this research scope. Nevertheless, the Koningspleij and Blaakweg cases demonstrate that entities lacking legal personality are also employed in practice. Therefore, future research should encompass these structures to provide a comprehensive overview of all available legal options. This inclusive approach would offer a more thorough understanding of the diverse legal frameworks utilized in project organization within the Netherlands.

The number of views, objections and appeals might not accurately reflect community perspectives. To enhance the accuracy of understanding public opinion, integrating surveys in future research is recommended. Surveys offer a direct and dependable method to gauge public attitudes, providing valuable insights that complement the data gathered from permit application views.

Lastly, the decision guide as presented in the previous section is not exhaustive and may not fully capture the diversity and complexity of institutional design options available for local energy communities in the Netherlands. Moreover, institutional designs are highly context-dependent, influenced by factors such as local regulations, community needs, and available resources. This study's decision tree cannot account for all these variables, limiting its applicability to certain context. It is therefore a general guide rather than an exhaustive framework. Future research should focus on validating this framework with stakeholders.

8. Conclusion

In this chapter the main findings are presented and the answers to the research questions are discussed in Section 8.1. Section 8.2 discusses the contribution of this research paper to academic literature. Lastly, in Section 8.3 practical implications of the research findings are presented.

8.1 Main Research Outcomes

The Dutch Climate Agreement mandates the generation of 35 TWh of energy from onshore solar and wind farms by 2030. However, onshore solar and wind farms have significant implications for the local environment, highlighting the need for community support and acceptance. Research emphasize that local energy communities can improve social acceptance and reduce public resistance to renewable energy projects. Despite extensive studies on the drivers and barriers of local energy initiatives, no studies have explored the discrepancies between the formal rules that influence design choices and their practical application as rules-in-use for Dutch local energy communities. Moreover, there is limited research done on the governance structures of local energy communities and the structuring of external support within partnership models. Therefore, the following main research question has been formulated:

What institutional design options are available for local energy communities to realize the development of local onshore renewable energy projects in the Netherlands?

This research has integrated the Williamson's (2000) four-layer model and the IAD framework of Elinor Ostrom (2005) to examine the institutional design options for local energy communities in the Netherlands.

8.1.1 Answer to Research Question 1

What formal rules are in place which delineate the institutional design options for local energy communities in the Netherlands?

In the Netherlands, formal rules and regulations influence the institutional design options available for local energy communities, ensuring they adhere to specific principles and objectives outlined in both European directives and Dutch legislation.

At the European level, the Clean Energy Package set the groundwork for local energy communities by introducing the concepts of Citizen Energy Communities and Renewable Energy Communities. The Dutch Climate Agreement (2019) further reinforces the importance of local participation and ownership in renewable energy projects, setting a target of 50% local ownership in onshore solar and wind projects by 2030.

The forthcoming Dutch Energy Act, which will replace the existing Electricity Act (1998), plays a pivotal role in defining the legal framework for energy communities. The proposed bill does not differentiate citizen energy communities and renewable energy communities and introduces energy communities as legal entities with a primary objective of providing environmental, economic, or social benefits to their members or the local environment in which they operate. This legislation emphasizes the democratic control of energy communities by their members, partners, or shareholders, ensuring open and voluntary participation in decision-making processes. However, the law does not describe what type of

legal entity must be used for energy communities. The Netherlands offers a range of legal structures that can be used for the establishment of local energy communities, including foundations, associations, cooperatives, public limited companies, private limited companies, and administrative office foundations. Furthermore, the Dutch Participation Guide outlines four distinct participation models for energy projects: co-ownership, financial participation, environmental funds, and local resident schemes. These models offer flexibility in how community members can engage with and benefit from energy projects, accommodating diverse preferences and levels of involvement. In conclusion, the institutional framework allows local energy communities to tailor their governance structure to their specific needs and objectives.

8.1.2 Answer to Research Question 2

What governance structures are currently utilized by local energy communities in the Netherlands?

The analysis of boundary rules across the seven cases highlights the evolvement of project dynamics, influencing project trajectories and outcomes. This emphasizes the adaptability and evolution of boundary rules, illustrating how actors permit the entry or exit of themselves or others from the action arena. Across nearly all examined cases, local energy cooperatives took on proactive roles as project initiators, collaborating with various partners to leverage expertise and resources for project realization. The flexible nature of aggregation rules demonstrates the efficacy of collaborative endeavors in attaining shared project objectives.

In the Netherlands, local participation in energy initiatives is commonly structured through energy cooperatives. This preference for cooperatives is often driven by their inherent characteristics, including open membership, voluntary participation, and legally enshrined democratic control. Moreover, other legal entities such as private limited companies, general partnerships, and foundations are established to manage financial risks associated with project investments.

Most projects primarily rely on conventional sources like bank loans and subsidies to finance their energy projects. However, in one case, the municipality also assumed a portion of the costs by prefinancing the environmental impact assessment. Moreover, certain local energy cooperatives collaborate with more experienced energy cooperatives, leveraging their expertise and track record in establishing renewable energy projects. This collaboration extends beyond knowledge-sharing; as demonstrated in one case, it may involve financial support as well. Such partnerships enhance the capacity of emerging local energy cooperatives and contribute to the overall success of renewable energy initiatives.

Furthermore, across all examined cases, there was a consistent provision of financial benefits to the local environment through the establishment of environmental or community funds.

8.1.3 Answer to Research Question 3

What are the differences in the rules-in-form and rules-in-use regarding the institutional design options for local energy communities in the Netherlands?

The examination of various wind energy projects in the Netherlands does not reveal distinct differences between the rules-in-form and rules-in-use regarding the institutional design options for local energy communities. This can be attributed to the considerable flexibility within the institutional environment, allowing for diverse governance structures to emerge

and adapt to the specific dynamics of each project. This is underscored by the results of the case studies, revealing a wide variety of governance structures employed for the development of local energy projects, each shaped by its specific context.

Despite the absence of stringent prescriptions in formal regulations, energy cooperatives emerge as the prevailing legal structure for facilitating local ownership in renewable energy projects across the Netherlands (Maqbool et al., 2023). However, there is variability in the project entities responsible for permit and subsidy applications, reflecting the unique circumstances of each project.

In general, all examined cases meet the goal of 50% local ownership from the Dutch Climate Agreement. Additionally, several projects show a noteworthy commitment to community benefits, as evidenced by contributions to environmental or community funds. In these instances, the contribution per MWh even surpasses the standard set by the Code of Conduct for Onshore Wind projects (NWEA, 2018), indicating a heightened dedication to supporting local communities and environmental initiatives beyond regulatory requirements.

8.1.4 Answer to Research Question 4

How can the formal rules and their practical application be translated into institutional design options for local energy community projects in the Netherlands?

Based on insights from the first three research questions, a rough institutional design framework for future local energy projects is developed. While not exhaustive, this framework serves as a general guide for establishing local energy communities in the Netherlands. Building on the research findings, it is recommended that local energy communities organize themselves as cooperatives due to their principles of open access, voluntary participation, autonomy, and democratic control.

New energy cooperatives should identify skill or knowledge gaps, such as technical, funding, or community engagement, and seek partnerships to address these deficiencies. Potential partners include experienced energy cooperatives, local authorities, and commercial developers.

To mitigate investment risks, a separate private limited company should be established as the project entity, with the local energy cooperative holding at least 50% of the shares to maintain significant voting influence. Directors appointed by project initiators should manage daily operations and be accountable to shareholders.

8.1.5 Answer to Main Research Question

The institutional design options available for local energy communities to realize the development of local onshore renewable energy projects in the Netherlands encompass a combination of formal rules and regulations, as well as practical implementations shaped by project dynamics and stakeholder interactions.

Existing literature showed a large variety in local energy communities in the Netherlands in terms of legal structures and financing structures. This is confirmed by the results of this study. Practical implementations of institutional design options vary based on project needs and dynamics. Local energy cooperatives often emerge as initiators and key players in renewable energy projects, using varying collaborative partnerships to leverage financial support and expertise.

Community involvement and ownership are central themes in the institutional environment, with emphasis placed on equitable distribution of benefits and costs among stakeholders. While the regulatory framework provides flexibility, the actual implementation and adaptation of institutional design options are shaped by stakeholder interactions, reflecting a dynamic interplay between formal rules and practical considerations.

In summary, institutional design options for local energy communities in the Netherlands encompass a range of formal rules and regulations, legal entities, and practical implementations tailored to project needs and stakeholder dynamics.

8.2 Academic Contribution

Some previous studies have explored the organizational structures and financing strategies of local energy communities in Europe. However, these studies lack a detailed analysis of the internal governance structures that are applied by existing local energy communities in the Netherlands. Utilizing the IAD framework in several case studies, this study provides a comprehensive understanding of the governance structures and financing models of Dutch local energy communities. The study thereby contributes valuable insights to the academic literature on local energy communities, particularly within the Dutch context.

While prior research has extensively examined the drivers, barriers, and outcomes of local energy initiatives, there has been limited focus on the interaction between formal rules and practical applications. This study addresses that knowledge gap and significantly advances existing literature by integrating Ostrom's IAD framework with Williamson's four-layer model, providing a comprehensive analysis of the disparities between formal regulations and practical implementations.

8.3 Practical Implications

The findings of this study offer valuable practical insights for stakeholders involved in local energy community projects, particularly policymakers and project developers. By providing an overview of the institutional environment, the research equips future developers with the knowledge needed to navigate the complexities of developing a local energy community project. By documenting and disseminating successful case studies, this research enables communities to learn from each other, leading to more efficient and effective project implementation. The institutional design framework in this study offers future project developers a valuable starting point for establishing renewable energy projects and ensuring local participation. As a results, this research hopefully contributes to accelerating the large-scale implementation of local energy community projects in the Netherlands, thereby significantly to achieving the targets of the Dutch Climate Agreement.

Furthermore, policymakers can leverage the insights from this study to refine and enhance existing regulatory frameworks for local energy communities in the Netherlands. They can utilize the results of this study to recognize the significant diversity in institutional designs among local energy communities in the Netherlands. This diversity, while reflecting the adaptability and creativity of local initiatives, can also present challenges for large-scale collaboration and implementation of renewable energy projects. The findings illustrate the variety of governance structures, legal entities, and participation mechanisms employed by different communities. Such variability can complicate efforts to establish standardized procedures and frameworks that facilitate seamless collaboration across projects. By addressing these variations, policymakers can help streamline project development processes,

reduce administrative barriers, and promote more cohesive and scalable renewable energy initiatives across the country.

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Appendix A: Kookepan project

This appendix presents a case study examining the development of Windpark Kookepan in Limburg through the lens of Ostrom's Institutional Analysis and Development (IAD) Framework. By employing this framework, a comprehensive analysis is provided of the complex interactions and institutional arrangements involved in the establishment of this particular wind park.

1. Project description

In January 2015, Leudal Energie, an LEC focusing on renewable energy generation, started communicating with the Municipality of Leudal regarding collaboration for the development of a wind farm. This marks the project's inception (BRO, 2018). Subsequently, in April of the same year, the Municipalities of Leudal, Nederweert, and Weert collectively expressed their collective interest in collaborating on wind energy initiatives. This declaration led to the establishment of a joint policy by these municipalities, along with Peel and Maas, in 2016. outlining the initial steps for collaboration, including the initiation of the tender process. Concurrently, several regional LECs, such as Leudal Energie, Peel Energie, Weert Energie, and Zuidenwind, joined forces to establish REScoop Limburg, aimed at supporting LECs in wind energy development.

By March 2016, Leudal became the first municipality to finalize policy guidelines, emphasizing active community involvement, maximizing local revenue, spatial planning, and preventing land speculation (Gemeente Leudal, 2016). Leveraging these principles, a working group from Leudal Energie began exploring potential wind farm sites within the Leudal area, engaging stakeholders such as landowners, residents, and advisory groups from the project's inception (Leudal Energie, 2018). Over a series of six information sessions held between May 2016 and November 2017, the project initiators underscored the importance of community acceptance, transparency, and local benefits.

In April 2016, 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 provincial and municipal governments shared authority in this agreement (Gemeente Leudal, 2018). In June 2017, REScoop Limburg, representing Leudal Energie, submitted a detailed request for planning cooperation, which underwent review before being presented to the Municipal Council for discussion and approval. Out of seven applications, the LEC Leudal Energie was granted planning permit by the municipality (Gemeente Leudal, 2016).

By September 2017, the Municipal Council unanimously endorsed proceeding with the cooperation, under certain conditions. Regular consultations between Leudal Energie and local residents and landowners continued throughout the first quarter of 2018, aiming to foster community engagement. Various efforts, including advertisements in local newspapers and signage, were undertaken to promote participation in the wind farm project. Information sessions played a crucial role in educating the community and attracting potential members and investors. To finance the construction of the three wind turbines, approximately €2.3 million was required, which was successfully raised through a campaign that attracted 200 additional members. Within four months in 2020, more than half of these members contributed to reaching the required sum. The interest rates offered varied depending on the

bond's duration: 4% per year for 5 years, 5% per year for 10 years, and 6% per year for 15 years. Revenue generated from energy production was partially distributed to investing members, with the remainder sold to commercial entities (Energie, 2018).

In March 2018, the license holder submitted a permit application for the wind farm's construction. Despite objections, the permit was eventually granted by the local council on August 29, 2018 (Rechtbank Limburg, 2019). Legal challenges ensued, including appeals to higher authorities, but were ultimately overcome, allowing construction to begin in August 2020 and production to commence in September 2021.

The wind farm began operating in September 2021, accompanied by several compensatory measures for the surrounding area and residents. These measures included the establishment of the Kookepan Community Fund, annual land compensation fees for landowners, financial compensation for local residents, incentives for sustainability measures in nearby homes, and a one-time contribution for enhancing nature and landscape around the wind farm (HIER, 2020; Leudal Energie, 2018).

The project's execution faced challenges, yet its successful resolution and implementation marked a significant achievement for sustainable energy initiatives in the region. The project's swift implementation can be attributed to comprehensive collaboration among regional LECs, facilitated by proactive government involvement. Government policies emphasizing cooperative development, community involvement, fair land compensation, and reinvestment of profits back into the community contributed to the project's success (HIER, 2020).

2. Action situation: (Pre-)Development Phase

The action situation commenced in January 2015 when Leudal Energie initiated discussions with the Municipality of Leudal regarding the development of a wind farm. Subsequently, in March 2016, after finalizing its policy guidelines, the Municipality of Leudal tasked a working group from Leudal Energie with scouting potential wind farm sites. This endeavor involved engaging various stakeholders, including landowners, residents, and interest groups, through a series of six information sessions held from May 2016 to November 2017. These sessions aimed to promote transparency, garner community support, and elucidate the objectives of the LEC. By September 2017, the municipal council formalized the planning cooperation request, and efforts persisted to encourage public involvement in the wind farm project. Additionally, preliminary compensatory measures for local residents were established, encompassing initiatives such as a community fund, annual landowner compensation, subsidies for home sustainability, and funds for landscape enhancement. In March 2018, the LEC submitted a permit application for the construction of three turbines in the Kookepan area. Despite direct efforts by the LEC to address objections, opposition to the wind turbines persisted among certain community members. However, in April 2020, the objections were dismissed by the Council of State, affirming the decisions made within the action situation. To fund the construction of the three wind turbines, Leudal Energie needed to secure 15% of the total costs, amounting to approximately 2.3 million euros. This financial requirement was met through a fundraising campaign, which attracted over 200 additional members. In 2020, more than 150 members contributed to raising the necessary funds. Ultimately, construction of the wind farm commenced in August 2020, marking a significant milestone in the project's progression.

3. Participants

The following actors were involved in this action situation:

- **Province of Limburg**: maintained strategic alignment across different levels of government, sharing authority with the municipalities in the area.
- **Municipality of Leudal:** serving as the competent authority, they were in charge of managing the initiative. They finalized the initial policy guidelines and spearheaded efforts to promote active community engagement and local benefits.
- **REScoop Limburg:** comprising Regional Energy Cooperatives Peel Energie, Weert Energie, Zuidenwind formed REScoop Limburg, REScoop contributed to the regional push for local wind energy development and facilitated expanded collaboration efforts.
- **Council of State**: functioned as a legal arbiter, ultimately dismissing the appeal and affirming the project's regulatory approval.
- **Local Energy Cooperative Leudal Energie:** as a project initiator, Leudal Energie played a pivotal role in initiating cooperative endeavours, shaping policies, and establishing the REScoop Limburg cooperative. Moreover, they took on the essential task of informing local residents and organizing meetings with landowners, fostering direct community involvement.
- **Local Residents:** the local residents were actively engaged, participating in informational sessions, consultations, and often serving as investors.

4. Policy regulations

The following formal laws, regulations, and policy measures were applicable to this action situation:

- Environmental Impact Assessment (EIA) Decree (in Dutch: Milieueffectrapportage or MER) is a General Administrative Order based on the Environmental Management Act. An EIA is prepared for activities and projects that could have significant adverse effects on the environment. Conducting an EIA for projects that can cause significant harm to the environment is mandatory within the European Union (Ministerie van Infrastructuur en Waterschap, 2023).
- The Environmental Impact Assessment (EIA) Decree (in Dutch: Milieueffectrapportage or MER), derived from the Environmental Management Act, mandates the preparation of an EIA for activities with significant environmental impacts, as required by the European Union (Ministerie van Infrastructuur en Waterschap, 2023).
- Spatial Planning Act (in Dutch: Wet Ruimtelijke Ordening or Wro) governs energy transition and spatial planning procedures, including provincial zoning plans for projects of provincial significance.
- The European Direct 2009/28/EG sets a target of 14% energy consumption from renewables by 2020, shing national wind energy policies.
- The Energy Report (in Dutch: Energierapport) articulates the ambition of the Dutch government for sustainable energy, emphasizing wind energy opportunities.
- The National Energy Agreement (in Dutch: Nationaal Energieakkoord) accelerates sustainable energy production through commitments between the government, provinces, and societal organizations. The goal for the Province of Limburg is to have 95.5 MW of wind energy capacity by 2020.

- The Decree on General Rules of Spatial Planning (in Dutch: Besluit algemene regels ruimtelijke ordening or Barro) limits policy space for other authorities in areas of national interest, guiding the establishment of search areas for large wind farms in the Structural Vision Wind Energy on Land.
- The Structural Vision Infrastructure and Space (2012) (in Dutch: Structuurvisie Infrastructuur en Ruimte) outlines the national spatial policy and strategy for large-scale wind energy sites.
- The Structural Vision Wind Energy on Land (in Dutch: Structuurvisie Windenergie op Land) identifies suitable locations for large scale wind farm, contribution to the 6 GW wind energy goal.
- The Electricity Act (1998) (in Dutch: Elektriciteitswet) mandates national coordination for projects exceeding 100 MW, with provinces able to delegate authority for wind farms over 5 MW to municipalities. The Province of Limburg transferred its authority to the Municipality of Neederweert for this particular wind farm.
- The Provincial Environment Plan Limburg 2014 (in Dutch: Provinciaal Omgevingsplan Limburg or POL2014) focuses on wind energy and designates preferred areas for wind turbine development.
- The Collaboration Agreement (in Dutch: Samenwerkingsovereenkomst) between Mid-Limburg municipalities and the Province of Limburg coordinates sustainable energy initiatives, aiming for at least one wind energy project per municipality to benefit local communities.
- Strategic Overall Vision 2020 - 'Living in Leudal' (in Dutch: Strategische Overallvisie 2020 – 'Leven in Leudal'): This vision outlines Leudal's long-term plans, emphasizing 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 (in Dutch: 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 emphasizes 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' (in Dutch: 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 emphasizes sustainable development, renewable energy, and multifunctional agriculture to support local farms.

5. Governance rules

Position rules

The division of roles among the stakeholders was clearly delineated in the position rules. Leudal Energie, as LEC, took on the role of project initiator, spearheading the initial proposal, engaging with the Municipality of Leudal, and identifying potential wind farm locations.

Moreover, Leudal Energie led fundraising efforts to secure project financing. While the Province of Limburg played a less direct role, it served as regulator and overseer, sharing authority with municipal governments. REScoop Limburg provided support to LECs like Leudal Energie in wind energy development, assisting in planning cooperation requests and offering necessary assistance. Meaningful interaction between Leudal Energie and municipal and provincial governments was evident, with the LEC's wind farm application evaluated and approved by the local council. Their collaboration was characterized by ongoing consultation, illustrating a collaborative relationship with shared authority. Local residents and landowners fulfilled various roles in the project as beneficiaries, investors, and those impacted by potential adverse impacts.

Boundary rules

Throughout the development of Windpark De Kookepan, the guidelines for project involvement were established based on the participation criteria set forth by Leudal Energie. Initially, the Municipality of Leudal laid down the initial conditions for project involvement. Over a period of two to three years, these guidelines and conditions for local ownership underwent refinement, clarifying who could contribute to and benefit from the project. These boundary rules also dictated the roles of various participants as the wind farm project progressed. As the project advanced and its feasibility became evident, more community members became involved, and ground compensation arrangements were extended to all residents in the turbine area, broadening the scope of participants. Notably, stakeholder inclusion was a crucial aspect of these boundary rules, initiating dialogues with the municipality upon proposal submission and meeting pre-phase permit application conditions. As the project evolved, community consultations were conducted, engaging a wider audience through informative sessions. This dynamic reflects an expansive, inclusive interpretation of boundary rules, not only defining who participates but also guiding their involvement. Furthermore, the campaign to enlist additional LEC members underscores the significance of boundary rules, with a substantial number of new members contributing to the wind farm's budget, transitioning from local residents to active stakeholders in the Windpark De Kookepan project.

Scope rules

In 2015, Leudal Energie took the lead by reaching out to the Municipality of Leudal to initiate the project for developing a wind farm. This pivotal moment marked the beginning of collaborative efforts, aiming for at least 50% community involvement, if not full participation. The initial proposal outlined the project's objectives, emphasizing the significance of cooperation and community engagement. Following this, the joint policy formulated by the Municipalities of Leudal, Nederweert, Weert, Peel, and Maas in 2016 laid down clear guidelines for wind energy development and management. These guidelines prioritized active community participation, maximizing revenue benefits for the local area, ensuring a robust spatial plan, and preventing land speculation. This policy framework established the legal and administrative boundaries within which the project would operate. The Wind Energy Collaboration Agreement signed in 2017 between the Province of Limburg and the Mid-Limburg municipalities further elucidated these scope rules, with both governmental levels sharing authority over the project, thereby defining jurisdiction over its outcomes. Notably, key milestones in the project's progression included the approval process for planning cooperation requests and the subsequent construction and operation of wind turbines.

Moreover, the implementation of compensatory measures upon the wind farm's operational commencement, such as the establishment of the Kookepan Community Fund, annual land compensation fees, neighbour agreements for financial compensation, and incentives for sustainability measures in homes, delineated the project's impact on the local community, providing specific parameters defining the range and extent of project outcomes.

Aggregation rules

The collective decision-making process, guided by aggregation rules, unfolded with the active participation of various stakeholders. Initially, Leudal Energie spearheaded the initiative by presenting its plan to the Municipality of Leudal, initiating extensive consultations with local residents. This inclusive process emphasized the necessity of transparent information sharing and engagement to mitigate potential resistance. As collaboration progressed, additional municipalities joined forces, collectively identifying sites for sustainable energy development under provincial guidance. This collaborative effort led to the formulation of joint policies by municipalities like Leudal, Nederweert, Weert, Peel, and Maas, with significant contributions from LECs such as REScoop Limburg. Moreover, substantive interaction took place between Leudal Energie and both municipal and provincial governments. The evaluation and approval of the LEC's wind farm construction application by the local council showcased this collaborative dynamic, with ongoing consultation underscoring a shared authority between the LECs and the government. Additionally, municipal policies accorded preferential treatment to LECs in sustainability initiatives, although they were still required to submit robust plans and assume associated risks independently without municipal support.

Information rules

Communication channels were established with stakeholders to provide timely updates on the project's progress. The LEC maintained ran open dialogue with the municipality, other LECs, and interested parties, providing regular updates on project status and community discussions. Transparency was a key priority for Leudal Energie, which shared comprehensive information about the project's development and its expected community benefits. This transparency was facilitated through various means, including recurring meetings with local residents and landowners, personalized discussions for interested individuals, updates via Leudal Energie's website and newsletters, as well as public information sessions. A crucial aspect of the information strategy was the creation of a communication plan, which placed significant emphasis on the wind farms' progress. Additionally, local residents were actively involved in shaping the project's direction through a working group composed of local residents, responsible for managing a community fund. Additionally, residents were encouraged to become LEC members, allowing them to invest directly in the wind farms and share in the revenue. Proactive measures were also taken to address potential concerns about wind energy, highlighting the project's local benefits and ensuring that a significant portion of the profits stayed within the community. This transparent and collaborative approach facilitated discussions and negotiations with municipal officials, demonstrating the importance of keeping all parties well-informed to minimize resistance.

Payoff rules

The wind farm project entailed various costs and benefits, each distributed among different stakeholders within the action arena. Firstly, financing the project required a substantial

investment, partly covered by 150 members of the Leudal Energie LEC, who raised €2.2 million in four months (HIER, 2022). These investors received returns on their investment through interest rates ranging from 4% to 6% per year, depending on the bond duration. Furthermore, these members benefited from the energy generated by the wind farm, with any surplus sold to commercial entities. Secondly, local landowners in the wind farm's vicinity received annual compensation fees, while residents living within 1000 meters of the turbines received financial compensation based on their proximity. This equated to €250 for residents residing within 1000 and 900 meters, and €150 for each additional 100 meters. This compensation structure aimed to distribute project benefits among those potentially affected. Additionally, the project contributed financially to local community initiatives, such as the Kookepan Community Fund, receiving annual contributions from Leudal Energie. Every year €25.000 to €30.000 from Leudal Energie is reserved 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. Funds were also allocated for home sustainability measures and local environmental enhancement projects. Overall, the wind farm project's benefits, including monetary returns, compensation payments, community funds, and environmental enhancements, were strategically distributed among investors, landowners, residents, and the broader community. The project received three SDE-subsidies, one for each turbine, covering a maximum of approximately 28 million euros (Rijksdienst voor Ondernemend Nederland, n.d.). Currently, the project has not faced community opposition, highlighting the importance of meeting residents' expectations to avoid potential costs.

Choice rules

Upon analysis of the choice rules, it is evident how interactions among different actors shaped the design and implementation of the project, specifying actions that actors in various positions were required, forbidden, or permitted to take under different circumstances. Initially, Leudal Energie initiated cooperation with the Municipality of Leudal for the wind farm's development, a pivotal action mandated of the actors involved. Subsequently, while approval from the municipality was not guaranteed, it fell within the scope of permissible actions, showcasing the discretion these actors had in decision-making processes. Moreover, the LEC had to collaborate with a project team established by the province, demonstrating its ability to navigate a multi-level governance environment within institutional boundaries. Crucially, transparent engagement with local community members and stakeholders was essential for the LEC to address resistance and ensure project viability, echoing Ostrom's emphasis on collective action and consensus-building in resource management. Finally, despite the municipality's preference for LEC initiatives, the LEC still had to present a robust proposal and assume project risks, indicating that while institutional context may favor certain actors, it does not absolve them of their responsibilities.

6. Biophysical/material conditions

In accordance with the Provincial Environmental Plan of Limburg 2014 (POL2014), the wind farm location selection process was meticulously conducted, considering various exclusion areas such as nature reserves, populated areas, and surrounding noise zones. After comprehensive evaluation, De Kookepan, situated in Neer alongside the drainage channel, emerged as the most suitable site for wind energy development. The proposed location primarily consisted of forested and agricultural land, intersected by several roads and

pathways, with surrounding areas primarily comprising similar agricultural and forested regions, featuring minimal recreational usage such as a dog club, a camping site extension area, and various walking and cycling routes. Approximately 2.5 kilometers south of the existing Windpark Neer, the approved wind farm comprised three turbines, each adhering to specific material specifications, including a maximum hub height of 132 meters, a maximum tip height of 200 meters, and a maximum rotor diameter of 142 meters, with energy capacities ranging between 3.15 and 4.5 megawatts. The nearest homes were situated approximately 500 meters away, while populated areas were located more than 1 kilometer from the wind farm site, aligning with the POL2014 criteria for site selection.

7. Attributes of the community

In terms of demographic composition, the community encompassed various stakeholders, notably Leudal Energie, who took a proactive role in spearheading the project with both internal expertise and external consultancy support. The community's active participation, particularly evidenced by engaged locals attending informational sessions, showcased their collective enthusiasm for sustainable energy and its associated advantages. This diverse assembly of involved individuals, alongside local landowners and municipal authorities, played pivotal roles in advancing the cooperative endeavor. Established norms promoting LEC involvement and inclusive policy activities were evident, with Leudal Energie consistently prioritizing transparency and community engagement through extensive dialogues with residents and municipal stakeholders. Despite occasional emphasis on challenges, the LEC's commitment to enhancing communication was palpable, fostering mutual understanding through ongoing discussions and informative sessions focused on transparency, LEC objectives, and community benefits. Efforts to raise awareness, promote local energy consumption, and foster acceptance demonstrated a shared vision of the project's goals. Moreover, the project team's introduction of a "neighbors' agreement," proposing a financial compensation mechanism for residents within close proximity to the wind farm, aimed to address concerns and strike a fair balance between benefits and potential disruptions. Additionally, the local community showed strong support for the concept of a citizen wind farm, appreciating the prospect of retaining revenue within Leudal. This sentiment was echoed by municipal backing, evident in the provision of startup subsidies and the favorable treatment of LECs within policy frameworks. The membership of Leudal Energie, predominantly comprised of individuals participating in informational sessions, exemplified this shared commitment to local sustainable energy initiatives.

8. Interactions

The initial interactions observed in this case were predominantly formal, characterized by structured meetings, documented agreements, and an organized process of negotiation and decision-making. Participating entities included Leudal Energie and the Municipalities of Leudal, Nederweert, and Weert, with active involvement from provincial authorities. Communication among these entities was regular and formalized, centered around the common objective of establishing a wind farm. Crucial decisions, such as the formulation of policy guidelines and the identification of potential wind farm locations, were reached through collective consultation. These formal dialogues also prioritized transparency, ensuring that information was accessible to all stakeholders. In addition to formal interactions, informal engagements took place, often in the form of community meetings and public information sessions. While informal, these interactions were instrumental in garnering local acceptance,

promoting transparency, and discussing LEC objectives, donations, and membership benefits. Despite their informal nature, these engagements played a crucial role in disseminating information to the broader community and attracting potential members and investors. Such openness is believed to have minimized resistance and facilitated greater community acceptance of the wind farm project.

9. Outcomes

The overarching objective of the (pre-)development phase was to build a wind farm in the Kookepan area, achieved through extensive discussions and collaboration. This process led to the formation of a new LEC named REScoop, involving regional counterparts, with LEC Leudal Energie securing the highest score among permit applicants. Subsequently, the municipality granted an agreement of intent to Leudal Energie, initiating project groundwork and ensuring 100% community ownership, surpassing the initial target of 50%. Multiple rounds of dialogue and a successful fundraising campaign facilitated the accumulation of capital for constructing three wind turbines with an installed capacity of 13.5 MW. Critical conditions, such as local ownership, were established, emphasizing community involvement and cooperation, demonstrating the LEC's dedication to transparency and local benefit maximization. Construction commenced in August 2020, adhering to the original plan despite the timeline extension, with no alterations to the wind turbines' physical structure.

10. Evaluative criteria

First and foremost, the transparent communication, exemplified by well-organized information sessions, played a pivotal role in garnering community acceptance, thereby mitigating resistance and streamlining the implementation process. The community's positive response was further evidenced by the successful fundraising campaign, which yielded 2.3 million euros. The promising returns motivated more than half of the new members to contribute to the fund within a mere four months in 2018. This not only facilitated the construction of the three wind turbines but also underscored the community's eagerness to invest in the wind project. The project's impact is also evident in the financial benefits reinvested in the community. The establishment of the Kookepan Community Fund, the land compensation fee, the neighbors' agreement, and the initiative to incentivize sustainability measures in homes near the turbines have collectively resulted in economic advantages for the community. These initiatives not only ensure that the revenue generated from the wind farm remains within the local area but also promote sustainable practices and enhance living standards in the vicinity. The outcomes of the Kookepan wind farm project demonstrated relationships between LECs, effort, community engagement, transparent communication, equitable benefits distribution, and the successful realization of the wind energy project. 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 complete process of (pre-)development of the wind farm lasted from January 2015 (first initiation) till August 2020 (start of the construction).

Appendix B: Ospeldijk project

This appendix presents a case study examining the development of Windpark Ospeldijk in Limburg through the lens of Ostrom's Institutional Analysis and Development (IAD) Framework. By employing this framework, a comprehensive analysis is provided of the complex interactions and institutional arrangements involved in the establishment of this particular wind park.

1. Project Description

In 2015, the Limburg provincial government was mandated by the national Dutch government to realize 95.5 MW of sustainable energy generation by 2020 (Omgevingsverordening Limburg, 2014). Preferring to support local initiatives, Limburg encouraged its municipalities to propose ideas for this renewable energy goal. The consequence of not taking action was clear: the province would step in and select wind turbine locations. In 2015, the Municipalities of Leudal, Nederweert, and Weert announced their commitment to collaborate on wind energy projects, laying the groundwork for a broader regional strategy. This initiative led to the establishment of REScoop Limburg in December 2015, a cooperative organization involving regional entities like Leudal Energie, Peel Energie, Weert Energie, and Zuidenwind. Their primary objective was to pinpoint suitable locations for wind farms, ensuring community support and minimizing disruption.

In March 2016, the local council authorized the development of wind farm projects within their jurisdiction, providing local energy cooperatives with the opportunity to establish cooperative wind parks, benefiting the residents of central Limburg. Simultaneously, project planners outlined six essential guidelines for wind farm development, including cooperative project management, maximizing community benefits from wind turbines, selecting suitable locations through spatial planning, and mitigating land speculation. In April 2016, project developers were invited to submit proposals for potential wind farms, resulting in thirteen proposals. Among these proposals was the Windpark Ospeldijk project, a joint effort by Waterleiding Maatschappij Limburg (WML), a local water filtration company, and Nederweerter Energie Coöperatie (NEWECOOP), forming a 50% cooperative initiative with each entity operating two wind turbines (HIER, 2022). Initially, both parties presented separate proposals for a wind farm. However, on October 5 in 2017, a strategic shift prompted them to collaborate and jointly approach the Municipality of Nederweert. Their plan was for each to individually own and manage half of the wind farm after completing planning procedures and obtaining permits (SWECO, 2018).

NEWECOOP, a newly established LEC, sought support from more seasoned entities like Zuidenwind, an energy cooperative operating with a business-like approach. Funding for the project was secured by members of both Zuidenwind and NEWECOOP, with Zuidenwind contributing 90% of the financing. Together they founded the Burgerwindpark Ospeldijk B.V., of which they jointly own 100% of the shares (HIER, 2022). Over time, NEWECOOP gradually acquired the stake of Zuidenwind. The members who invested in the wind park also gained membership in the Zuidenwind cooperative, thereby granting them democratic control over the wind farm's operations. Faced with numerous proposals, municipalities collaborated with the province to form an acceleration team in 2017. This acceleration team consisted of participation and financing experts who refined the proposals, ultimately selecting three projects in 2018. The decision to approve WML and the LEC project primarily stemmed from

the cooperative nature of these initiatives. The chosen wind farm site, Ospeldijk, could power all of WML's pumps for a year with just two turbines, rendering the company energy-neutral, if not entirely green.

The subsequent task for the project initiators was obtaining the environmental permit, requiring extensive community involvement. The feedback from local residents varied, reflecting diverse perspectives on wind energy. Engagement efforts included discussion meetings, energy cafes, and gatherings hosted by neighborhood associations. The initial permit request was officially submitted on January 31, 2018 (Gemeente Nederweert, 2018). The application for the wind park entailed the installation of four turbines, each meeting specific dimensions: hub heights ranging from 110 to 140 meters, rotor diameters between 110 and 145 meters, and tip heights varying from a minimum of 55 meters to a maximum of 210 meters. These specifications were tailored to accommodate wind turbines with a capacity of approximately 3 to 4 MW (SWECO, 2018).

Between March 2018 and May 2018, the draft environmental permits were open for public review, during which nine submissions were received (Gemeente Nederweert, 2018). The comments raised significant concerns regarding the permit content, with submitters expressing beliefs in substantial flaws and decisions lacking necessary care and precision. Issues were also raised regarding the communication and participation plan associated with the decision-making process, indicating shortcomings in information sharing and public involvement. Furthermore, comments addressed concerns about health, safety, and noise, expressing worries about potential adverse effects resulting from the proposed project. Lastly, the impact on nature was highlighted as another significant aspect of concern.

On the 16th of July 2018, environmental permits were granted to the Windpark Ospeldijk project by the Municipality of Nederweert (Raad van State Provincie Limburg, 2019), allowing both WML and the energy cooperatives to operate two wind turbines each. These turbines were arranged in a line spanning approximately 2 kilometers, with an inter-turbine distance of about 670 meters. An appeal filed by an individual advocating for the Blauwe Kiekendief bird species to the Council of State, the appeal was dismissed on February 27, 2019, as the individual was absent during the preliminary study (Raad van State Provincie Limburg, 2019). Construction began on June 25, 2020, for Windpark Ospeldijk, consisting of four wind turbines, each with a hub height of 135 meters and a capacity of 4 MW (Redactie van Wind Energie Nieuws, 2021). Though there were minor adjustments necessitating a new permit due to technological innovation, the process was completed more swiftly than anticipated due to the absence of significant objections or appeals.

2. Action situation: (Pre-)Development Phase

The action situation started when the project took share in 2016, when project developers could persue their project plans for wind energy in the Municipalities of Leudal, Weert, and Nederweert. Initially, WML and NEWECOOP pursued separate project plans, but they eventually merged their efforts in October 2017, aligning with the institutional framework promoting cooperation (HIER, 2022). Throughout the project's development, community engagement remained a crucial aspect of institutional analysis (Niens, 2020). The initial permit application was filed on January 31, 2018. The key actors in the (pre-)development phase included WML and the LECs, who proposed and planned to operate the wind farm, the local community, which was given an opportunity to review and provide feedback on the draft

environmental permits, and the Municipality of Nederweert, which processed the feedback and granted the permit. The interplay among these actors, each with their distinct positions and interests within established rules and processes, led to various outcomes. These outcomes encompassed the approval of environmental permits, the dismissal of the appeal by the Council of State, and the commencement of wind park construction. Despite minor adjustments due to technological advancements, the project progressed more rapidly than anticipated, facilitated by the absence of significant objections or appeals. Consequently, the action situation, delineated as the (pre-)development phase of the Ospeldijk wind farm project, concluded in June 2020 with the onset of construction.

3. Participants

The following actors were involved in this action situation:

- **Province of Limburg:** solidified strategic alignment between various tiers of government and shared authority with existing municipal authorities.
- **Municipality of Nederweert:** served as the project's overseeing authority and collaborated with neighbouring municipalities to establish unified policies for wind energy development in the region. They spearheaded the formulation of policy guidelines and championed active community involvement and local revenue generation.
- **REScoop Limburg:** bolstered the regional push for local wind energy development while broadening collaboration opportunities. The organization was formed by local energy cooperatives Peel Energie, Weert Energie, and Zuidenwind.
- **Acceleration Team**: convened by the municipalities which play a pivotal role in refining proposed plans and ultimately selecting final projects and consisted of a group of experts appointed by the Province of Limburg.
- **Council of State**: acted as a legal arbiter, ultimately dismissing the appeal and affirming the project's regulatory approval.
- **Project Initiators (WML and NEWECOOP**): submitted two separate project proposals, but eventually joined forces to propose a collaborative wind farm project in Ospeldijk. This partnership facilitated resource and expertise sharing, with each entity planning to own and operate half of the wind farm.
- **Local Energy Cooperatives Zuidenwind and NEWECOOP:** Zuidenwind provided valuable support to the less-experience local energy cooperative NEWECOOP by offering professional guidance and significant financial investment in the project. NEWECOOP, the project initiator, played a crucial role in engaging local residents. Together they founded the Burgerwindpark Ospeldijk B.V.
- **Local Residents:** an important group in the action situation, the local community's input shaped the trajectory of the project and the local acceptance. Engaged from the project initiation, residents participated in information sessions, consultations, and invested as stakeholders. They served dual roles as beneficiaries and individuals directly impacted by potential negative consequences.

4. Policy regulations

The following formal laws, regulations, and policy measures were applicable to this action situation:

- The Environmental Impact Assessment (EIA) Decree (in Dutch: Milieueffectrapportage or MER), derived from the Environmental Management Act, mandates the preparation of an EIA for activities with significant environmental impacts, as required by the European Union (Ministerie van Infrastructuur en Waterschap, 2023).
- Spatial Planning Act (in Dutch: Wet Ruimtelijke Ordening or Wro) governs energy transition and spatial planning procedures, including provincial zoning plans for projects of provincial significance.
- The European Direct 2009/28/EG sets a target of 14% energy consumption from renewables by 2020, shing national wind energy policies.
- The Energy Report (in Dutch: Energierapport) articulates the ambition of the Dutch government for sustainable energy, emphasizing wind energy opportunities.
- The National Energy Agreement (in Dutch: Nationaal Energieakkoord) accelerates sustainable energy production through commitments between the government, provinces, and societal organizations. The goal for the Province of Limburg is to have 95.5 MW of wind energy capacity by 2020.
- The Decree on General Rules of Spatial Planning (in Dutch: Besluit algemene regels ruimtelijke ordening or Barro) limits policy space for other authorities in areas of national interest, guiding the establishment of search areas for large wind farms in the Structural Vision Wind Energy on Land.
- The Structural Vision Infrastructure and Space (2012) (in Dutch: Structuurvisie Infrastructuur en Ruimte) outlines the national spatial policy and strategy for large-scale wind energy sites.
- The Structural Vision Wind Energy on Land (in Dutch: Structuurvisie Windenergie op Land) identifies suitable locations for large scale wind farm, contribution to the 6 GW wind energy goal.
- The Electricity Act (1998) (in Dutch: Elektriciteitswet) mandates national coordination for projects exceeding 100 MW, with provinces able to delegate authority for wind farms over 5 MW to municipalities. The Province of Limburg transferred its authority to the Municipality of Neederweert for this particular wind farm.
- The Provincial Environment Plan Limburg 2014 (in Dutch: Provinciaal Omgevingsplan Limburg or POL2014) focuses on wind energy and designates preferred areas for wind turbine development.
- The Wind Energy policy outlines Nederweert municipality's commitment to environmentally friendly, community-centered wind energy projects.
- The Nederweert Structural Vision (in Dutch: Structuurvisie Nederweert) guides future spatial developments, emphasizing environmental impact assessment and community contributions.

5. Governance rules

Position rules

The Ospeldijk project engaged various positions held by an array of actors involved, each playing vital roles in its planning and development. These actors encompassed the provincial government, local councils, WML, energy cooperatives, and local residents, each bringing distinct perspectives and contributions to the decision-making process. The provincial

government of Limburg provided overarching guidance, urging municipalities to propose sustainable energy projects in line with national goals. Collaborative efforts between municipalities like Leudal, Nederweert, and Weert propelled wind energy initiatives forward. NEWECOOP and WML acted as project initiators, holding pivotal roles in the trajectory of the project. NEWECOOP, a fledgling cooperative, sought guidance from Zuidenwind, which provided mentorship, financial support and operational expertise. Local residents influenced decision-making through active participation in community engagement activities facilitated by WML and the LECs, offering valuable feedback on permit content and environmental concerns. The Municipality of Nederweert served as a regulatory authority, overseeing permit applications and ensuring compliance with environmental regulations. Additionally, an individual advocated for the protection of the Blauwe Kiekendief species raised ecological concerns through legal channels. The Council of State served as a legal arbitrator, ultimately dismissing the appeal and affirming regulatory approval for the project.

Boundary rules

The initial significant involvement of stakeholders occurred when the local council authorized the development of new wind energy projects in 2016, empowering Local Energy Cooperatives (LECs) to contribute to the establishment of cooperative wind farms for community benefit. Simultaneously, the establishment of six crucial guidelines for wind farm development delineated stakeholder roles and participation parameters. Community engagement initiatives such as discussion meetings, energy cafes, and gatherings organized by neighborhood associations facilitated direct engagement of local residents and stakeholders, enabling their participation in decision-making processes and fostering collective endeavors. The invitation for developers to submit proposals for potential wind farms, resulting in thirteen proposals, exemplified an inclusive approach to participation in the action arena while retaining authorities' control over conditions and means of participation. Among these proposals, the Windpark Ospeldijk project submitted by WML and NEWECOOP emerged as a leading contender. Throughout the planning process, the boundary of stakeholder involvement remained dynamic, continuously adjusting. To effectively manage the influx of proposals, an acceleration team comprising participation and financing experts was established in 2017, playing a pivotal role in refining proposals and facilitating decision-making. The submission of the initial permit request on January 31, 2018, marked the Municipality of Nederweert's transition from the action situation as environmental permits were granted, signifying the culmination of their primary role in the project's approval phase. The relatively expeditious process, despite the involvement of numerous stakeholders, suggests efficient management of stakeholder entry and exit, potentially facilitated by factors such as the organizational structure of project initiators and support from the provincial acceleration team.

Scope rules

The collaborative policy formed by the Municipalities of Leudal, Nederweert, Weert, Peel, and Maas in 2016 established precise guidelines dictating how wind energy would be developed and governed, thereby defining the scope rules. These guidelines delineated clear boundaries within which project developers were mandated to operate, covering aspects like cooperative project management, maximizing community benefits from wind turbines, selecting appropriate locations through spatial planning, and preventing land speculation. By April 2016, the scope expanded to include participation from private developers, who were

invited to submit proposals for potential wind farms. This solicitation resulted in the submission of thirteen project proposals, effectively narrowing the range of potential outcomes and further defining the scope rules. Following the evaluation of proposals, the project plan for the Ospeldijk site was selected, refining the project's scope. The collaborative effort between WML and NEWECOOP ensured ongoing community engagement and adherence to the scope rules established in the early phase of the project. Additionally, the specifications outlined in the environmental permit underscored the scope rules, setting precise boundaries for the project's execution concerning turbine specifications, power output, and positioning within the wind farm. While the initial plan aimed to establish a wind park within specific parameters, technological advancements necessitated adjustments to the turbines' tip height, prompting the application for a revised permit. Despite these alterations and any subsequent appeals, the project progressed more expeditiously than anticipated, indicating effective management of the scope rules and the capacity to accommodate necessary modifications without significant delays.

Aggregation rules

The aggregation rule employed in this case epitomized a deeply collaborative approach, emphasizing co-creation and coalition building, as key facets of governance. A diverse array of pivotal actors participated in the decision-making process. While each actor exerted influence, their actions were amalgamated into a broader collective endeavor. The start of the action situation can be traced back to the provincial government's mandate to generate 95.5 megawatts of sustainable energy, catalyzing municipalities to propose renewable energy ventures in alignment with the government's emphasis on local initiatives. This initial application of the aggregation rule underscored the collaborative decision-making dynamic between diverse governmental bodies. The establishment of REScoop Limburg, an overarching cooperative entity, further exemplified the collaborative approach, striving to identify wind farm sites with community backing and minimal disruption. The decision-making process involved both individual and collaborative efforts. While WML and NEWECOOP initially pursued separate proposals, their subsequent collaboration showcased the adaptive and fluid nature of the aggregation rules. Decision-making throughout the project was anchored on co-creation and consensus-building rather than rigid rules, as demonstrated by the involvement of an acceleration team convened by municipalities to review and improve project plans. Final decisions regarding project approval prioritized cooperation over commercial interests, adhering to principles of democratic control, notably in financing arrangements where NEWECOOP members gained membership in Zuidenwind. Community engagement initiatives such as discussion forums and energy cafes facilitated feedback collection, reinforcing the commitment to shared decision-making.

The permit application phase overseen by the Municipality of Nederweert marked a pivotal juncture, embodying aggregation rules despite ostensibly being executed by a single actor, as it integrated various expert inputs. The public review period allowed for community participation, with received comments influencing decision-making, highlighting the participatory essence of aggregation rules.

The issuance of environmental permits on July 16, 2018, endorsed by the Municipality of Nederweert, constituted a binding decision, subject to appeal, ultimately dismissed by the Council of State on February 27, 2019.

Information rules

The shift towards a collaborative approach to wind energy represented a pivotal juncture in information dissemination, where project guidelines pertaining to location selection, project management, and community benefits were clearly delineated and provided to potential developers. This emphasis on transparency underscored the application of information rules, ensuring stakeholders were actively engaged through diverse channels such as discussion forums, energy cafes, and neighbourhood gatherings, fostering the collection of varied perspectives and feedback. Furthermore, the of information shared with stakeholders extended beyond initial planning, encompassing detailed specifications regarding wind turbine parameters like hub height, rotor diameter, and tip height. This comprehensive approach not only ensured regulatory compliance but also alignment with designated locations. Moreover, the establishment of an independent acceleration team comprising experts exemplified a high degree of transparency in decision-making processes. Combined with transparent sharing of information regarding project proposals and selection criteria, this fostered a robust and democratic environment for project development. Obtaining the environmental permit represented a critical milestone for project initiators, necessitating extensive community engagement and highlighting the significance of information rules in facilitating a platform for sharing insights, information, and perspectives with the community.

The subsequent public review period from March 2018 to May 2018 further exemplified the application of information rules, with draft environmental permits made accessible for public scrutiny, enabling stakeholders to provide comments based on available information. The granting of environmental permits to the Windpark Ospeldijk project on July 16, 2018, by the Municipality of Nederweert reinforced the effectiveness of information rules by publicly announcing the decision outcome, ensuring stakeholders remained informed about the project's progression and promoting transparency.

Payoff rules

The financing of the project was orchestrated through contributions from members of the Local energy cooperatives Zuidenwind and NEWECOOP, with Zuidenwind shouldering 90% of the expenses. A SDE subsidy was also allocated to the project for a maximum of 20 million (Rijksdienst voor Ondernemend Nederland, n.d.). The project faced challenges, particularly in structuring the wind farm's revenues. Two-thirds of the revenues were earmarked for the benefit of the local community, while the remaining third was allocated to the members. Moreover, the cooperative project model allowed local residents to participate and invest in the venture, guaranteeing democratic control irrespective of the investment amount.

To further enhance the community's welfare from the wind farm, an environmental fund was established to finance sustainable initiatives over a 15-year period. One euro per kilowatt-hour was allocated to the fund, surpassing the standard compensation rate of 50 cents per megawatt-hour. This initiative would provide approximately €45,000 annually for such projects (SWECO, 2018). In essence, the application of the pay-off rule to Windpark Ospeldijk revealed various cost and benefit scenarios. Despite the incurred costs, both financial and temporal, the establishment of an environmental fund, opportunities for local resident involvement, and the equitable distribution of the project's earnings highlighted the advantages associated with this endeavor. Furthermore, the transparency and fairness ensured

through the pay-off rule played a pivotal role in securing the permit application's success without encountering significant delays or obstacles.

Choice rules

In the initial phases of the project, decision rules were embodied within the guidelines established by project planners in 2016. These guidelines outlined the cooperative management of projects, prioritizing community benefits, careful spatial planning, and the prevention of land speculation. It was these decision rules that empowered the Municipality of Nederweert to invite project developers to propose potential wind farm plans, resulting in the submission of thirteen project proposals. Among these proposals emerged the Ospeldijk wind farm project, initiated by WML and NEWECOOP. A critical decision point for the project was the acquisition of permits. WML and NEWECOOP devised a strategy to consolidate their permits, ultimately leading to the approval of their project in August 2019. Regarding the project's costs and benefits, the LEC made a decision to establish a board wherein democratic decisions were made. The cost-benefit analysis of the project was facilitated through a democratic decision-making process within the management board of the Burgerwindpark Ospeldijk B.V., ensuring that two-thirds of the profits would be allocated towards environmental funds, with the remaining third benefiting the members. Another significant decision revolved around the management of the project's finances. NEWECOOP, facing financial constraints, sought assistance from Zuidenwind. Leveraging its experience and financial stability, Zuidenwind took on the project's responsibilities without expecting financial compensation in return. Throughout the execution of these projects, public consultation and engagement served as integral decision rules. Stakeholders were actively involved in decision-making processes through discussion meetings, energy cafes, and neighborhood association gatherings. These measures ensured that public feedback and sentiments were incorporated into the planning and execution of the wind farms.

6. Biophysical/material conditions

The Ospeldijk wind farm, situated in the Limburg region of Nederweert, occupies an agricultural landscape with vast fields, creating a sparsely populated area conducive to wind turbine installation. Positioned near the WML pumping station and southeast of Ospeldijk village, the site spans approximately 2 kilometers with turbines spaced about 670 meters apart. Residential dwellings are roughly 450 meters away, while the nearest village center is approximately 2650 meters distant. The approved wind farm comprises four turbines, each with a maximum hub height of 135 meters and a power capacity of 4 megawatts. These turbines, of the Delta 4000 N149 type, have hub heights of 135 meters, rotor diameters of 149 meters, and tip heights of 209.5 meters.

7. Attributes of the community

The inception of the Ospeldijk wind farm was marked by a diverse collaboration, with NEWECOOP playing a pivotal role. Despite its relative novelty, the LEC NEWECOOP demonstrated remarkable tenacity and adaptability. Faced with financial constraints, it proactively sought support from the more experienced LEC Zuidenwind, showcasing a willingness to learn and grow. In contrast, Zuidenwind demonstrated operational efficiency and a pragmatic business-oriented approach, readily offering its resources and expertise to support NEWECOOP. Their partnership exemplified shared goals, collective advancement, and democratic decision-making. Meanwhile, the Province of Limburg and local

municipalities played supportive roles, allowing the collaboration to flourish. The province fostered a conducive environment for such initiatives, while municipalities displayed leadership and management prowess in steering the projects. Despite initial community apprehension, effective communication efforts, including house-to-house discussions and public forums, assuaged concerns and garnered active community participation. This cooperative and proactive spirit among residents significantly contributed to expediting the project's realization, culminating in its successful completion within a shorter timeframe than anticipated. The Ospeldijk project stands as a testament to the efficacy of collaborative endeavors and the resilience of involved stakeholders.

8. Interactions

The interaction commenced in 2015 with a collective commitment from the local municipalities to delve into wind energy exploration, catalyzing active engagement from the local government in renewable energy endeavors. This prompted robust community involvement, sparking intense discussions and the organization of structured meetings. REScoop Limburg emerged as a pivotal player, uniting regional cooperatives with a shared objective of strategically siting wind farms to minimize disruption and garner community backing, emblematic of cooperative action and strategic planning. A significant turning point in wind farm development was marked by the introduction of project guidelines, a result of strategic interactions among the acceleration team, project planners, local council, and LECs. The call for project proposals triggered a dynamic interaction of solicitation and response, yielding a surge of proposals and showcasing strategic decision-making and stakeholder engagement. The collaboration between WML and NEWECOOP exemplified cooperation and negotiation, underscoring shared goals and mutual benefits in their joint approach to the Municipality of Nederweert (SWECO, 2018). In the financial realm, the interaction between LECs Zuidenwind and NEWECOOP demonstrated strategic cooperation, with Zuidenwind providing the bulk of financing while NEWECOOP gradually acquired ownership, preserving democratic control over wind farm operations. The establishment of an acceleration team in 2017 by municipalities and the province reflected an interaction involving expert evaluation and selection, streamlining project proposals and optimizing regional wind energy efforts collectively. Active community engagement throughout showcased robust interaction between project initiators and residents, with diverse responses shaping permit acquisition and community backing. Formal and regulatory interaction ensued as initiators submitted applications to the Municipality of Nederweert, triggering public review of draft permits and enabling stakeholders to voice concerns on various fronts, from permit content to environmental impacts. The appeal filed with the Council of State regarding the Blauwe Kiekendief underscored a new interaction, highlighting the tension between environmental preservation and development objectives.

9. Outcomes

The primary objective of the action situation was to secure a permit for constructing a wind farm in Ospeldijk, initiated by a joint commitment from local municipalities to pursue wind power regionally. Through the implementation of six crucial guidelines, the project invited proposals from developers, resulting in thirteen submissions. After a review process facilitated by an acceleration team, three final projects were selected, with the Windpark Ospeldijk project emerging as a milestone. Initially separate initiatives by WML and NEWECOOP evolved into a joint venture, with LEC ownership evenly distributed. Zuidenwind's support

ensured project financing, with ownership gradually transferred to NEWECOOP to maintain democratic control. Community engagement was evident through discussion meetings and public feedback, highlighting diverse attitudes towards wind energy. The permit request, submitted on January 31, 2018, prompted public review, resulting in 17 viewpoints addressing various concerns. Construction of the wind park commenced on June 25, 2020, following minor adjustments but no significant delays. Featuring four wind turbines, each with a hub height of 135 meters and a capacity of 4 MW.

10. Evaluative criteria

The action situation revolved around the intricate task of selecting, developing, and operationalizing wind farm sites. Various tactics were deployed by involved parties, including establishing regional cooperatives, setting up guidelines for development, inviting proposals, and engaging in negotiation and review processes. Notably, a strong emphasis was placed on participatory and cooperative approaches throughout this process, evident in initiatives like REScoop Limburg and the collaboration between WML and NEWECOOP. Decision-making processes embraced cooperation, supported by structures like the "acceleration team" and ongoing community engagement. Financial transparency and accountability were crucial elements, ensuring responsible resource management and stakeholder trust. Beyond achieving energy objectives, outcomes included local democratic control over resources, economic growth, and environmental sustainability. Efficient coordination and streamlined decision-making, facilitated by compact organizational structures and collaboration, contributed to a relatively short project duration of 21 months from initiation to permit application. Flexibility in project design and implementation, coupled with transparent communication towards local residents, enabled timely responses to emerging opportunities and constraints, ensuring resilience and success in the long run. Community engagement strategies, like discussion meetings and energy cafes, elicited crucial feedback, despite some process gaps highlighted by seventeen comments received. Despite concerns, environmental permits were granted, and the project progressed, with construction commencing without significant delays. The project exemplifies the value of foresight, strategic planning, and community engagement, underscoring the importance of impact assessments and transparent decision-making. The entire (pre-)development process spanned from April 2016 (initiation) to the end of June 2020 (start of construction).

Appendix C: Nijmegen-Betuwe project

This appendix presents a case study examining the development of Windpark Nijmegen-Betuwe in Gelderland through the lens of Ostrom's Institutional Analysis and Development (IAD) Framework. By employing this framework, a comprehensive analysis is provided of the complex interactions and institutional arrangements involved in the establishment of this particular wind park.

1. Project description

In 1996, plans for wind turbines in Nijmegen were initiated. The Municipality of Nijmegen announced its intention to provide sustainable energy to residents in the Waalsprong area that year (Windpark Nijmegen-Betuwe, n.d.-a). The Environmental Impact Assessment for the Waalsprong was conducted in 2001, confirming the suitability of the location (RVO, n.d.). Subsequently, in 2005, the location was included in the provincial spatial plan. Plans began to take shape in 2006 when the company Evelop (later Eneco) expressed interest as a potential developer. In 2009, the Municipal Council decided to provide planning support for the project. However, in April 2012, the plan faced setbacks when the Council of State nullified the zoning plan due to procedural errors in the EIA process, following objections from local residents. Eneco withdrew from the project after this event.

On December 6, 2012, Natuur en Milieu Gelderland (NMG) and Izzy Projects presented a proposal for a community wind park. This led to an intention agreement on May 22, 2013. Subsequently, the initiators officially established the Wiek-II Foundation and the WindpowerNijmegen (WPN) cooperative. In December 2013, the municipality began drafting a new Structural Vision. On December 10, 2013, the municipal council approved the "Sustainability in Action" policy and the "Roadmap Power 2 Nijmegen." In January 2014, a new EIA was conducted, reaffirming the suitability of the location.

After the draft project plan was prepared, it was made available for public review along with the EIA from March 26 to May 7, 2014. Interested parties could submit their comments during this period. An information evening was held on April 17, 2014. The Municipal Council approved a revision of the structural vision, a zoning plan amendment, and the EIA study on October 1, 2014. The zoning plan was then made available for public review for six weeks, during which five objections were filed. On May 6, 2015, the Council of State declared the zoning plan irrevocable.

Simultaneously, the process for the environmental permit began. An environmental permit application was submitted to the municipality on March 4, 2015. The draft decision on the environmental permit was published on March 27, 2015. The decision was open for public review for six weeks, during which four comments were received. On May 28, 2015, the municipality granted the environmental permit. The permit was open for review from June 5 to July 17, 2015, during which one appeal was lodged. A hearing on this appeal was held on September 8, 2015, and on October 21, 2015, the Council of State declared the environmental permit irrevocable. Construction activities commenced in April 2016, marking the end of action situation.

2. Action situation: (Pre-)Development Phase

The action situation unfolded in 1996 with the initiation of plans for wind turbines in Nijmegen, coinciding with the municipality's commitment to providing sustainable energy to

Waalsprong area residents. Evelop (later Eneco) emerged as a potential developer in 2006. Despite initial Municipal Council support in 2009, setbacks emerged in April 2012 when the Council of State nullified the zoning plan due to procedural errors in the EIA process, leading to Eneco's withdrawal. In December 2012, Natuur en Milieu Gelderland (NMG) and Izzy Projects proposed a community wind park, leading to an intention agreement in May 2013. This sparked the establishment of the Wiek-II Foundation and the WindpowerNijmegen (WPN) cooperative. An EIA reaffirmed the location's suitability in January 2014. Drafting of the zoning plan followed, with a public review period from March 2014 to May 2014, culminating in municipal council approval in October 2014. The zoning plan's irrevocability was confirmed by the Council of State on May 6, 2015. Concurrently, the environmental permit process commenced, with an application submitted on March 4, 2015, eventually granted by the municipality on May 28, 2015, and upheld by the Council of State on October 21, 2015. Construction activities commenced in April 2016, marking the conclusion of the action situation.

3. Participants

The following actors were involved in this action situation:

- **Province of Gelderland:** was partially involved as the wind park plans pertained to a location in Gelderland. However, Gemeente Nijmegen had jurisdiction over the wind park, and the province was reluctant to cooperate (Appendix F).
- **Council of State:** was involved in this action situation as it nullified Eneco's zoning plan (RVO, n.d.).
- **Municipality of Nijmegen:** was involved in this action situation as the geographical location for the Nijmegen wind park. Furthermore, the municipality had announced its intention to provide residents with sustainable energy as early as 1996 (RVO, n.d.).
- **Municipality of Overbetuwe:** was involved in this action situation as the initial plans for the wind park comprised five wind turbines in Nijmegen and four in Overbetuwe. However, these plans were altered to include only five turbines in Nijmegen, excluding the Municipality of Overbetuwe from the situation. Following the municipal elections, the municipality decided not to construct the four intended turbines.
- **Local Energy Cooperative WindpowerNijmegen (WPN)**: was established by the initiators in this action situation to ultimately create a community-owned wind park.
- **Eneco:** (Evelop) was involved in this action situation as the first initiator when the company emerged in 2006 (RVO, n.d.). However, after the plans stalled following the Council of State's ruling in 2012, Eneco decided to withdraw
- **Izzy Projects**: was involved in this action situation because its director, Pim de Ridder, is a local wind energy developer who, along with Natuur en Milieu Gelderland, initiated the Nijmegen-Betuwe wind park project.
- **Natuur en Milieu Gelderland (NMG):** along with Izzy Projects (Pim de Ridder), proposed the idea for the Nijmegen-Betuwe wind park to the Municipality of Nijmegen. Hence, NMG was one of the initiators.
- **Wiek-II:** was involved in this action situation as this development foundation was established during this phase. This was a requirement of the municipality, which lacked confidence in granting wind park authorization to a cooperative without a proven track record. NMG, the wind energy developer (Pim de Ridder/Izzy Projects), and Coöperatie WindpowerNijmegen were part of this foundation.

- **Local residents:** were involved in this action situation as the wind park plans directly affected their immediate surroundings. These residents were located in four residential areas: Nijmegen-Noord, Oosterhout, Ressen, and Reeth. The Reeth neighborhood vehemently opposed the wind park plans from the outset.

4. Policy regulations

The following laws, regulations, and policy measures were applicable to this action situation:

- General Administrative Law Act (in Dutch: Algemene wet bestuursrecht or Awb): This law outlines the fixed steps of an objection procedure, allowing stakeholders to formally respond to government decisions or plans. Additionally, the Awb stipulates that stakeholders who submit objections may subsequently file an appeal with the court. In this action situation, stakeholders had the right to submit objections and subsequent appeals against the zoning plan and permits, leading to the nullification of Eneco's plans by the Council of State in 2012.
- Sustainability Agenda 2011-2015 (in Dutch: Duurzaamsheidsagenda): This agenda aimed for Nijmegen to become energy-neutral by 2045, meaning the energy used by the municipality would be sustainably generated. The municipality's positive attitude and cooperation in initiating the wind park of NMG and Izzy Projects aligned with this agenda.
- Electricity Act (1998): This law allows provinces to transfer authority for wind parks with a capacity greater than 5 MW to municipalities. In the case of Windpark Nijmegen-Betuwe, the municipality of Nijmegen assumed authority.
- Energy Agreement (in Dutch: Energieakkoord): This agreement aimed for 14% of all energy consumption in the Netherlands to be sustainable by 2020, in line with the European directive on renewable energy. Although the plans for Windpark Nijmegen-Betuwe aligned with this goal, the province of Gelderland was not very cooperative.
- Environmental Ordinance Gelderland (in Dutch: Omgevingsverordening): This provincial ordinance requires a spatial design in zoning plans enabling wind turbines, considering landscape characteristics. This was also applicable to Windpark Nijmegen-Betuwe.
- Roadmap The Green Power (in Dutch: Routekaart De Groene Kracht) : This roadmap focuses on regional production of sustainable energy and energy conservation. It was jointly developed by municipalities in the Arnhem-Nijmegen region and includes objectives aligned with national and provincial sustainable energy goals. The plans for Windpark Nijmegen-Betuwe were in line with this roadmap.
- Nijmegen Structure Vision 2013 (in Dutch: Structuurvisie Nijmegen 2013): This vision outlines the main spatial developments and choices made by the municipality in its spatial policy. It was crucial in this action situation, as the structure vision needed revision to enable the wind park from a planning perspective.
- Land Wind Structure Vision (in Dutch: Stuctuurvisie Wind op Land or SWOL): This plan details the expansion possibilities for onshore wind energy in the Netherlands. The SWOL aimed to achieve 6000 MW of wind energy capacity by 2020 but lacked the means to achieve this goal, prompting the municipality of Nijmegen to take a proactive role in establishing Windpark Nijemgen-Betuwe.

- Spatial Planning Act (Wet ruimtelijke ordening or Wro): This law defines how spatial plans are formed and who is responsible for them. In the case of this wind park, the municipality of Nijmegen was responsible.

5. Governance rules

Position rules

The action situation delineates distinct position rules among various stakeholders with differing power dynamics. Eneco served as the primary initiator, wielding influence in determining the project's nature (RVO, n.d.). Subsequently, the competent authorities, represented by the Municipalities of Nijmegen and Overbetuwe, held sway over political decisions within the context of this situation (RVO, n.d.). Residents, possessing the power to voice objections and appeals, played a pivotal role, with the Council of State ultimately wielding authority to nullify Eneco's plans (RVO, n.d.). NMG and Izzy Projects emerged as secondary initiators, exercising their power to shape the project's direction (Windpark Nijmegen-Betuwe, n.d.-a). Following this, the Municipality of Nijmegen regained authority over political decisions (RVO, n.d.). Notably, the municipality held the foremost authority in making political decisions concerning the wind park, while Wiek-II and the cooperative WPN possessed decision-making positions regarding the park's specific layout. Within the cooperative, working groups enabled members to contribute to pertinent issues, with general meetings facilitating decisions on park-related matters. Although residents had the option to join the cooperative, they opted against it, yet retained the ability to submit objections and appeals, which they exercised (Windpark Nijmegen-Betuwe, n.d.-b). Finally, the Council of State wielded authority in rendering the zoning plan and environmental permit irrevocable (Windpark Nijmegen-Betuwe, n.d.-b).

Boundary rules

The action situation of the (pre-)development phase delineates its boundary rules as determinants of entry and exit for involved parties. Initially, Eneco initiated the situation, drawing in the municipalities of Nijmegen and Overbetuwe through its project proposals (RVO, n.d.). Residents entered at the outset, culminating in intervention by the Council of State. Upon the nullification of the zoning plan by the Council of State, Eneco exited the situation (RVO, n.d.). Subsequently, NMG and Izzy Projects entered as new initiators, having previously engaged with Eneco but were preempted by its withdrawal following the Council of State's ruling. Following this, the establishment of Wiek-II and WindpowerNijmegen marked their entry into the situation, prompted by municipal requirements (RVO, n.d.). Upon initiation of the zoning plan procedure, the Municipality of Nijmegen and residents re-entered, allowing for objections and appeals (Windpark Nijmegen-Betuwe, n.d.-a). Eventually, efforts to involve the Province of Gelderland further were rebuffed. Wiek-II (with NMG and Izzy Projects), the WindpowerNijmegen cooperative, and the municipality of Nijmegen entered the action situation through environmental permit applications. Residents and stakeholders joined when afforded the opportunity to submit objections and appeals regarding permits and zoning (Windpark Nijmegen-Betuwe, n.d.-b). The Council of State adjudicated on these matters, while the Innovatie- en Energiefonds Gelderland (IEG) entered to aid project financing and eventually became a minority co-owner.

Scope rules

The action situation delineates its scope rules as the range of alternative solutions for initiating and planning the wind park. Eneco's initial proposal envisioned a wind park with nine turbines: four in Overbetuwe and five in Nijmegen. However, the residents of Reeth influenced Overbetuwe's Municipal politics to the extent that the municipality opted not to construct the four turbines in Overbetuwe after the elections. Despite separate Environmental Impact Assessments (EIA) for each municipality, the Council of State mandated a comprehensive EIA, compelling Nijmegen to prepare it for nine turbines, although they only intended to build five. This precaution was necessary due to the possibility of a nine-turbine park. Any failure in the permitting process could have resulted in no wind park at all. Initially, the plan was for five turbines along the A15 in Nijmegen, later reduced to four, with no other alternatives introduced. Failure in the permitting process was also considered as a potential alternative outcome.

Aggregation rules

The action situation illustrates its aggregation rules as the collaborative efforts guiding decision-making throughout the phase. Initially, collaboration occurred between Eneco and the Municipalities of Nijmegen and Overbetuwe when they agreed to cooperate on Eneco's plans. Later, Natuur en Milieu Gelderland (NMG) and Izzy Projects collaborated to initiate the community wind park, leveraging their prior interactions and shared goals. NMG had previously collaborated with residents near the wind park on other sustainability initiatives, fostering a rapport with local residents. Additionally, the initiators (NMG and Izzy Projects) had connections within the Municipality of Nijmegen, facilitating project approval. Within the development foundation Wiek-II, collaboration persisted between NMG and Izzy Projects, extending to cooperation with the energy cooperative WPN during wind park development. Residents from Nijmegen and neighboring areas collaborated within the cooperative, participating in decision-making processes. Moreover, Wiek-II and the WPN cooperative collaborated closely with the Municipality of Nijmegen to address all necessary matters for wind park realization, including permits.

Information rules

The information exchange within this action situation followed formal channels primarily between the initiators and the Municipality of Nijmegen, where instructions for the EIA were provided and complied with. The municipality also handled official publications in the local newspaper and on its website, ensuring transparency for residents and stakeholders. However, administrative sensitivities with neighboring municipalities posed challenges, preventing equal access to information for residents in those areas. To address this, the initiators took the initiative to publish information in the local newspapers of Lingewaard and Overbetuwe and directly communicated with residents via email. This direct outreach was deemed crucial for fostering transparency and trust, according to NMG representatives. In addition to formal channels, the initiators engaged with residents through letters and occasional informal conversations and the documents from the Council of State were readily available for all residents. However, similar to the first action situation, the municipality faced sensitivities with neighboring municipalities, which hindered information sharing with residents from those areas. Nevertheless, the developer remained in contact with residents throughout the entire process (HIER, 2020). Furthermore, the board of the cooperative communicated information with its members in meetings and other forums. There was a minor issue

regarding communication about the so-called "planschade". In a meeting with members, a business case was discussed, which included a mention of four tons of planschade. It was not explained to the members that this was not the official compensation for planschade, as it is arranged through the municipality.

Payoff rules

Eneco faced significant costs as the project initiator, particularly in the event of losing the permit application. Eneco did not want to risk losing the money invested in the procedure again, prompting their decision to halt the project after the Council of State ruling. Subsequently, the new project initiators, including NMG, Izzy Projects, and LEC WindpowerNijmegen, assumed the costs of the pre-project phase, relying on various financing methods due to insufficient equity. NMG and Izzy Projects did invest some of their own money, but they also relied on subsidies. Political support for the wind park was strong; the entire Muncipal Council voted in favor, and the municipality deferred payment until financial close, effectively providing a subsidy. The municipality also covered the costs of the environmental impact assessment. These costs were reimbursed to the municipality when the wind park was actually developed, but that is beyond the scope of this action situation.

While the potential negative effects were uncertain, residents invested time in reviewing the wind park plan. Ultimately, the permit application advanced the initiators' goal of realizing the wind park. Additionally, Wiek-II and the WindpowerNijmegen cooperative covered part of the investment costs, with significant contributions from shareholders and financial support from other parties, including subsidies from the municipality. In total, the cooperative raised 2 million euros from 1013 shareholders within the cooperative. The province did not directly provide subsidies, but the initiators received financial assistance from Oost NL (now Innovatie- en Energiefonds Gelderland or IEG). This amounted to four hundred thousand euros. Oost NL is a development agency of Gelderland and Overijssel, and ultimately, IEG also became a 5 percent owner of the wind park (RVO, n.d.).

Initially, the revenues were allocated to repay the bank loan. The cooperative decided that the proceeds would then go to a community fund at one euro per MWh. The remaining funds would then be distributed to the cooperative's shareholders as returns. If this exceeded a 7 percent return, half of the additional returns would go to a sustainable energy fund, and the other half to the shareholders. There were objections to the decision to allocate one euro per MWh to the community fund, as the Wind Energy Code of Conduct of NWEA specifies that 40 to 50 cents per MWh should go to the community fund. Ultimately, the shareholders were also not paid out twice, but this falls outside of this action situation. The advantage of the community fund is that it has led to several worthwhile initiatives. Additionally, the cooperative set aside additional funds for residents of Reeth, which generated considerable goodwill, and some members of the Reeth Residents' Association put the money into a neighborhood fund to establish a solar park. However, this falls outside of this action situation. Furthermore, the interviewee from the Municipality of Nijmegen found it somewhat perverse that the cooperative promised residents money if they won the procedure.

Choice rules

In this action situation, significant decisions shaped the trajectory of the wind park project. Firstly, the municipality of Nijmegen decided to provide sustainable energy to the Waalsprong area and designated the Nijmegen-Betuwe location for the wind park project. Following this,

Eneco (formerly Evelop) made the pivotal choice to initiate the wind park, which was subsequently nullified by the Council of State. In response, NMG and Izzy Projects opted to initiate a community wind park at the same location. This initiative prompted the municipal council to approve revisions to the structural vision, zoning changes, and the environmental impact assessment. In a parallel action, Wiek-II and the WindpowerNijmegen cooperative made a crucial decision to submit the permit application. Subsequently, the Council of State's rulings declared both the zoning plan and environmental permit irrevocable, allowing Wiek-II and the cooperative to proceed with preparations for wind park construction.

6. Biophysical/material conditions

The envisioned wind park was initially slated to span across the Municipalities of Nijmegen and Overbetuwe in the province of Gelderland, with plans for five turbines in Nijmegen and four in Overbetuwe. However, following the municipal elections, Overbetuwe opted out of constructing the four intended turbines, leading to a shift in focus solely to Nijmegen. Situated on the northern edge of Nijmegen, the wind park borders the Municipalities of Overbetuwe and Lingewaard. Despite the Municipality of Nijmegen's dedication to the energy transition, the scarcity of suitable rural areas posed challenges for wind energy projects. Consequently, the municipality sought to capitalize on the few viable locations available, including the proposed site for the Nijmegen-Betuwe wind park. This wind park consists of four 2.5 MW turbines, each boasting a mast height of 99 meters and a total height of 150 meters, including the blades. Additionally, the rotors are set to have a diameter of 100 meters.

7. Attributes of the community

The residents surrounding the proposed wind park were divided across four residential areas: Nijmegen-Noord, Oosterhout, Ressen, and Reeth. Nijmegen-Noord, being a Vinex location, attracted many people who viewed the wind park as an interesting development. Additionally, there was hardly any opposition from the village of Oosterhout. Residents from Ressen also reacted relatively positively to the plans for the wind park in this action situation. However, residents from the Reeth hamlet vehemently opposed the plans for the wind park from the outset. They also contributed to Eneco's initiative failing at the Council of State. The attitude of the people from Reeth towards the proposed wind park was influenced by the numerous developments in the vicinity, such as the Betuweroute and the widening of the A15.

8. Interactions

This action situation encapsulates a series of pivotal interactions that laid the groundwork for the successful permit application and subsequent commencement of wind park construction. Initially, the collaboration between Eneco and the municipalities of Nijmegen and Overbetuwe set the project in motion, followed by the crucial partnership between NMG and Izzy Projects, which spearheaded the community wind park initiative. This collaborative effort led to the establishment of the cooperative and the development foundation, facilitating dialogue with the municipality of Nijmegen. Subsequently, the engagement between Wiek-II, the WPN cooperative, and the municipality of Nijmegen during the permit application spurred resident involvement through objections and appeals, resulting in a Council of State ruling. Additionally, significant growth occurred within the cooperative as it expanded to encompass 1013 members, reflecting heightened community engagement and support for the project.

9. Outcomes

The pivotal outcome of this action situation, the (pre)development phase, is a permit for the realization of the Nijmegen-Betuwe wind park and brought the municipality of Nijmegen one step closer to achieving their sustainable goals. The residents of Nijmegen and the surrounding area had the opportunity to participate in the wind park through the cooperative. This was largely done, but unfortunately not by the park's residents. There was some resistance from the residents, particularly those from Reeth. Only a few objections and appeals were filed, and the initiators managed to have an appeal from Reeth withdrawn. In total, there were four objections and one appeal filed. In summary, there was relatively little resistance from residents or stakeholders in this action situation.

10. Evaluative criteria

This action situation encapsulates both the failure and success in initiating a wind park in Nijmegen. Eneco's unsuccessful attempt highlights the importance of adhering to legal frameworks and procedures, while also paving the way for the community wind park initiative. Collaboration among NMG, Izzy Projects, and the municipality of Nijmegen proved instrumental in realizing the Nijmegen-Betuwe community wind park, showcasing the potential of collective efforts. The wind park's swift establishment, predominantly citizen-owned, marked a success, despite some resistance, particularly from Reeth residents. Notably, the distinction between local and Nijmegen residents played a role, with the former not actively participating in the cooperative. The initiators' recognition of this division and their leveraging of past attempts contributed to the wind park's success, according to the interviewee. Despite political reluctance from the province of Gelderland, effective collaboration between Wiek-II, the WPN cooperative, and the municipality facilitated a rapid and smooth progression of this action situation.

Furthermore, it can be said in hindsight that political reluctance was the primary obstacle for this wind park. The province of Gelderland provided minimal cooperation and even offered some resistance. However, despite this, the effective collaboration between Wiek-II, the WPN cooperative, and the municipality of Nijmegen ensured that this action situation proceeded quickly and smoothly. The (pre-)development process ended in April 2016, when the construction started.

Appendix D: Koningspleij project

This appendix presents a case study examining the development of Windpark Koningspleij in Gelderland through the lens of Ostrom's Institutional Analysis and Development (IAD) Framework. By employing this framework, a comprehensive analysis is provided of the complex interactions and institutional arrangements involved in the establishment of this particular wind park.

1. Project description

In 2010, OutSmart, specializing in offshore wind energy, established itself in Arnhem and initiated discussion with the municipality about wind energy in the area (De Keijzer, 2016). By 2011, the Municipality of Arnhem presented two studies: the KEMA feasibility study for four areas in Arnhem and the Quickscan by Bureau Waardeburg regarding the environmental effects (De Keijzer, 2016). The results indicated that the Koningspleij area was suitable for wind turbines. Subsequently, in 2012, the Rijn en IJssel Energy Cooperative (REIJE) was established, followed by the founding of Pleij BV as the development company for the wind park in 2013 (De Keijzer, 2016). In 2013, the Municipality of Arnhem decided to facilitate market initiatives for wind turbines, including the location where the Koningspleij wind park is now located (Rijn en IJssel Energy Cooperative, 2020b). Immediately after, LEC RIJE and Pleij BV approached the municipality to jointly initiate a cooperative wind park on this site, marking a significant event in the pre-development phase.

The project initiators anticipated the municipal elections of March 2014, and upon the formation of the coalition agreement, which included provisions for wind turbine placement, they intensified their efforts (De Keijzer, 2016). In June 2014, wind consultations allowed residents and stakeholders to pose questions about the wind park, with the responses factored into subsequent studies; the results were shared in an information session on January 11, 2017 (Windpark Koningspleij, 2017b). Furthermore, Pure Energie joined as the third initiator in 2015, informed by landowner Industriepark Kleefse Waard (IPKW) about the potential for installing a wind turbine on their land (De Keijzer, 2016). This development led to a significant event, followed by the completion of a preliminary ecological assessment by Waardenburg in June 2016, based on various field visits conducted in 2015 (Kruijt & Heunks, 2016). Waardenburg's recommendations included measures to mitigate negative impacts on bird species, particularly the curlew, with a follow-up study introducing a shutdown mechanism for the curlew completed by Bureau Waardenburg in September 2016 (Windpark Koningspleij, 2016a; Windpark Koningspleij, 2016b).

During a general meeting of REIJE on December 12, 2016, it was decided that members could participate in the wind park through membership certificates (Windpark Koningspleij, 2017d). Shortly after, on December 19, 2016, the Municipality of Arnhem opted to implement the coordination regulation, enabling the simultaneous processing of the draft zoning plan, the Environmental Impact Assessment (EIA), and the draft environmental permit for the wind park (Windpark Koningspleij, 2017a). Subsequently, on January 3, 2017, an application for an environmental permit for the wind park was submitted (Bod, n.d.). Following this, in February 2017, the first meeting for volunteers aspiring to become 'wind ambassadors' was convened (Windpark Koningspleij, 2017d). An information session was organized at the Energy Café in the following month (Windpark Koningspleij, 2017c). The draft zoning plan and the environmental permit were available for public inspection from March 2017 to May

2017, during which stakeholders could provide their feedback (Gemeente Arnhem, 2017). Additionally, four information markets were held by the municipality of Arnhem and the wind park initiators in March and April of 2017, for interested parties (Windpark Koningspleij, 2017e). In response to received comments, certain technical adjustments were made to the zoning plan. On June 13, 2017, the Municipal Council decided to present the zoning plan and the EIA to the city council of Arnhem (Windpark Koningspleij, 2017g).

The Municipal Council definitively approved the plans for the Koningspleij wind park in July 2017, marking a crucial milestone allowing for the renewal of the zoning plan and the granting of the environmental permit (Windpark Koningspleij, 2017h). Following this decision, from August 2017 to September 2017, the approved zoning plan and the granted environmental permit were open for public inspection, during which stakeholders could submit appeals (Windpark Koningspleij, 2017i). In 2018, Pleij BV sold its shares to Prowind (Rijn en IJssel Energy Cooperative, 2019). Additionally, on July 20, 2018, the Council of State held a hearing addressing appeals against the approved zoning plan, the granted environmental permit, and the exemption under the Nature Conservation Act (Windpark Koningspleij, 2017k). Furthermore, on September 10, 2018, the initiators submitted an application for a water permit to the Rijn en IJssel Water Board (Gemeente Arnhem, 2019), with the draft water permit available for public inspection from November 2018 to December 2018, during which stakeholders submitted comments (Gemeente Arnhem, 2019). Preparatory work, including an investigation into Unexploded Explosive Ordnance (UXO investigation), commenced on December 3, 2018 (Windpark Koningspleij, 2018).

On February 13, 2019, the Council of State made an important decision regarding the appeals filed, and the exemption under the Nature Conservation Act was declared final (Windpark Koningspleij, 2019a). The zoning plan and the environmental permit were not yet final at that time. The initiators and the municipality were given 16 weeks to improve the zoning plan based on the mentioned points (Windpark Koningspleij, 2019a). Subsequently, in February 2019, the Rijn en IJssel Water Board granted the water permit. This decision was available for public inspection from March 2019 to April 2019, and stakeholders filed appeals (Gemeente Arnhem, 2019). On May 15, 2019, the Municipal council of Arnhem approved the improvements to the zoning plan (Windpark Koningspleij, 2019c). On December 3, 2019, the amended zoning plan and the environmental permit were reviewed by the Council of State (Windpark Koningspleij, 2019c). At this hearing, the appeals against the water permit were also addressed. On April 1, 2020, the Council made a decision on this, and the zoning plan, environmental permit, and water permit were declared final (Windpark Koningspleij, 2020). This was a significant event, as construction preparations could begin after this decision. On February 1, 2021, the construction of the wind park began (Windpark Koningspleij, 2021a).

2. Action situation: (Pre-)Development Phase

The pre-development phase of Windpark Koningspleij began in 2010 when OutSmart initiated discussions with the Municipality of Arnhem on wind energy. Feasibility and environmental studies in 2011 identified the Koningspleij area as suitable location for wind turbines. The establishment of the Rijn en IJssel Energy Cooperative (REIJE) in 2012, followed by Pleij BV as the development company in 2013, laid the foundation for the development phase. Municipal facilitation of wind turbine market initiatives in 2013 prompted REIJE and Pleij BV to propose a cooperative wind park. Following the 2014 municipal elections and coalition agreement, wind consultations in 2014 and ecological assessments led to intensified efforts.

REIJE's member participation decisions in December 2016, alongside the initiation of preliminary work, marked progress. Early 2017 saw the submission of an environmental permit application, followed by volunteer meetings and information sessions. Approval by the Municipal Council in July 2017 allowed for the renewal of zoning plans and environmental permit issuance, with continued public inspection and appeals until September 2017. Changes in ownership and permit applications continued in 2018, including a water permit. Key decisions by the Council of State in 2019 and zoning plan improvements in May 2019 marked significant progress. Final review and approval of permits in December 2019 and April 2020 concluded the second action situation. Construction of the wind park commenced in February 2021, signaling the conclusion of the action situation.

3. Participants

The following actors were involved in this action situation:

- **Province of Gelderland:** was involved because it officially had authority under the Electricity Act in the decision-making process of this wind park. The province transferred that authority to the municipality of Arnhem but remained facilitative.
- **Municipality of Arnhem:** was involved in this action situation because the municipality facilitated market initiatives for wind turbines at the location of the Koningspleij wind park (Rijn en IJssel Energy Cooperative, 2020b). The municipality also commissioned several studies to assess the feasibility of wind turbines at the Koningspleij location (De Keijzer, 2016).
- **Industriepark Kleefse Waard (IPKW)** was involved in this wind park as the landowner (Attachment D). IPKW pointed out their land to Pure Energie for the realization of one wind turbine.
- **OutSmart:** is the initiator of the Koningspleij wind park. The company specializes in offshore wind energy. Several local initiators from Arnhem and Velp who had their eye on the location for the Koningspleij wind park were employed by this company.
- **Pleij BV:** was founded in 2013 as a development company for the Koningspleij wind park (De Keijzer, 2016).
- **LEC Rijn en IJssel Energy Cooperative (REIJE):** was communicatively involved from the beginning in this wind park. However, in this action situation, the cooperative was not yet financially involved. The cooperative represents an enthusiastic group of people from the area.
- **Pure Energie:** became co-initiators of the Koningspleij wind park in 2015 as a sustainable energy company by initiating one of the four wind turbines (Attachment D; Windpark Koningspleij, n.d.-a).
- **Prowind:** Outsmart sold its shares of Pleij B.V. to Prowind, therefore Prowind also became a project developer.
- **Local residents:** were involved because the plans for the wind park affected their immediate surroundings. Residents had the opportunity to participate and exchange information about the project in the Sounding Board Group. This group was established by the initiators and included, among others, the bird sound group and representatives of neighborhood councils from the area. Most of the resistance from residents arose from the Presikhaaf and Westervoort neighborhoods, which are closest to the wind park.

4. Policy regulations

The following laws, regulations, and policy measures were applicable to this action situation:

- Electricity Act (1998): Provinces can, based on this law, transfer the authority for wind parks with a capacity greater than 5 MW to municipalities (Ministerie van Economische Zaken en Klimaat, 2018d). Province of Gelderland has also transferred their authority to municipality of Arnhem regarding this wind park.
- Energy Agreement (in Dutch: Energieakkoord): In the Energy Agreement of September 6, 2013, it was agreed that in the Netherlands, by 2020, 14 percent of all energy consumption should be from renewable sources. This agreement was made based on the European Directive on Renewable Energy 2009/28/EC. Province of Gelderland has agreed with the State to realize 230.5 MW. This objective may have ensured that the province did not oppose the realization of this wind park.
- Gelderland Energy Agreement (in Dutch: Gelders Energieakkoord or GEA): In 2018, about 250 Gelderland organizations agreed to reduce CO2 emissions by 55 percent by 2040 and to become a climate-neutral province by 2050 (Gelders Energieakkoord, 2023). Windpark Koningspleij aligns with this agreement and helps achieve this goal. The GEA may have contributed to the enthusiasm for Windpark Koningspleij.
- New Energy Made in Arnhem 2015-2020: This program plan consisted of actions carried out by the municipality of Arnhem with residents and businesses (Plan Viewer, n.d.-c). These actions included generating sustainable energy from wind (Plan Viewer, n.d.-c). This program was relevant in this action situation because initiator Maarten de Keijzer (OutSmart) added two ideas to it (De Keijzer, 2016). Ultimately, he implemented these ideas with the realization of Windpark Koningspleij.
- Spatial Planning Ordinance Gelderland (in Dutch: Omgevingsverordening Gelderland): This provincial ordinance indicates that a zoning plan that allows for wind turbines must include a spatial design. In the design of Windpark Koningspleij, attention had to be paid to landscape characteristics among other things.
- Spatial Vision Gelderland (in Dutch: Omgevingsvisie Gelderland): The Province of Gelderland established this vision to spatially visualize the possibilities of wind energy, in order to achieve the 230.5 MW target of the Energy Agreement. The Wind Vision Gelderland was integrated into the spatial vision after its adoption. The plans for Windpark Koningspleij were in line with this vision and may have contributed to the province not opposing this wind park.
- Green Power Roadmap (in Dutch: Routekaart De Groene Kracht): This roadmap focuses on regional production of sustainable energy and energy conservation. Municipalities in the Arnhem-Nijmegen region jointly developed this roadmap. The roadmap includes objectives that align with national and provincial goals for sustainable energy. The plans for Windpark Koningspleij were in line with this roadmap and brought municipalities closer to their goals.
- Arnhem Structural Vision (in Dutch: Structuurvisie Arnhem): This vision provides a framework for assessing spatial plans and initiatives in Arnhem. In 2012, the city council developed a structural vision for 2020 with a perspective towards 2040. Koningspleij Noord was included in this vision as a 'course area'.
- Structural Vision Wind on Land (in Dutch: Structuurvisie Wind op Land or SWOL): This is an elaboration of the Structural Vision Infrastructure and Space (in Dutch: Structuurvisie Infrastructuur en Ruimte). It encompasses a spatial plan for the growth

potential of onshore wind energy in the Netherlands. The SWOL aimed to achieve a wind energy generation capacity of 6000 MW by 2020. However, the SWOL lacked the resources to achieve this goal, leading the province to take on the task itself and delegate it to the municipality of Arnhem for this wind park.

- Architectural Quality Note Arnhem 2015 (in Dutch: Welstandsnota Arnhem): In this note, the city council of Arnhem determined how the city can remain attractive. Among other things, the note stipulates that new constructions must fit into the environment, with criteria varying per area. This note applied to Koningspleij as it considered how the wind park would best fit into the surroundings.
- Nature Conservation Act (in Dutch: wet natuurbescherming): This law contains regulations for protecting plants and animals in the Netherlands (Ministerie van Landbouw, Natuur en Voedselkwaliteit, n.d.). This law was relevant in this action situation because the curlew inhabits the area around the planned wind park. Research by consultancy firm Waardenburg revealed that the wind park could have negative effects on this bird (Windpark Koningspleij, 2016a).
- Spatial Planning Act (in Dutch: Wet ruimtelijke ordening or Wro): This law outlines how spatial plans are formed and who is responsible (Ministry of Infrastructure and Water Management, n.d.-d). For this wind park, the province of Gelderland transferred this responsibility to the Municipality of Arnhem.

5. Governance rules

Position rules

The position rules delineate the power dynamics through the roles and authority of various stakeholders involved in the Koningspleij project. The three initiators, OutSmart, Pure Energie, and the Rijn en IJssel Energy Cooperative, wielded significant power in shaping the project proposal. The Kleefse Waard Industrial Park (IPK) acted solely as the landowner, without substantial decision-making authority. Competent authorities, such as the Municipality of Arnhem and the Council of State, held considerable power due to their ability to make political decisions and rulings on appeals(Windpark Koningspleij, 2017i). With the transfer of authority from the Province of Gelderland to the Municipality of Arnhem, the latter gained power to grant permits, among other responsibilities. The initiators further solidified their influence when permits and zoning plans were deemed irrevocable, enabling them to proceed with construction preparations. Conversely, residents primarily exerted their power through the submission of opinions and appeals, without direct decision-making authority (Windpark Koningspleij, 2017i).

Boundary rules

During the (pre-)development phase of the project diverse actors allowed themselves or other parties to enter or exit the action arena. Initially, OutSmart introduced the concept of the wind park to the Municipality of Arnhem, establishing its presence in the situation. Subsequently, the establishment of the Rijn en IJssel Energy Cooperative and Pleij BV introduced new entities (De Keijzer, 2016). Meanwhile, the Kleefse Waard Industrial Park (IPKW) approached Pure Energie, marking their entry as the third initiator. Residents were inherently involved due to the project's impact on their surroundings, with efforts made by Pure Energie and the Municipality of Arnhem to engage them actively. Information dissemination through sessions further engaged stakeholders (Windpark Koningspleij, 2017). When Pleij BV sold its shares to Prowind, Prowind entered and OutSmart exited the situation (Rijn en IJssel

Energiecoöpratie, 2019). The involvement of the Council of State arose for ruling on opinions and appeals. Upon the finalization of decisions, both the Council of State and the municipality withdrew, while the initiators geared up for construction. Residents remained engaged throughout, some submitted their opinions and filed appeals (Windpark Koningspleij, 2017i).

Scope rules

Initially, Pleij B.V. and REIJE proposed a three-turbine wind park, which later expanded to four with the involvement of Pure Energie. Had Pure Energie not joined, the permit application might have proceeded for a three-turbine park. Early discussions also entertained a broader planning area along the IJssel River, hinting at alternative layouts. Considering space constraints, the four-turbine plan was deemed feasible. Nature studies identified the need for a curlew shutdown mechanism, suggesting environmental considerations shaped the project scope. Absence of curlews would obviate this requirement. Lastly, the project's failure could have led to no permit application at all, highlighting the significance of successful initiation amidst uncertainties.

Aggregation rules

Pure Energie engaged in a collaboration with IPKW following their outreach. Seamless cooperation between initiators and the landowner (IPKW) proved crucial, given the substantial investment at stake. Moreover, Pure Energie entered a partnership with fellow initiator Pleij BV, who, in turn, collaborated with the energy cooperative REIJE, forming a collective alliance. Together, Pure Energie, Pleij BV, and REIJE opted to pursue a permit application by the phase's conclusion. Given their shared background in the wind energy sector, the initiators' familiarity facilitated fluid information exchange and alignment of goals. Subsequently, the aggregation dynamics shifted with Prowind replacing Pleij BV, forging a new collaboration alongside Pure Energie and REIJE. This intensified partnership demanded uniformity in wind turbine specifications and dimensions. Additionally, the initiators collaborated closely with the municipality to navigate permit-related procedures and other necessary arrangements for park realization. While residents held advisory roles within the environmental council and sounding board group, they maintained a consultative rather than collaborative relationship with the initiators, offering input and guidance.

Information rules

Initially, communication between initiators and competent authorities flowed seamlessly due to their shared goal and acknowledgment of the wind park's significance. However, engaging with residents proved somewhat more intricate, given occasional differing perspectives. Initiators claim to have dispatched thousands of letters to residents on multiple occasions, maintaining consistent contact and hosting a project website for disseminating pertinent information. Nonetheless, one of the aldermen suggested that REIJE could have engaged Westervoort residents better and earlier in the project. Additionally, four information markets were organized, attracting approximately 200 to 250 attendees, facilitating discussions and showcasing a layout and 3D model of the wind park. Presentations during wind consultation feedback sessions addressed potential environmental impacts, while initiators remained accessible at various events to provide stakeholders with updates. Moreover, an environmental council enabled residents and stakeholders to voice concerns and share information, meeting six times during this phase. The sounding board group served as another avenue for resident information exchange, with representatives informally updated by initiators to prevent misinformation. According to a Pure Energie representative, the initiators

maintained continuous contact with residents, ensuring a smooth flow of information throughout.

Payoff rules

During the (pre-)development phase, initiators shouldered the costs associated with initiating and planning the wind park. Pure Energie assumed responsibility for one wind turbine, while Pleij BV and REIJE undertook the other three. As the approval of the wind park was uncertain at this stage, no costs were incurred due to potential adverse effects. Residents might have invested time familiarizing themselves with the wind park plan, representing a potential cost. However, the permit application yielded benefits for initiators, bringing them closer to realizing the Koningspleij wind park. They bore investment costs, with Pure Energie, Prowind, and REIJE responsible for respective turbines and subsequently receiving proceeds. Residents could still benefit from the wind park through participation with a membership certificate (Windpark Koningspleij, 2017d). REIJE needed €2.6 million in equity to finance the purchase of shares in Koningspleij BV. To raise this amount, REIJE issued project participations for the acquisition amount with a possible additional margin for unforeseen project costs, with a total maximum value of €2.86 million, the target capital, offering participants a return on their investment of 6.5%. In the agreements made by REIJE at the start of activities to develop a wind park in Arnhem with Pleij BV, it was stipulated that REIJE had the right to purchase 2/3 of Pleij BV's shares upon realization. Koningspleij BV started with equity of €4 million, which is the value of the acquisition of shares from the development company Pleij BV. Koningspleij took out a bank loan worth €18.65 million to finance the construction of the wind park. This brought the total balance sheet at the start of the operational phase at the end of 2021 to €22.7 million, with 17.6% financed by equity. Ultimately, the province and municipality also benefited as the wind park aligned with their sustainable objectives.

Choice rules

The first significant decision was the choice of OutSmart to establish itself in Arnhem and initiate the wind park project. Another crucial decision was the establishment of LEC RIJE, which led to the wind park becoming partially community-owned. Furthermore, IPKW's decision to engage Pure Energie resulted in Pure Energie becoming a co-initiator. Another pivotal choice was the initiators' decision to submit the permit application. The subsequent important decision was the approval of the Municipality of Arnhem for the wind farm plans (Windpark Koningspleij, 2017h). Following this, residents opposed to the wind farm opted to submit opinions and appeals under the General Administrative Law Act. The Council of State then made the critical decision to render the exemption under the Nature Conservation Act irrevocable, though not the zoning plan and environmental permit. This mandated the municipality to enhance the zoning plan. Upon completion, the Council of State made the definitive choice to declare everything irrevocable (Windpark Koningspleij, 2020).

6. Biophysical/material conditions

The wind park plans were situated within the Municipality of Arnhem in the province of Gelderland, a compact urban area posing spatial constraints for the initiators. However, the shared enthusiasm of both the municipality and the province for wind energy enabled the discovery of a suitable location despite the challenges. Ultimately, permits were obtained for four wind turbines with a tip height of 180 meters and an installed capacity of 4 MW each, relatively modest due to various constraints such as restrictions on blade rotation over paved

roads and businesses. Additionally, radar interference from Deelen Air Base limited turbine dimensions. Despite these obstacles, the initiators successfully established a profitable wind park.

7. Attributes of the community

Within the vicinity of the wind farm site, there existed both proponents and opponents of the project. Particularly in the neighborhoods of Westervoort and Presikhaaf, opposition was prevalent, which was unsurprising considering their close proximity to the proposed wind farm location. While some community members expressed criticism towards the project, no formal action groups were formed. However, critical residents in this scenario opted to utilize the legal process for submitting opinions and appeals

8. Interactions

This action situation is composed of a set of important interactions that ultimately ensured the permit was applied for successfully. The first interaction took place between OutSmart and the Municipality of Arnhem. This interaction initiated the wind park. The next significant interaction involved Pure Energie and IPKW, making Pure Energie a co-initiator of the wind park. Ultimately, there was an interaction among the initiators Pure Energie, Pleij BV, and REIJE. This crucial interaction led them to jointly apply for the permit.
This situation is comprised of a series of significant interactions that ultimately led to the start of construction of the wind park. The first critical interaction occurred between the municipality of Arnhem and the initiators. This ultimately led to the municipality's approval of the plans for the Koningspleij wind park (Windpark Koningspleij, 2017h). This interaction prompted residents to take action and submit opinions and appeals (Windpark Koningspleij, 2017i). Subsequently, an interaction took place between the Council of State and the municipality of Arnhem, in which the Council gave the municipality the opportunity to improve the zoning plan (Windpark Koningspleij, 2019a). Afterward, everything was declared irrevocable, and interactions occurred where the environmental and water permits were granted (Windpark Koningspleij, 2020). Following this, there were interactions between the initiators and the manufacturer, enabling construction to commence in 2021.

9. Outcomes

The primary outcome of this action situation concerns the permit application in 2017, marking a significant advancement for the initiators towards their wind park project .Moreover, it propelled the Province of Gelderland and the Municipality of Arnhem closer to their sustainable goals. Another notable outcome was the establishment of the collaboration between commercial companies and an energy cooperative. This situation encountered minimal resistance or protests, despite initial criticisms of the wind park, which were largely general in nature. No formal action groups emerged. Spanning seven years (2010 to 2017), the key achievement was the permit issuance, initiating the construction phase of the Koningspleij wind park, aligning with municipal and provincial sustainability goals. While residents had the opportunity to engage through the cooperative, some resistance emerged, predominantly from nearby neighborhoods like Presikhaaf and Westervoort, reflected in opinions and appeals. Despite a substantial number of submissions, approximately ten appeals reached the Council of State, alongside an appeal by a bird watching group under the Nature Conservation Act. This phase spanned four years, from 2017 to 2021. In February 2021 the construction of the four wind tubrines commenced.

10. Evaluative criteria

This action situation illustrates an example of the initiation and establishment of a wind park involving various stakeholders. This case demonstrates that commercial companies and cooperatives can successfully collaborate to initiate a wind park. However, in this action situation, the energy cooperative REIJE was only communicatively involved and not financially. Nowadays, it is customary for local parties to be financially involved from the outset, contributing 50 percent of the funding. This makes the parties more equal and allows for sharing both the costs and benefits. In this action situation, REIJE did not financially invest in this wind park because they were not yet capable of providing such large amounts of funding. Nowadays, this is more feasible for cooperatives. This situation illustrates the complexity of partially cooperative development of an onshore wind park within limited physical space. In this scenario, the LEC Rijn en IJssel Energy Cooperative was also financially involved, creating an equal partnership among the three initiators. Despite the involvement of a citizen cooperative, there was still resistance from residents in this situation. This resistance was mainly evident in the large number of opinions submitted. One possible reason for the resistance is the limited physical space at the wind park location, which could lead to the community experiencing negative effects from the wind park more quickly. However, the number of appeals was relatively low compared to the number of opinions. The resistance from residents was not to the extent that, for example, action groups were formed. The entire (pre-)development process spanned from 2010 (first initiation) to the end of February 2021 (start of construction).

Appendix E: Avri project

This appendix presents a case study examining the development of Windpark Avri in Gelderland through the lens of Ostrom's Institutional Analysis and Development (IAD) Framework. By employing this framework, a comprehensive analysis is provided of the complex interactions and institutional arrangements involved in the establishment of this particular wind park.

1. Project Description

The development narrative of Windpark Avri intertwines with that of Windpark Deil, originating from multiple project developers securing land positions while engaging in discussions with the municipality. Some developers submitted preliminary requests, while others initiated discussions. This rising interest in wind energy led to the formulation of a policy and the creation of the wind vision in 2013, with plans for these locations dating back nearly two decades and existing ground contracts already in place. The commercial wind development parties had assessed the region's potential for about twenty years.

Initial discussions commenced in the autumn of 2013 following the adoption of the wind vision, designating two areas, Econo-Brundel and Avri, due to developer interest. Despite separate permits and procedures, LEC Betuwewind aimed to manage both as a unified project. While both farms stemmed from the same vision, their paths diverged, each facing unique challenges. Windpark Deil encountered procedural hurdles causing delays, whereas Windpark Avri tackled technical demands like drilling foundations through an old landfill site. Nevertheless, they were constructed almost simultaneously.

Concrete steps for the development of Windpark Avri commenced in March 2015, marking the initiation of the project. On this date, a pivotal moment occurred as government authorities entered into a development agreement with a consortium of developers, comprising Prodeon, Yard Energy, Winvast, Raedthuys, and Betuwewind. Under this agreement, Betuwewind was slated to acquire a 25% stake in the development of both Windpark Avri and Windpark Deil. The design and planning of both farms adhered to the initial proposal: a farm of eleven turbines and a park of three windmills. Discussions throughout the process deliberated on the optimal height to render the wind farms profitable in the region, culminating in a decision of 120 meters for Windpark Avri and 140 meters for Windpark Deil. Following the agreement, developers and local authorities embarked on an extensive community engagement endeavour. Numerous information sessions were organized to gather public inquiries and offer insights into the development process, aiming to compare various project variants concerning nuisance, landscape, and sustainable yield. These sessions also ensured regular updates to involved municipal councils.

The plan for Windpark Avri, comprising three turbines with a total power output of 15 MW, was officially presented by Betuwewind on May 1, 2017, with the exact turbine type yet to be determined. The wind farm was to be developed cooperatively, with 25% by the LEC West-Betuwe (later Betuwewind) and the remaining 75% by development partners Winvast and Yard Energy (37.5% each). The community was informed about a proposed amendment to the zoning plan specifically for Windpark Avri, necessitated by its smaller scale, which did not require an Environmental Impact Report (MER). This amendment was presented to the public on April 29, 2016, as part of the Draft Zoning Plan for Windpark Avri.

Subsequently, on October 26, 2016, the Municipal Council of Geldermalsen approved further coordinated handling of the zoning plan and environmental permit for Windpark Avri. The developers submitted a permit application for three turbines with a maximum hub height of 120 meters on June 7, 2017. A significant breakthrough transpired on November 7, 2015, when the Municipalities of Geldermalsen and Neerijnen agreed to initiate procedures for amending the zoning plan and obtaining a building permit for Windparks Avri and Deil. This decision was influenced by positive feedback received during two information sessions, attended by approximately 55 local residents and representatives from various entities.

Despite receiving significant public interest, resulting in 19 opinions primarily focused on procedural matters, health concerns, and visual impairment, Betuwewind employed proactive communication and assertive advocacy to address concerns satisfactorily. Additionally, Betuwewind actively engaged with individuals, striving to find suitable resolutions for their legitimate concerns, demonstrating commitment beyond mitigating bird mortality to improving conditions for avian species.

Despite Betuwewind's efforts for Avri, extensive discussions ensued with individuals who opposed the plans. This included engagements with the counter-movement "Tegenwind," involving multiple conversations. Subsequently, these discussions were escalated to the Council of State. Despite three objections submitted to the Council of State, the permit was deemed irrevocable by the council on June 6, 2018 (Raad van State Gelderland afdeling Bestuursrechtspraak, 2017). The objections encompassed the following points:

- One of the appeals focused on concerns regarding the zoning plan and the environmental permit, particularly fearing a decline in their quality of living.
- The second objection highlighted apprehensions regarding the impact of the wind turbines on a local plant nursery and the health of its employees.
- A group of residents, consolidated under an action group, expressed fears of a decline in their living conditions.

By October 2, 2018, Betuwewind had expanded its membership to 1000, raising over €4.6 million to build seven wind turbines. On December 1, 2018, Betuwewind acquired the remaining 75% stake in the wind park from its development partners, making it 100% cooperative ownership (Betuwe Wind, 2017a, 2017b).

After 53 months since its initiation, the construction of Windpark Avri started on July 24, 2019. The wind farm consists of three turbines, each with a power output of 3.6 MW and a maximum hub height of 120 meters. The distances from the turbines to the nearest building and the nearest town center are approximately 750 and 1500 meters, respectively (HIER, 2018). The design and planning of the park adhered to the initial proposal: a farm consisting of three wind turbines. There were no setbacks, with the exception of a delay caused by a producer.

Transparency remained paramount throughout the process, with all discussions conducted openly among project developers, the citizen wind corporation, and the municipality. Separate deliberations also occurred between developers and the citizen wind corporation, focusing on propositions within the park.

2. Action situation: (Pre-)Development Phase

The action situation for Windpark Avri was initiated in March 2015 with the execution of a development agreement between government authorities and a consortium of developers comprising Prodeon, Yard Energy, Winvast, Raedthuys, and Betuwewind. This pivotal agreement marked the outset of the wind farm's development journey, setting the stage for subsequent actions. Over the ensuing months, an extensive community engagement process was launched, involving informative sessions and dialogues to address various concerns and considerations surrounding the project's advancement. Notably, on November 7, 2015, the municipalities of Geldermalsen and Neerijnen made a significant decision to progress with amending the zoning plan and securing a building permit for Windparks Avri and Deil, influenced by positive feedback from local residents and stakeholders. Transitioning into its second phase on October 26, 2016, the municipal council of Geldermalsen authorized coordinated management of the zoning plan and environmental permit for Windpark Avri. This phase marked the inception of endeavors to tackle concerns raised by the public, encompassing health-related issues, aesthetic considerations, and procedural matters. Despite encountering challenges and opposition from groups like "Tegenwind," Betuwewind showcased a dedication to resolving issues through constructive dialogue and advocacy. The culmination of the action situation came with the irrevocable validation of the permit by the Council of State, affirming the project's legality. Subsequently, Betuwewind's complete acquisition of the remaining stake in the wind park and the onset of construction represented significant milestones, underscoring the advancements achieved during this phase of the project. Following a period of negotiations, consultations, and meticulous planning, the commencement of construction in July 2019 denoted the conclusion of the (pre-)development phase and therefore the action situation.

3. Participants

The following actors were involved in this action situation:

- **National Government:** The National Government holds the responsibility of formulating and enforcing laws on a national scale. It plays a pivotal role in overseeing the implementation of the Spatial Planning Act (Wet ruimtelijke ordening) and the Environmental Impact Assessment Decision (Besluit Milieueffectrapportage) as outlined in the Environmental Management Act (Wet Milieubeheer). In 2012, the National Government 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 planning phase, it exerts pressure on the province of Gelderland to initiate sustainable energy projects.
- **Province of Gelderland:** While lacking direct authority over the wind farm project, the province expressed its dedication to facilitating and expediting the development process by forming an acceleration team in collaboration with municipalities.
- **Municipality of Geldermalsen**: The municipality played a pivotal role by entering into a development agreement with a consortium of developers on March 16, 2015. Government authorities provided the necessary legal framework and oversight for the wind farm project. They spearheaded the formulation of policy guidelines and championed active community involvement, local revenue generation, and spatial planning integrity. Acting as the competent authority, they finalized the policy guidelines and led efforts to promote community engagement.

- **Acceleration Team:** Comprising experts in participation and financing, this group was assembled in consultation with the province. Representatives from the acceleration team attended information sessions to gather feedback and insights from the local community, ensuring that decision-making processes incorporated the interests of various stakeholders.
- **Project initatiors (Winvast and Yard Energy)**: This consortium of developers collaborated to undertake the planning and development of Windpark Avri. They shared resources and expertise, enabling efficient project planning.
- **LEC Betuwewind**: As per the development agreement, Burgerwind acquired a 25% stake in the development of Windpark Avri. Their involvement showcased the inclusion of local community members in the project and demonstrated a commitment to local participation. Betuwewind played a vital role in engaging with local residents.
- **Local residents:** This crucial group of stakeholders influenced the project's trajectory and eventual acceptance. They were actively engaged from the project's outset, participating in information sessions, consultations, and as investors. Serving as both beneficiaries and individuals directly affected by negative externalities, their input was integral to the project's success.

4. Policy regulations

The following laws, regulations, and policy measures were applicable to this action situation:

- The Environmental Impact Assessment (EIA) (in Dutch: Milieueffectrapportage or MER) is a regulatory order based on the Environmental Management Act. It mandates the preparation of an EIA for activities and projects that could significantly impact the environment. Within the European Union, conducting an EIA for such projects is obligatory (Ministerie van Infrastructuur en Waterschap, 2020).
- Spatial Planning Act (in Dtuch: Wet Ruimtelijke Ordening or Wro): This legislation governs energy transition and includes spatial planning procedures, crucial for all project phases, allowing provincial zoning plans for projects of provincial importance.
- European directive 2009/28/EG mandates that 14% of energy consumption from renewable sources by 2020, supporting national wind energy policies.
- Energy Report (in Dutch: Energierapport): It articulates the Dutch government's ambitions for generating and utilizing sustainable energy, with a focus on wind energy opportunities, particularly offshore.
- National Energy Agreement (in Dutch: Energieakkoord): Established to expedite sustainable energy production, this agreement includes commitments between the government, provinces, and various societal organizations. The Province of Limburg aims to achieve a capacity of 95.5 MW of wind energy by 2020.
- Decree on General Rules of Spatial Planning (in Dutch: Besluit algemene regels ruimtelijke ordening or Barro): This decree, effective since December 30, 2011, provides legal assurance for national spatial policy. It contains rules limiting the policy space of other governmental authorities concerning spatial plans' content in areas where national interests require restriction.
- Structural Vision Infrastructure and Space 2012 (in Dutch: Structuurvisie Infrastructuur en Ruimte): Outlines the national spatial policy and strategy for large-scale wind energy locations.

- Structural Vision Wind Energy on Land (in Dutch: Structuurvisie Windenergie op Land or SWOL): Identifies locations for large wind farms; though Windpark Greenport Venlo is not included, it contributes to the 6000 MW wind energy goal.
- Electricity Act (1998): Projects exceeding 100 MW fall under the National Coordination Scheme, mandating the national government to coordinate decision-making for significant energy projects. Provinces can transfer authority for wind parks exceeding 5 MW capacity to municipalities under this law. In this wind farm's case, the Province of Limburg transferred its authority to the municipality of Venlo.
- Spatial Planning Regulation Gelderland 2014 (in Dutch: Omgevingsverordening): This provincial regulation mandates that a zoning plan enabling wind turbines must include a spatial design, requiring specific attention to landscape characteristics in Windpark Avri's development.
- Vision for Wind Turbines in Geldermalsen, Neerijnen, and Tiel 2013 (in Dutch: Visie Windturbines in Geldermalsen, Neerijnen en Tiel): Developed in 2013 by the municipalities of Geldermalsen, Neerijnen, and Tiel, this vision outlines their stance on wind energy and identifies preferred areas for wind turbine placement, considering factors like limited residential density and landscape compatibility.
- Spatial Vision / Weighing and Considering / Enjoying Life along the Linge 1999/2010 (in Dutch: Structuurvisie / Wikken en wegen / Lekker leven langs de Linge): This policy framework, consisting of the Spatial Vision adopted in 1999, subsequent adjustments and additions outlined in the Weighing and Considering document, and the comprehensive Enjoying Life along the Linge note approved in 2010, serves as the guiding spatial vision for the municipality of Geldermalsen, providing a basis for evaluating various projects and plans.

5. Governance rules

Position rules

In the (pre-)development phase of Windpark Avri, multiple project developers strategically acquired land positions and initiated discussions with the municipality. The catalyst for this park development was the Province of Gelderland's push for the Municipality of Geldermalsen to explore wind energy opportunities. The strategic positioning of these developers played a crucial role in prompting the formulation of a local wind vision policy, fostering broader regional acceptance of renewable energy. Specifically, the Avri area was earmarked for development primarily due to the interest expressed by these developers, highlighting how land position distribution influenced wind energy spatial planning. Additionally, the roles played by local authorities, such as the Municipality of Geldermalsen, alongside the Province of Gelderland, were pivotal in steering this project from inception to realization. The municipality granted wind farm permits, while in cases involving projects with significant impacts, provincial leadership took charge. This oversight by provincial authorities was crucial in coordinating diverse stakeholders and streamlining the development process. The appointment of a process supervisor by the province played a key role in ensuring all stakeholders felt heard and satisfied with the collaborative efforts. The involvement of the LEC, initially known as Gelderlandmalsen in Neerijnen and later renamed Betuwewind, was also notable. Initially holding a 25% stake in the wind farm's development, Betuwewind was instrumental in both planning and execution. This role significantly expanded when Betuwewind acquired the remaining stake from development partners

Winvast and Yard Energy, resulting in sole ownership of the project. This entity was entrusted with facilitating participation and garnering support for the project, strategically aligning itself with local residents to foster participation and collaboration. Public participation was vital in the decision-making process, allowing the general public to express concerns and objections through formal channels, thus shaping the project's trajectory. Betuwewind's proactive communication and advocacy efforts underscored the significance of public input. Another critical stakeholder was the Council of State, whose involvement became prominent amidst project opposition. Discussions and objections were escalated to this level, with the Council holding the authority to declare the wind farm permit irrevocable, thus validating the project's legal standing.

Boundary rules

The implementation of the wind vision in 2013 laid the groundwork for involving various stakeholders, from developers to local municipalities, shaping boundary rules by developers securing land positions in Econo-Brundel and Avri, leading to concurrent wind farm development despite challenges. Discussions on fund allocation among developers, the municipality, and the province defined participant flux and interests, evolving with the merger of municipalities and the province's co-leadership due to the project's impact, showcasing flexible boundary rules. The citizen wind corporation, initially Geldermalsen and later Betuwewind, exemplified this adaptability, starting with participation and support and eventually co-owning half of the turbines, illustrating how boundary rules evolved with the project's dynamics, influencing participation and exit conditions for various actors. In the initial phase, key participants included the Municipal Council of Geldermalsen, developers (Betuwewind, Winvast, and Yard Energy), and the broader public, focusing on the permit application for three turbines. Entry conditions were inclusive, allowing public engagement, resulting in 19 public opinions addressing procedural, health, and visual concerns. Despite initially owning a 25% stake, Betuwewind actively engaged in decision-making, addressing concerns and enhancing the wind park's conditions. Their role expanded significantly upon acquiring the remaining stake from development partners, assuming full ownership of the project, marking a notable shift in boundary rules. Procedures for exiting the decision-making process were outlined, evident when opposition groups like 'Tegenwind' escalated concerns to the Council of State. Despite objections, the Council rendered the permit irreversible, signifying the departure of dissenting stakeholders from the formal decision-making process.

Scope rules

In 2013, the Province of Gelderland's push for wind energy exploration in Neerijnen and Geldermalsen prompted involvement from various stakeholders, including the province, municipalities, landowners, project initatiors, and local organizations, reflecting a diverse and intricate jurisdiction within the scope rule. Negotiating the scope was influenced by dynamic factors like turbine positioning, project costs, external challenges, and stakeholder participation. Changes in turbine locations impacted visibility and noise, shaping the final project layout, while cost considerations, particularly grid connection expenses, constrained development. The defense department mandated radar upgrades due to turbine growth, highlighting scope complexities. Initial talks among developers, notably Betuwewind's demand for 50% ownership despite lacking land, led to negotiations. Ultimately, Betuwewind's stake increased after Staatsbosbeheer transferred shares, showcasing stakeholder engagement's impact on outcomes. The establishment of the zoning plan and

environmental permit for Windpark Avri served as initial benchmarks, delineating the formal framework for project progression. Upon approval, Betuwewind and development partners Winvast and Yard Energy embarked on a cooperative effort to develop the wind farm, with a total power output of 15 MW distributed among three turbines, setting the initial parameters for project outcomes. The scope rules ensured the incorporation of broader community concerns and interests in defining potential results, as evidenced by the collection of 19 public views. These concerns were thoroughly addressed, leading to the approval of the zoning plan and environmental permit for Windpark Avri, illustrating the adaptable nature of outcomes within the established scope. As the project advanced, the scope rules facilitated adjustments in outcomes, notably when Betuwewind acquired the remaining 75% stake from its development partners, thereby assuming sole ownership of the wind park. Such modifications were permitted within the project's scope, underscoring the scope rules' role in outlining the range of possibilities within which the project operated. Ultimately, the construction of the wind farm progressed in alignment with the initial proposal, experiencing minimal technical delays, thus achieving the originally envisioned outcome.

Aggregation rules

The project's decision-making process involved key stakeholders, including project developers, local municipalities, the provincial government, and a citizen wind corporation, operating within a shared decision-making model that prioritized inclusivity and collaboration over majority rule. A designated process supervisor appointed by the province oversaw proceedings, ensuring stakeholder satisfaction and preventing dominance by any single entity. This cooperative approach was evident in agreements allowing pre-financing of the project and Betuwewind's substantial 25% ownership stake, despite lacking land positions, indicating decision-making based on collaboration rather than land control alone. External factors like political pressure and public demand for wind energy also influenced decisions, as seen in the province's encouragement prompting municipalities to explore wind energy potential. The municipal council of Geldermalsen coordinated the development of Windpark Avri, reflecting collective decision-making, with involvement from developers, governmental bodies, and the wider community. Stakeholders' proportional influence over project outcomes fostered shared decision-making, while extensive discussions with opposing groups like "Tegenwind" showcased the incorporation of diverse perspectives into final decisions. The decision-making process involved negotiation and conflict resolution rather than relying solely on majority-based decisions. The three objections submitted to the Council of State were addressed, leading to the permit being deemed irrevocable, demonstrating the binding nature of decisions within this framework.

Information rules

In the development of Windpark Avri, the implementation of information rules played a crucial role in facilitating interactions among various stakeholders. Central to this process were themes of trust and transparency in communication between the LEC and commercial parties. Establishing trust was paramount and achieved through open dialogue, where transparency signalled the developers' commitment to realizing the best possible project. Conversely, developers relied on trust that the LEC would honor their commitments, often requiring demonstrated efforts and possibly hiring professionals to meet the project's requirements. Resistance to wind farm development was reportedly minimal, attributed to extensive community engagement efforts. Personal discussions led by the LEC with residents

were particularly influential, with one-on-one interactions considered more manageable and impactful in smaller communities. Engaging residents in the process was deemed essential, focusing on informing them about planned activities, timelines, and potential impacts, thus enabling the early identification and addressing of objections, fostering public support. The provincial government's role in facilitating collaboration was also emphasized, with the appointment of a process supervisor ensuring that all parties felt heard and satisfied, preventing any one party from feeling marginalized—an outcome indicative of effective application of information rules. The initiation of the wind farm stemmed from dialogues between different project initiators and the municipality regarding land positions, prompting the development of a policy in response to the growing demand for wind energy in the area. Information sharing was characterized by openness and transparency. The unveiling of the Windpark Avri plan on May 1, 2017 marked the commencement of informational exchanges and garnered significant public interest, resulting in the collection of 19 views. These inputs from the public played a pivotal role in shaping subsequent actions and decisions by involved parties. Betuwewind employed proactive communication and assertive advocacy to effectively manage public concerns, utilizing available information to understand and address objections. This strategic approach exemplifies the application of information rules within the IAD framework. Betuwewind's engagement with the counter-movement "Tegenwind" was instrumental in mitigating opposition to the project, reflecting the practical implementation of information rules in resolving conflicts and reaching consensus.

Payoff rules

The (pre-)development phase of Windpark Avri encountered unique challenges related to project expenses, particularly concerning technical requirements for foundational work on an old landfill site, impacting the timeline and costs. The payoff rules aimed for equitable distribution of benefits and costs, with discussions extending to all landowners for inclusive decision-making. The province's assumption of project leadership and cost coverage further promoted fairness. The involvement of Betuwewind ensured shared benefits, with half of the turbines owned by the LEC. The establishment of wind farms brought multiple benefits, offsetting costs, satisfying stakeholders, and ensuring smooth execution. Membership in the LEC allowed individuals to invest up to €20,000 with returns of 4 to 10% over 15 years, fostering a sense of ownership and participation. Additionally, the wind farms aimed to provide locally sourced renewable energy, potentially meeting 60% of the municipality's electricity consumption and aligning with regional sustainability goals. Profits were reinvested in future sustainable projects, empowering Betuwewind members to propose and vote on initiatives during general meetings. Transparency in negotiations was crucial, minimizing disputes and leading to agreeable outcomes. Options to address negative impacts were available throughout, with public consultations identifying and mitigating nuisances. Regular updates to councils and public engagement ensured project acceptability. The smooth project progression, minimal obstacles, and low costs reflect successful community engagement and professional processes. The project spanned 26 months, with Betuwewind contributing over €4.6 million, addressing objections and demonstrating commitment to sustainable energy. Windpark Avri features three turbines generating 3.6 MW each, contributing to cleaner energy. The cooperative structure ensured equitable distribution of benefits, initially with Betuwewind holding a 25% stake. Following Winvast and Yard Energy's exit, Betuwewind expanded its ownership to 100%, enhancing benefits for its members. Proactive communication strategies were employed to address local objections,

fostering a balanced distribution of costs and benefits. Efforts extended beyond mitigating bird mortality to enhance conditions for avian species, demonstrating a commitment to address environmental concerns.

Choice rules

In the development of Windpark Deil and Windpark Avri, the initial phase involved discussions between multiple project developers and the municipality, prompting the formulation of the wind vision policy due to the area's wind energy potential, exemplifying a choice rule in action. This decision point demonstrated the municipality's balance between formal regulations and informal discussions with developers. The LEC, Betuwewind, sought to treat both wind farms as a single project, despite their separate permits and procedural pathways, showcasing efforts to maintain coherence throughout the projects' development phase. Simultaneously, discussions regarding fund allocation engaged all project developers and landowners, emphasizing collective decision-making. Negotiations involving stakeholders like project developers, the citizen wind corporation, and the municipality aimed at addressing unique interests, yielding satisfactory outcomes despite potential conflicts, such as Betuwewind's demand for 50% ownership without land positions. Key agreements, like Burgerwind's acquisition of a 25% stake, were signed, guided by choice rules dictating acceptable actions at specific times. Extensive community engagement marked another decision point, aiming to gather public opinions and address concerns transparently. The municipality's involvement significantly influenced the projects, with both farms obtaining permits before the 2019 municipal merger. The acquisition of the remaining stake in the wind park by Betuwewind highlighted a determination to promote collective ownership and inclusivity, reflecting strategic choices in response to challenges. These choice rules not only reflect decision points within the process but also demonstrate a strategic orientation in addressing various aspects of the project transparently.

6. Biophysical/material conditions

The Avri wind farm in Geldermalsen, is strategically positioned amidst several residential areas, including the Geldermalsen center, De Plantage residential area, and Est, all within close proximity (Bosch & van Rijn, 2020). Comprising three turbines with a power capacity ranging from 7.2 MW to 15 MW, the specific turbine type remains undetermined, allowing for the consideration of various options to analyse worst-case effects. With hub heights of up to 120 meters and a maximum rotor diameter of 131 meters, Windpark Avri's turbines are situated both on and around the landfill mound, serving as a sustainable repurposing of the site following Avri's cessation of landfill operations in 2016. Each turbine, with a capacity of 3.6 megawatts, is strategically positioned approximately 750 meters from the nearest built-up area and 1500 meters from the nearest village centre, ensuring minimal impact on surrounding communities.

7. Attributes of the community

The Avri project witnessed the convergence of multiple actors with diverse attributes, contributing to its complexity. A notable example is the growth of the LEC Betuwewind, initially focused on sustainability and knowledge dissemination but evolving into a substantial stakeholder with ambitions of co-ownership, significantly impacting the project's development phase. The LEC's gradual growth, from around 100 members to over 200,

paralleled the project's progression from concept to actionable reality, reflecting the community's increasing trust in its sustainability mission and return priorities. Project developers, driven by economic interests, and local authorities, tasked with meeting energy needs and sustainability goals, played pivotal roles, exemplified by Staatsbosbeheer's transfer of shares to Betuwewind, illustrating clear role delineation and interactor trust. Local authorities, supported by the province, assumed crucial leadership, coordinating efforts, covering costs, and urging municipalities to grant permits, balancing diverse stakeholder interests. Community involvement was integral, fostering trust and comprehensive decision-making, with the Municipal Council of Geldermalsen demonstrating flexibility, Windpark Avri developers showing diligence, and Betuwewind taking a proactive approach to address concerns, particularly regarding health and visual impact, through attentive consideration of public opinion. However, persistent objections from a vocal minority highlighted community polarization regarding wind energy initiatives, despite ongoing efforts by the LEC to engage in dialogue and address concerns, indicative of prevailing norms of communication and negotiation, albeit amid challenges to disseminate accurate information and maintain credibility amidst opposition.

8. Interactions

The inception of these wind farms stemmed from proactive initiatives by various project developers, who identified the region's wind energy potential and initiated land acquisition efforts. This activity attracted the attention of local municipalities, sparking initial discussions and requests from developers. Subsequently, in response to the growing demand for wind energy, the municipality formulated a policy, leading to the issuance of initial permits by Geldermalsen and Neerijnen municipalities. However, due to the project's multi-municipality scope, a coordinated approach was necessary, prompting the province to assume a leadership role and urging municipalities to issue permits. Transparent dialogue was maintained throughout, with negotiations among project developers, municipalities, and the province focusing on fund allocation and logistical aspects. Concurrently, discussions between developers and Betuwewind navigated propositions within the park, resolving discord, particularly when Betuwewind sought 50% ownership without land positions. Satisfactory negotiations ensued, culminating in Staatsbosbeheer transferring shares to Betuwewind, bolstering its role. The province's appointment of a process supervisor, someone from Royal Haskoning, was pivotal in ensuring all parties felt heard and satisfied, facilitating a satisfactory contract. Final interactions involved developers, local authorities, and the community, with extensive community engagement including information sessions to address inquiries and provide project insights, ultimately leading to a zoning plan amendment for Windpark Avri. Throughout Windpark Avri's development, interactions among stakeholders were instrumental, with the municipal council of Geldermalsen overseeing permit management and public feedback, Betuwewind collaborating closely with development partners and addressing community concerns, and interactions with the Council of State focusing on presenting arguments and resolving objections. Betuwewind's expansion of membership and acquisition of the remaining stake from development partners further underscored the project's collaborative nature. During the construction phase, interactions among developers, contractors, and suppliers remained essential for project progress.

9. Outcomes

The Windpark Avri project commenced in March 2015, with initial discussions primarily involving developers and the municipality, focusing on determining the optimal height of the wind turbines. Consensus was quickly achieved on this matter, although adjustments were required due to the presence of a former waste dump, resulting in slightly shorter turbines. Despite these modifications, the project largely adhered to its original design and planning, maintaining the intended number and height of the turbines. As the project progressed, a series of negotiations and agreements unfolded among developers, the province, and municipalities, leading to the submission of a permit application on June 7, 2017. Betuwewind held a 25% stake, with Yard Energy and Windvast each holding a 37.5% share in the project, reflecting a collective effort to realize the wind farms. Despite objections from three appellants, a Council of State ruling rendered the permit irrevocable, paving the way for construction to commence on three turbines in July 2019. This resulted in three turbines, towering at 120 meters with a 3.6 MW power capacity, which were strategically positioned approximately 750 meters from the nearest buildings and 1500 meters from the town center. The entire process, spanning from initiation to construction, witnessed Betuwe Wind's ownership of seven out of 14 turbines at the wind farm.

10. Evaluative criteria

Despite encountering several technical challenges, the wind park projects managed to navigate through them without significant delays, thanks in large part to the province's involvement, particularly with the appointment of a process supervisor from Royal Haskoning, which notably improved project organization. Emphasizing citizen involvement, Betuwewind played a vital role in ensuring that all individuals had avenues to contribute to discussions and share their perspectives, even if they harboured reservations about the project. Extensive dialogues with local residents were crucial, effectively mitigating resistance and garnering increased support by providing insight into the project's specifics, timelines, and anticipated impacts. The Windpark Avri project deviated from a rigid timeline, involving two years of planning followed by two years of intensive efforts to bring the project to fruition, characterized by moments of uncertainty and setbacks typical of such endeavours. However, transparent communication, professionalism, and citizen investment opportunities proved instrumental in overcoming resistance and minimizing its impact on progress. Betuwewind's unexpected profits enabled the acquisition of an additional 75% of shares, surprising many involved parties and further enhancing the project's success from the LEC's perspective. The entire (pre-)development process spanned from March 2015 (first initiation) to the end of July 2019 (start of construction).

Appendix F: Suyderlandt project

This appendix presents a case study examining the development of Windpark Suderlandt in South-Holland through the lens of Ostrom's Institutional Analysis and Development (IAD) Framework. By employing this framework, a comprehensive analysis is provided of the complex interactions and institutional arrangements involved in the establishment of this particular wind park.

1. Project description

Windpark Suyderlandt is one of the two wind parks located in the wind location Battenoord within the Municipality of Goeree-Overflakkee, comprises three large modern wind turbines. Each towering turbine stands at a maximum hub height of 95 meters with a capacity of 3.6 MW, collectively producing enough electricity annually to power approximately 13,000 households (Deltawind, 2022). Co-owned by Peijnenburg B.V. and Deltawind, the park represents a notable partnership in the renewable energy sector, with 50% ownership held by an energy cooperative.

In 2006, the cooperative Deltawind entered into a land agreement with the owner of the parcels where later Windpark Suyderlandt was established. The intention was to develop together in a 50:50 partnership. The farmer would contribute the land, and Deltawind would become the developer. This municipality believed it had already cooperated sufficiently with the wind energy goals and was not willing to budge. This led to no development until 2013.

In 2013, the four municipalities on the island merged into the Municipality of Goeree-Overflakkee. By then, the province had determined that 300 MW (at that time about 100 MW) of wind turbines should be installed. The municipality decided to resist by initiating its own MER to determine the available space for wind turbines. They concluded 225 MW in 5 concentration areas. One of the concentration areas is between Oude-Tonge and Nieuwe-Tonge, as Windpark Battenoort was already there (since 1996; 100% owned by Deltawind) and Windpark Krammer, located on Zeeland territory (then 50% owned by Deltawind), was under construction. That was the moment when the agreements for Windpark Suyderlandt could be concretized. It was also the moment when the agreement between Eneco and Deltawind led to a second line in the polder behind Windpark Battenoort. The result is that there are 2 simultaneously developed wind parks, one with a farmer (Suyderlandt) and one with Eneco (Blaakweg). Both locations have 3 turbines, Nordex, with a total capacity of 10.8 MW each.

The project's development was preceded by the establishment of the 'Partial revision regional structure vision Goeree-Overflakkee, Wind Energy' on June 19, 2015, which designated specific areas for wind energy projects, including Battenoord. Despite facing opposition reflected in over 2,000 petitions primarily concerning the proliferation of wind turbines in Battenoord, the project advanced. The petitions revealed that residents primarily opposed the large number of wind turbines that would be installed at the location (van Esch & Grootenboer-Dubbelman, n.d.). Despite this large number of petitions, the plan was still set in motion. A 6-week during public consultation in 2017, from March to April, revealed divergent viewpoints, yet the project received approval with the official zoning plan ratified on September 28, 2017, and the environmental permit granted the following day. After the general environmental permit, several partial permits were also required. However, the

resistance to "construction permits," as Lighthouse Projects calls them, was minimal. Resistance here was much lower, and the procedures were therefore shorter.

Nearly one year later, on July 25, 2018, the appeals of the stakeholders, as far as admissible, were dismissed by the court. Against this, the Mallemolens Foundation and residents appealed to the Council of State. The municipal council submitted defenses, and in response to the appeals, the mayor and aldermen submitted a written explanation. Hearings with multiple stakeholders were held on November 15, 2018, for the appeals. In addition to this hearing, another hearing was held on December 3 with stakeholders regarding the other grounds for appeal (Raad van State, 2019a). However, on April 3, 2019, the Council of State dismissed all appeals, clearing the path for construction. Post-approval, the acquisition of partial permits proceeded with minimal resistance, leading to the commencement of construction activities by contractor GMB in March 2020 (Windenergie Nieuws, 2020).

2. Action situation: (Pre-)Development Phase

The action situation for Windpark Suyderlandt commenced in 2006 with a groundbreaking land agreement between Deltawind and a local landowner, marking the outset of the project's development journey. This pivotal agreement established a 50:50 partnership, with the landowner contributing the land and Deltawind undertaking the role of developer. However, initial progress was hampered by the reluctance of the local municipality to further wind energy development until 2013, citing previous cooperation and a lack of willingness to accommodate additional projects. The merger of four municipalities in 2013 into the Municipality of Goeree-Overflakkee brought about a renewed focus on renewable energy targets. With the provincial mandate for significant wind energy installation, the municipality embarked on its own environmental assessment process to determine suitable locations for wind turbines. This process culminated in the identification of concentration areas, including the site between Oude-Tonge and Nieuwe-Tonge, where Windpark Suyderlandt would later be established.

The formal development process of Windpark Suyderlandt was initiated with the establishment of the 'Partial revision regional structure vision Goeree-Overflakkee, Wind Energy' on June 19, 2015, which designated specific areas for wind energy projects, including Battenoord. Despite facing opposition reflected in over 2,000 petitions primarily concerning the proliferation of wind turbines, the project advanced.

Crucially, the agreement between Deltawind and Peijnenburg BV, as well as strategic partnerships with local stakeholders, facilitated the development of Windpark Suyderlandt. These collaborations underscored a collective commitment to achieving regional wind energy targets.

Following a period of public consultation in 2017, the project received official approval with the ratification of the zoning plan and the granting of the environmental permit. Legal challenges ensued, with appeals lodged by stakeholders, yet on April 3, 2019, all appeals were dismissed by the Council of State, paving the way for construction. The subsequent acquisition of partial permits encountered minimal resistance, leading to the commencement of construction activities in March 2020.

3. Participants

The following actors were involved in this action situation:

- **Local government authorities:** Both the Province of South Holland and the Municipality of Goeree-Overflakkee have been involved in the realization process of wind farm Suyderlandt.
- **Council of State:** Due to appeals from the same actors against the court's rulings, the Council of State has also been involved.
- **Project Initiatiors:** Windfarm Suyderlandt has two different developers, namely: Peijnenburg B.V. and Deltawind. Deltawind is an energy cooperative with nearly 2,500 members (Deltawind - NCR, 2022). Lighthouse projects is an organization that assists in the development and management of the process of large sustainable energy projects.
- **Interest groups:** During the construction of wind farm Suyderlandt, one specific foundation has emerged prominently, namely the Mallemolens Foundation. This foundation aims to critically monitor and prevent the realization of more wind turbines in the area between Oude-Tonge and Nieuwe-Tonge ("Mallemolens: 'Show as a municipality that you have the best interests of Oude-Tonge at heart'", 2019).
- **Local residents:** In this case as well, there are residents participating in the realization process. These include inhabitants of both Nieuwe-Tonge and Oude-Tonge (Raad van State, 2019a).

4. Policy regulations

The following laws, regulations, and policy measures were applicable to this action situation:

- The Environmental Impact Assessment (EIA) (in Dutch: Milieueffectrapportage or MER) is a regulatory order based on the Environmental Management Act. It mandates the preparation of an EIA for activities and projects that could significantly impact the environment. Within the European Union, conducting an EIA for such projects is obligatory (Ministerie van Infrastructuur en Waterschap, 2020).

- Spatial Planning Act (in Dtuch: Wet Ruimtelijke Ordening or Wro): This legislation governs energy transition and includes spatial planning procedures, crucial for all project phases, allowing provincial zoning plans for projects of provincial importance.

- European directive 2009/28/EG mandates that 14% of energy consumption from renewable sources by 2020, supporting national wind energy policies.

- Energy Report (in Dutch: Energierapport): It articulates the Dutch government's ambitions for generating and utilizing sustainable energy, with a focus on wind energy opportunities, particularly offshore.

- National Energy Agreement (in Dutch: Energieakkoord): Established to expedite sustainable energy production, this agreement includes commitments between the government, provinces, and various societal organizations. The Province of South-Holland aims to achieve a capacity of 735.5 MW of wind energy by 2020.

- Decree on General Rules of Spatial Planning (in Dutch: Besluit algemene regels ruimtelijke ordening or Barro): This decree, effective since December 30, 2011,

provides legal assurance for national spatial policy. It contains rules limiting the policy space of other governmental authorities concerning spatial plans' content in areas where national interests require restriction.

- Structural Vision Infrastructure and Space 2012 (in Dutch: Structuurvisie Infrastructuur en Ruimte): Outlines the national spatial policy and strategy for large-scale wind energy locations.
- Structural Vision Wind Energy on Land (in Dutch: Structuurvisie Windenergie op Land or SWOL): Identifies locations for large wind farms; the area of Goeree-Overflakkee was mentioned to contribute to the 6000 MW wind energy goal.
- Electricity Act (1998): Projects exceeding 100 MW fall under the National Coordination Scheme, mandating the national government to coordinate decision-making for significant energy projects. Provinces can transfer authority for wind parks exceeding 5 MW capacity to municipalities under this law.
- Spatial Policy Energy Transition South-Holland 2012 (in Dutch: Provinciale Structuurvisie en Verordening Ruimte 2012): This provincial regulation indicates policy on locating wind parks in South-Holland.
- Partial Revision Regional Structural Vision Goeree-Overvlakkee 2015 (in Dutch: Partiële herziening regionale structuurvisie Goeree-Overvlakkee): This spatial development strategy designates the placement areas where wind turbines can be realised. With this spatial development strategy, the municipal council established the framework against which initiatives from the market must in any case be assessed.

5. Governance rules

Position rules

The Windpark Suyderlandt project involved a multitude of stakeholders, each fulfilling crucial roles in its conceptualization and realization. These actors included the provincial and municipal authorities, Peijnenburg and Deltawind, each contributing unique insights and efforts to the decision-making process. Peijnenburg aims for green energy for cost-saving/profit and greening of production, while Deltawind aims to achieve the goals of its members. The Province of South Holland set the regulatory framework, encouraging municipalities to pursue renewable energy projects aligned with national objectives. Municipalities like Goeree-Overflakkee navigated this framework, identifying suitable sites for wind energy projects like Windpark Suyderlandt. Deltawind and Peijnenburg BV played instrumental roles in project initiation and execution, with Peijnenburg providing land and having a stake in the ownership. Local residents participated actively, offering feedback and concerns through community engagement initiatives facilitated by Deltawind. The local residents and Stichting Mallemolens can be seen as opponents within this action situation. They are the actors who have submitted opinions and appealed against the various required documents Regulatory oversight was provided by the Municipality of Goeree-Overflakkee, which processed permit applications and monitored environmental compliance. Legal matters were addressed through interventions such as appeals to the Council of State, which ultimately upheld project approval, affirming its regulatory legitimacy. Through collaborative

efforts and regulatory adherence, Windpark Suyderlandt exemplified the synergy among diverse stakeholders in advancing renewable energy initiatives.

Boundary rules

Initially, as the project initiators, Peijnenburg B.V. and Deltawind held the role of project owners, being the primary parties involved. However, their involvement diminishes as Lighthouse Projects take over responsibilities for development, contracting, and construction, marking the end of their central role. The province initially contributed by identifying potential wind locations, with the municipality also offering assistance at this stage and later in the environmental permit and zoning plan processes. While the province exited the action situation early, the municipality remains engaged in the ongoing phase. Residents became involved due to anticipated inconveniences arising from construction and operational impacts, particularly concerning shadow flicker, noise, and visual pollution. They have the opportunity to appeal wind turbine construction post-permit issuance. Stichting Mallemolens shares the residents' objective of preventing wind turbine construction, maintaining involvement throughout the entire action situation. The court and the Council of State intervened during the appeal process concerning the environmental permit and zoning plan but exited the action situation after their rulings.

Scope rules

The situation action exemplified a commitment to local engagement and benefit, commencing with an initiative to involve residents in wind energy projects for mutual gain. Recognizing the inefficiency of disparate initiatives, Deltawind fostered collaboration among stakeholders, uniting 18 parties to create a unified plan aligned with municipal and provincial goals. Partnerships with entities like Eneco and Peijnenburg underscored the importance of engaging diverse stakeholders, with Peijnenburg, an agrarian landowner, collaborating for the Suyderlandt wind park. To mitigate financial risks, Deltawind established separate BVs for each project, safeguarding the cooperative and its members. While Peijnenburg BV was fully included in the decision-making process, Deltawind was leading in making decisions, for example when it came to the choice of turbines. Regulatory compliance and environmental stewardship were paramount, guiding Deltawind's approach to permit applications and project planning. Learning from experiences with partners like Eneco, Deltawind adapted strategies to enhance sustainability and community acceptance. The narrative emphasized the financial risks faced by co-operatives, highlighting the importance of capitalization and risk-sharing mechanisms. Through adherence to these principles, Deltawind navigated the complexities of wind energy development, fostering community engagement, financial sustainability, and environmental stewardship in its projects.

Aggregation rules

The aggregation rules encompassed clearly defined boundaries established among project stakeholders, including Deltawind, Peijnenburg, and local residents, to delineate roles, responsibilities, and decision-making authority within each project's scope. Collective choice arrangements were enacted through joint decision-making processes, forming partnerships, and participating in collaborative planning efforts to align with community interests and project objectives. Firstly, the partnership between Peijnenburg B.V. and Deltawind signifies a notable collaboration in the renewable energy sector, with 50% ownership held by an energy cooperative, reflecting collective ownership and shared decision-making. This cooperative arrangement demonstrates a commitment to collective choice and mutual benefit among stakeholders. Additionally, the development process of Windpark Suyderlandt was characterized by collaboration and negotiation among diverse stakeholders, including local landowners, municipalities, and provincial authorities, emphasizing the importance of collective decision-making and cooperation in achieving regional renewable energy goals. The involvement of multiple stakeholders in the decision-making process, from the establishment of land agreements to the acquisition of *permits* and resolution of legal challenges, underscores the importance of inclusive governance structures and collaborative approaches to resource management. Furthermore, the resolution of conflicts and legal challenges through transparent and participatory processes reflects the principles of monitoring, enforcement, and conflict resolution outlined by Ostrom. Overall, the aggregation rules derived from the text highlight the importance of collective action, collaboration, and adaptive governance in the development and management of common pool resources like wind energy projects.

Information rules

Transparency and accessibility of information were essential throughout the development process of Windpark Suyderlandt. The establishment of the 'Partial revision regional structure vision Goeree-Overflakkee, Wind Energy' in 2015 designated specific areas for wind energy projects, providing clarity on the spatial planning and enabling stakeholders to understand the proposed developments. Despite facing opposition reflected in over 2,000 petitions concerning the proliferation of wind turbines, the project advanced, indicating that information about the project's objectives, benefits, and potential impacts was disseminated to the public. Moreover, the engagement of stakeholders through public consultations in 2017 allowed for the expression of divergent viewpoints, demonstrating a commitment to inclusive decision-making and information exchange. Additionally, the legal processes involving appeals and hearings provided avenues for stakeholders to access and contribute information, ensuring transparency and accountability in decision-making. Overall, the information rules inferred from the text emphasize the importance of transparent communication, public participation, and accessibility of information in governing common pool resources like wind energy projects.

Payoff rules

The payoff rules underscore the equitable distribution of benefits and costs within the Windpark Suyderlandt project. Co-owned by Peijnenburg B.V. and Deltawind, with 50% ownership by an energy cooperative, the project reflects a balanced sharing of economic benefits among stakeholders. The 2006 agreement between Deltawind and a local landowner further solidified this fairness, establishing a 50:50 partnership between the developer and the

landowner. Financial sustainability was ensured through a combination of member investments, loans, and subsidies, with Deltawind relying on bank loans to fund Suyderlandt, totaling around 12 million euros. Their track record, spanning from their founding in 1991 with a 50% equity commitment to more recent projects with 10-15% equity contributions, highlights their commitment to member support. In 2018, Deltawind decided to convert these member loans into bonds issued by the cooperative. So now their members hold bonds in the cooperative. Additionally, they also hold bonds in certain projects. However, this is not the case in Suyderlandt and Blaakweg. This is because in these two projects, the co-initiators/investors are covering 50% of the financing and did not require this form of funding, making it financially and organizationally too complex to arrange. However, they did offer project bonds to their members in other projects, where they were responsible for more than 50% of the investments. Additionally, the project contributes to an environmental fund, demonstrating a commitment to equitable benefit sharing and community supportThe establishment of the wind fund as a separate entity with its own board emphasizes transparency and accountability in distributing benefits to the community. Overall, these payoff rules prioritize equitable distribution, partnership collaboration, and minimizing resistance among stakeholders.

Choice rules

The success of the Suyderlandt wind park project hinged on several pivotal decisions. Initially, Deltawind strategically partnered with Peijnenburg, an agrarian landowner, for land use negotiations and ownership collaboration. Thorough location assessments were then conducted to designate Suyderlandt as the ideal site, considering wind conditions, environmental impact, and community acceptance. Collaborating with Eneco for both the Blaakweg and Suyderlandt projects provided shared expertise and resources. The ownership structure was meticulously designed to include Peijnenburg as a co-owner, fostering local participation and land access. Financial strategy involved securing funding through cooperative member bonds, mitigating risks and ensuring community support. Community engagement efforts, including meetings and visualizations, addressed concerns and garnered acceptance. Environmental considerations prioritized turbines with minimal disturbance to surroundings, reflecting a commitment to sustainable development. These decisions collectively shaped the successful implementation of the Suyderlandt wind park project. Furthermore, municipal collaboration proved vital in facilitating progress through the issuance of environmental permits and zoning plans, while the province played a crucial role in coordinating the determination of wind locations, notably in the utilization of the Battenoord site. Preceding the drafting of the zoning plan, petitions played a decisive role in reducing the number of proposed wind turbines, underscoring the impact of community feedback on project planning and development.

6. Biophysical/material conditions

Windpark Suyderlandt comprises three Nordex wind turbines with a combined capacity of approximately 10.8 MW. These turbines stand tall with a hub height of up to 95 meters and a tip height reaching up to 150 meters, as detailed in the Government Gazette of 2017. The components of these turbines are sourced from Germany, necessitating transportation to the wind location in Battenoord. However, beyond the technical aspects, the project faces resistance from stakeholders due to the potential overshadowing of two prominent landscape landmarks: a mill and a church tower. These structures hold cultural and historical

significance, and their overshadowing by the wind turbines raises concerns among stakeholders. Balancing the benefits of renewable energy generation with the preservation of cultural heritage emerges as a key challenge for the project developers and stakeholders involved in the Suyderlandt wind park.

7. Attributes of the community

The community surrounding the wind location in Battenoord, encompassing residents from Nieuwe-Tonge and Oude-Tonge, initially harbored opposition to the construction of the wind turbines and later extended their concerns to the entirety of the project. Despite residing in close proximity to the wind park, there are no distinctive attributes to note regarding the demographic composition in terms of age or educational level. However, their collective resistance highlights the shared apprehensions and concerns regarding the impact of the wind turbines on their surroundings and the broader community landscape.

8. Interactions

The interactions between the different actors surrounding the Suyderlandt wind park project were multifaceted and dynamic. Initially, residents and the Foundation Mallemolens voiced their opposition, utilizing various channels such as petitions to express their concerns and influence the course of legal proceedings, which significantly impacted the project's timeline. Municipal collaboration played a pivotal role in facilitating progress by issuing environmental permits and drafting zoning plans, highlighting the importance of coordination between local authorities and project developers. Additionally, strategic partnerships between Deltawind and Peijnenburg, an agrarian landowner, were crucial for land use negotiations and ownership collaboration, demonstrating the significance of private-public partnerships in project development. These interactions underscore the complex network of relationships and negotiations involved in wind park development, where the interests and concerns of various stakeholders must be navigated and addressed to ensure successful project implementation.

9. Outcomes

The outcomes of the Suyderlandt wind park project reflect the culmination of various factors influencing the management of the common pool resource represented by the wind park. Notably, the successful negotiation of land use agreements with agrarian landowner Peijnenburg contributed to the project's viability. Moreover, the strategic selection of the wind location in Battenoord, considering wind conditions, environmental impact, and community acceptance, would influence the project's long-term sustainability. The transparent decision-making processes involving stakeholders, such as community members and local authorities, would foster a sense of ownership and collective responsibility, aligning with Ostrom's principles of shared governance. Effective community engagement efforts, including meetings and visualizations to address concerns and garner acceptance, would enhance social capital and trust among stakeholders. The action situation resulted in the realization of 3 wind turbines with an installed capacity of 10.8 MW in total.

10. Evaluative criteria

The evaluative criteria derived from the development of Windpark Suyderlandt align closely with Elinor Ostrom's principles of collective action and governance of common pool resources. Firstly, the project demonstrates the importance of clearly defined boundaries and rules regarding resource usage through the establishment of a 50:50 partnership between Deltawind and a local landowner. This arrangement ensured equitable participation and

shared responsibility for the wind park's development. Additionally, the collaboration between Deltawind and Peijnenburg BV exemplifies the principle of collective decision-making and collaboration among stakeholders, fostering a sense of ownership and commitment to achieving shared goals. Furthermore, the project's successful progression despite initial opposition underscores the effectiveness of inclusive and transparent decision-making processes, allowing for diverse perspectives to be considered and addressed. The resolution of legal challenges through judicial review further highlights the importance of clear institutional arrangements and mechanisms for conflict resolution in facilitating collective action. Overall, the comprehensive (pre-)development process spanned from 2006 to March 2020.

Appendix G: Blaakweg project

This appendix presents a case study examining the development of Windpark Blaakweg in South-Holland through the lens of Ostrom's Institutional Analysis and Development (IAD) Framework. By employing this framework, a comprehensive analysis is provided of the complex interactions and institutional arrangements involved in the establishment of this particular wind park.

1. Project description

The initiative for Windpark Blaakweg arose in 2012 when Deltawind, a renowned cooperative with a rich history in wind energy, opted to collaborate with Eneco to streamline local wind energy initiatives. Deltawind and Eneco agreed not to independently pursue the same locations, but rather to share them in a 50/50 arrangement. Out of the 18 initiatives on the island, only about 7 to 8 were ultimately realized, and the rest fell through.

In 2013, the four municipalities on the island merged into the Municipality of Goeree-Overflakkee. By then, the province had determined that 300 MW (at that time about 100 MW) of wind turbines should be installed. The municipality decided to resist by initiating its own MER to determine the available space for wind turbines. They concluded 225 MW in 5 concentration areas. One of the concentration areas is between Oude-Tonge and Nieuwe-Tonge, as Windpark Battenoort was already there (since 1996; 100% owned by Deltawind) and Windpark Krammer, located on Zeeland territory (50% owned by Deltawind), was under construction. Eneco and Deltawind would develop the Windpark Blaakweg together, based on the 50/50 agreement.

Engaging with Eneco proved to be beneficial for Deltawind, because of their experience with realizing wind farm projects. It was decided that Eneco would handle the technical aspects, for which Eneco would provide a quote to the BV, and Deltawind focused on the financial side. The total costs for the project were approximately 12 million euros. Deltawind, relying on bank loans to fund the Blaakweg project with 10-15% equity. To their member they offer loans with a 6% interest rate. Furthermore, they contribute to an environmental fund, as stated by the Dutch Wind Energy Association (NWEA). This amounts to 50 cents per megawatt-hour, regardless of further plans for the environment, and this is a commitment made upfront. The establishment of the wind fund as a separate entity with its own board emphasizes transparency and accountability in distributing benefits to the community.

During community engagements, Deltawind conducted meetings and showcased visual representations. Concurrently, the construction of Windpark Krammer was underway. The proliferation of wind turbines in Windpark Krammer sparked concerns among residents, particularly regarding the impact on Windpark Blaakweg. Initially, Blaakweg intended to install 4 additional turbines, creating a row of 7 turbines behind the existing parks. This triggered protests in the village, prompting the cancellation of 4 turbines as residents expressed discontent with the proliferation of wind turbines.

The project's progression began with the establishment of the 'Partial revision regional structure vision Goeree-Overflakkee, Wind Energy' on June 19, 2015, which outlined designated areas for wind energy projects, including Battenoord. Despite encountering opposition evidenced by over 2,000 petitions, primarily concerning the proliferation of wind turbines in Battenoord, the project persevered. The petitions highlighted residents' objections

to the significant number of turbines planned for the area. Despite the substantial opposition expressed through petitions, the project proceeded as planned. During a 6-week public consultation period in 2017, divergent viewpoints emerged, yet the project garnered approval, with the official zoning plan ratified on September 28, 2017, and the subsequent granting of an environmental permit the following day. Although additional partial permits were necessary after the general environmental permit, resistance to "construction permits," as termed by Lighthouse Projects, was minimal. This lower resistance led to shorter procedural timelines.

Nearly a year later, on July 25, 2018, the court dismissed the appeals of the stakeholders, to the extent deemed admissible. In response, the Foundation Mallemolens and residents appealed to the Council of State. The municipal council presented defenses, and the mayor and aldermen provided a written explanation in reaction to the appeals. Hearings involving multiple stakeholders were convened on November 15, 2018, to address the appeals. Additionally, another hearing took place on December 3 with stakeholders concerning other grounds for appeal (Raad van State, 2019a). However, on April 3, 2019, the Council of State dismissed all appeals, paving the way for construction to proceed. Following approval, the acquisition of partial permits encountered minimal resistance, facilitating the initiation of construction activities in March 2020, aiming to realize three turbines, each with an installed capacity of 3.6 MW (Windenergie Nieuws, 2020).

2. Action situation: (Pre-)Development Phase

The action situation surrounding Windpark Blaakweg initiated in 2012 when Deltawind, an esteemed cooperative in wind energy, partnered with Eneco to streamline local wind energy endeavors, establishing a 50/50 agreement to share locations. Despite numerous proposed initiatives on the island, only a fraction materialized. The merger of four municipalities into the Municipality of Goeree-Overflakkee in 2013 coincided with a provincial mandate to install 300 MW of wind turbines, prompting the municipality to conduct its own MER, resulting in the identification of suitable areas, including one between Oude-Tonge and Nieuwe-Tonge. Collaborative efforts with Eneco proved beneficial, with Eneco handling technical aspects and Deltawind focusing on finances, supported by bank loans and member contributions to an environmental fund. Community engagements highlighted concerns regarding the proliferation of wind turbines, particularly in light of Windpark Krammer's construction, leading to protests and the cancellation of some turbines. Despite opposition evidenced by over 2,000 petitions, the project persevered, receiving approval during a public consultation in 2017 and subsequent legal challenges, ultimately dismissed by the Council of State in April 2019. Following approval, construction commenced in March 2020, aiming to realize three turbines with an installed capacity of 3.6 MW each.

3. Participants

The following actors were involved in this action situation:

- **Local government authorities:** Both the Province of South Holland and the Municipality of Goeree-Overflakkee have been involved in the realization process of wind farm Suyderlandt.
- **Council of State:** Due to appeals from the same actors against the court's rulings, the Council of State has also been involved.

- **Project Initiatiors:** Eneco and Deltawind. Deltawind is an energy cooperative with nearly 2,500 members and Eneco is a commercial energy company who also invests in renewable energy projects.
- **Interest groups:** During the construction of wind farm Suyderlandt, one specific foundation has emerged prominently, namely the Mallemolens Foundation. This foundation aims to critically monitor and prevent the realization of more wind turbines in the area between Oude-Tonge and Nieuwe-Tonge ("Mallemolens: 'Show as a municipality that you have the best interests of Oude-Tonge at heart'", 2019).
- **Local residents:** In this case as well, there are residents participating in the realization process. These include inhabitants of both Nieuwe-Tonge and Oude-Tonge (Raad van State, 2019a).

4. Policy regulations

The following laws, regulations, and policy measures were applicable to this action situation:

- The Environmental Impact Assessment (EIA) (in Dutch: Milieueffectrapportage or MER) is a regulatory order based on the Environmental Management Act. It mandates the preparation of an EIA for activities and projects that could significantly impact the environment. Within the European Union, conducting an EIA for such projects is obligatory (Ministerie van Infrastructuur en Waterschap, 2020).

- Spatial Planning Act (in Dtuch: Wet Ruimtelijke Ordening or Wro): This legislation governs energy transition and includes spatial planning procedures, crucial for all project phases, allowing provincial zoning plans for projects of provincial importance.

- European directive 2009/28/EG mandates that 14% of energy consumption from renewable sources by 2020, supporting national wind energy policies.

- Energy Report (in Dutch: Energierapport): It articulates the Dutch government's ambitions for generating and utilizing sustainable energy, with a focus on wind energy opportunities, particularly offshore.

- National Energy Agreement (in Dutch: Energieakkoord): Established to expedite sustainable energy production, this agreement includes commitments between the government, provinces, and various societal organizations. The Province of South-Holland aims to achieve a capacity of 735.5 MW of wind energy by 2020.

- Decree on General Rules of Spatial Planning (in Dutch: Besluit algemene regels ruimtelijke ordening or Barro): This decree, effective since December 30, 2011, provides legal assurance for national spatial policy. It contains rules limiting the policy space of other governmental authorities concerning spatial plans' content in areas where national interests require restriction.

- Structural Vision Infrastructure and Space 2012 (in Dutch: Structuurvisie Infrastructuur en Ruimte): Outlines the national spatial policy and strategy for large-scale wind energy locations.

- Structural Vision Wind Energy on Land (in Dutch: Structuurvisie Windenergie op Land or SWOL): Identifies locations for large wind farms; the area of Goeree-Overflakkee was mentioned to contribute to the 6000 MW wind energy goal.

- Electricity Act (1998): Projects exceeding 100 MW fall under the National Coordination Scheme, mandating the national government to coordinate decision-making for significant energy projects. Provinces can transfer authority for wind parks exceeding 5 MW capacity to municipalities under this law.
- Spatial Policy Energy Transition South-Holland 2012 (in Dutch: Provinciale Structuurvisie en Verordening Ruimte 2012): This provincial regulation indicates policy on locating wind parks in South-Holland.
- Partial Revision Regional Structural Vision Goeree-Overvlakkee 2015 (in Dutch: Partiële herziening regionale structuurvisie Goeree-Overvlakkee): This spatial development strategy designates the placement areas where wind turbines can be realised. With this spatial development strategy, the municipal council established the framework against which initiatives from the market must in any case be assessed.

5. Governance rules

Position rules

The Windpark Blaakweg project, similar to the Windpark Suyderlandt initiative, engaged various stakeholders in pivotal roles throughout its inception and execution. These key actors included provincial and municipal authorities, as well as Deltawind and Eneco, each contributing distinct insights and efforts to drive the project forward. Eneco, a company active in renewable energy projects, partnered with Deltawind, a cooperative with extensive experience in wind energy, to streamline local wind energy initiatives. Together, they agreed on a collaborative approach, sharing locations in a 50/50 arrangement to maximize efficiency. Provincial and municipal authorities, particularly the Municipality of Goeree-Overflakkee, played regulatory roles, guiding the project within the broader framework of renewable energy objectives. Deltawind and Eneco assumed crucial responsibilities, with Eneco focusing on technical aspects and Deltawind handling financial matters, including funding through bank loans and member support initiatives. Community engagement initiatives, spearheaded by Deltawind, provided a platform for local residents to voice feedback and concerns, shaping the project's trajectory. Within this action situation, local residents and concerned groups emerged as stakeholders expressing opposition, influencing decision-making processes through petitions and appeals. Regulatory oversight by municipal authorities, supported by legal interventions such as appeals to higher administrative bodies like the Council of State, ensured compliance and legitimacy throughout the project's development. Through collaborative efforts and regulatory adherence, Windpark Blaakweg underscored the collective commitment of diverse stakeholders towards advancing renewable energy goals in the region.

Boundary rules

Boundary rules within the Windpark Blaakweg project context are delineated by the collaborative agreement between Deltawind and Eneco, establishing a 50/50 arrangement to select and develop wind turbine locations, fostering cooperation and preventing conflicts over site selection. Regulatory oversight is governed by the actions of the Province of South Holland and the Municipality of Goeree-Overflakkee, with the province setting the regulatory framework and the municipality conducting environmental assessments to determine suitable sites for wind turbines, ensuring compliance with regulatory standards and objectives.

Community engagement and opposition are evident through the involvement of local residents and groups like Stichting Mallemolens, who actively participate in community engagements and oppose wind turbine construction, expressing concerns and engaging in decision-making processes. Legal interventions by the court and the Council of State establish boundary rules regarding legal proceedings and appeals, reviewing appeals and rulings concerning environmental permits and zoning plans to ensure adherence to legal standards and procedural fairness. The boundary rule governing project progression and construction involves the acquisition of permits and the initiation of construction activities, overseen by regulatory bodies and stakeholders, ensuring adherence to established regulatory processes and timelines while facilitating the project's progression.

Scope rules

Scope rules within the Windpark Blaakweg project context are defined by the collaborative decision-making processes between Deltawind, Eneco, and regulatory bodies, establishing parameters for site selection, project development, and environmental compliance. The initial agreement between Deltawind and Eneco outlines the scope of their collaboration, including the shared responsibility for selecting and developing wind turbine locations, ensuring transparency and accountability in decision-making. Regulatory authorities, such as the Province of South Holland and the Municipality of Goeree-Overflakkee, further define the scope by conducting environmental assessments and issuing permits based on established criteria, ensuring that the project aligns with regional and national renewable energy objectives while minimizing environmental impact. Community engagement initiatives, including meetings and consultations facilitated by Deltawind, broaden the scope by providing opportunities for local residents to voice concerns and provide feedback on project plans, influencing decision-making processes and project outcomes. Additionally, legal interventions by the court and the Council of State define the scope by reviewing appeals and rulings concerning environmental permits and zoning plans, ensuring that project activities adhere to legal standards and procedural fairness. Through these collaborative and regulatory processes, the scope of the Windpark Blaakweg project is defined and governed to achieve renewable energy objectives while addressing community and environmental concerns.

Aggregation rules

Aggregation rules within the Windpark Blaakweg project context are established to consolidate resources, expertise, and decision-making authority among stakeholders, facilitating effective project development and implementation. The collaboration between Deltawind and Eneco exemplifies aggregation, as both entities pool their respective strengths in wind energy experience and technical expertise to streamline project processes and achieve shared objectives. The 50/50 arrangement between Deltawind and Eneco further aggregates resources, ensuring equitable distribution of responsibilities and benefits. Regulatory authorities play a crucial role in aggregation by consolidating legal frameworks and permitting processes, providing a standardized approach to project development and environmental compliance. Community engagement initiatives led by Deltawind aggregate local knowledge and perspectives, enabling stakeholders to collectively address concerns and contribute to project decision-making. Legal interventions by the court and the Council of State aggregate authority in resolving disputes and ensuring compliance with regulatory standards. Through these aggregated efforts and resources, the Windpark Blaakweg project

optimizes collaboration, efficiency, and accountability to achieve its renewable energy objectives while balancing stakeholder interests and regulatory requirements.

Information rules

Information rules within the Windpark Blaakweg project context govern the flow and transparency of information among stakeholders, ensuring informed decision-making and fostering trust and accountability. The collaboration between Deltawind and Eneco exemplifies information rules, as both entities share technical details, financial projections, and project updates to align objectives and facilitate effective coordination. The 50/50 arrangement between Deltawind and Eneco establishes clear communication channels for sharing information on project progress, challenges, and decisions, enhancing transparency and mutual understanding. Regulatory authorities enforce information rules by mandating public consultations, environmental impact assessments, and permit disclosures, ensuring stakeholders have access to relevant project information and opportunities to provide input. Community engagement initiatives led by Deltawind adhere to information rules by disseminating project updates, hosting meetings, and addressing stakeholder concerns transparently, fostering trust and inclusivity. Legal interventions by the court and the Council of State uphold information rules by requiring disclosure of relevant documents and evidence during legal proceedings, promoting fairness and accountability in dispute resolution.

Payoff rules

The payoff rules within the action situation define the distribution of benefits and costs among stakeholders based on their contributions, investments, and interests. Deltawind and Eneco, as project partners, adhere to a 50/50 arrangement, implying an equal distribution of financial investments, risks, and rewards. Deltawind's reliance on bank loans to fund the project with a 10-15% equity contribution indicates a proportional sharing of financial burdens and potential returns. In 2018, Deltawind decided to convert these member loans into bonds issued by the cooperative. So now their members hold bonds in the cooperative. Additionally, they also hold bonds in certain projects. However, this is not the case in Suyderlandt and Blaakweg. This is because in these two projects, the co-initiators/investors are covering 50% of the financing and did not require this form of funding, making it financially and organizationally too complex to arrange. However, they did offer project bonds to their members in other projects, where they were responsible for more than 50% of the investments. Additionally, the project contributes to an environmental fund, demonstrating a commitment to equitable benefit sharing and community support. The establishment of the wind fund as a separate entity with its own board ensures transparent and accountable distribution of benefits to the community, aligning with the principle of fairness in payoff distribution. Regulatory authorities may enforce payoff rules by stipulating conditions for project approval, such as community benefit agreements or revenue-sharing mechanisms, ensuring that stakeholders receive fair compensation for any adverse impacts or inconveniences caused by the project. Ultimately, adherence to payoff rules promotes fairness, equity, and social responsibility in the distribution of benefits and costs associated with the Windpark Blaakweg project.

Choice rules

The choice rules within the Windpark Blaakweg project framework dictate the decision-making processes and criteria employed by stakeholders to determine project direction,

allocation of resources, and resolution of conflicts. Deltawind's decision to collaborate with Eneco reflects a strategic choice aimed at leveraging Eneco's expertise in wind farm projects to streamline local initiatives and optimize resource utilization. The 50/50 arrangement between Deltawind and Eneco establishes a clear framework for equitable decision-making and resource allocation, ensuring that both parties have equal influence and responsibility in project development. Additionally, the engagement of residents and stakeholders in community meetings and consultations provides a platform for input and feedback, allowing their preferences and concerns to influence project decisions. The establishment of regulatory frameworks, such as zoning plans and environmental permits, by municipal and provincial authorities delineates the boundaries within which project choices are made, ensuring compliance with legal and regulatory requirements. Conflict resolution mechanisms, including appeals processes through the court and the Council of State, offer avenues for stakeholders to challenge decisions and seek recourse in cases of disagreement or dissatisfaction. Overall, adherence to choice rules fosters transparency, accountability, and stakeholder participation in the decision-making processes of the Windpark Blaakweg project.

6. Biophysical/material conditions

Windpark Blaakweg consists of three Nordex wind turbines with a combined capacity of around 10.8 MW, which is similar to the Suyderland project. These turbines reach impressive heights, with a hub height of up to 95 meters and a tip height extending to approximately 150 meters, as outlined in the Government Gazette of 2017. The turbine components are imported from Germany, necessitating transportation to the wind location in Battenoord. However, apart from the technical considerations, the project encounters opposition from stakeholders due to concerns about overshadowing two significant landscape features: a mill and a church tower. These landmarks hold cultural and historical importance, and their potential overshadowing by the wind turbines raises apprehensions among stakeholders. Balancing the advantages of renewable energy production with the preservation of cultural heritage emerges as a primary challenge for both the project developers and stakeholders involved in the Blaakweg wind park.

7. Attributes of the community

Initially, the community neighboring the wind site in Battenoord, inclusive of residents from Nieuwe-Tonge and Oude-Tonge, expressed opposition to the wind turbines' construction. Over time, their concerns expanded to encompass the entire project. Despite living near the wind park, there are no notable distinctions in the demographic makeup concerning age or educational background. Nonetheless, their unified resistance underscores shared apprehensions and worries about the wind turbines' effects on their environment and the broader community landscape.

8. Interactions

In the development of the Blaakweg project, a complex web of interactions unfolds among its diverse array of stakeholders. At the forefront are Deltawind and Eneco, whose collaboration forms the cornerstone of the project's inception, leveraging their respective expertise in wind energy and technical implementation. This partnership sets the stage for the project's trajectory, with Eneco assuming responsibility for technical aspects while Deltawind focuses on financial considerations. Meanwhile, the community, represented by residents from Nieuwe-Tonge and Oude-Tonge, emerges as a potent force in shaping the project's direction. Their initial opposition to the wind turbines evolves into broader concerns about the project's

implications for the cultural and historical landscape, particularly regarding overshadowing of significant landmarks. Regulatory bodies, including the Municipality of Goeree-Overflakkee and the Council of State, exert influence through permit approvals and legal interventions, respectively. Despite divergent interests and challenges, these interactions underscore the intricate dynamics at play as the Blaakweg project navigates towards realization, highlighting the need for collaborative engagement and stakeholder dialogue.

9. Outcomes

In the pre-development phase of the Blaakweg project, the interactions among stakeholders yield a variety of outcomes that shape the project's trajectory. The collaboration between Deltawind and Eneco establishes a solid foundation for technical and financial planning, laying the groundwork for subsequent stages. However, the resistance from the local community, particularly concerning the potential overshadowing of cultural landmarks, introduces complexities and challenges. This opposition prompts a reevaluation of the project's impact and necessitates adjustments to address community concerns. Regulatory interventions from bodies like the Municipality of Goeree-Overflakkee and the Council of State provide legal oversight and guidance, influencing the project's direction. Despite these challenges, the pre-development phase sets the stage for constructive dialogue and collaboration, emphasizing the importance of balancing renewable energy goals with community interests and cultural preservation. Effective community engagement efforts, including meetings and visualizations to address concerns and garner acceptance, enhanced social capital and trust among stakeholders. The action situation ultimately led to the start of the construction of 3 Nordex wind turbines with an installed capacity of 3.6 each.

10. Evaluative criteria

The evaluative criteria derived from the development of Windpark Blaakweg closely align with Elinor Ostrom's principles of collective action and governance of common pool resources. Firstly, the project underscores the significance of clearly defined boundaries and rules regarding resource usage through the establishment of a 50/50 partnership between Deltawind and Eneco. This partnership ensures equitable participation and shared responsibility for the development of the wind park, promoting a sense of ownership and collaboration. Additionally, the collaboration between Deltawind and Eneco exemplifies the principle of collective decision-making and stakeholder engagement, fostering a shared commitment to achieving common objectives. Moreover, the project's ability to overcome initial opposition reflects the effectiveness of inclusive and transparent decision-making processes, enabling diverse perspectives to be considered and addressed. The resolution of legal challenges through judicial review further emphasizes the importance of clear institutional arrangements and mechanisms for conflict resolution, facilitating collective action and project advancement. Furthermore, the establishment of an environmental fund, underscores the project's commitment to community benefit. In total, the process of (pre-)development extended from 2012 until March 2020.

Appendix H: Summary Interview Deltawind

In 2009 ben ik als directeur bij de coöperatie Deltawind gaan werken. Deltawind bestond op dat moment al 20 jaar en had een belangrijke rol gespeeld in de energietransitie op het eiland Goeree-Overflakkee. We hebben hier op het eiland de eerste kleine windturbines gebouwd en zijn geleidelijk gegroeid. Het doel van de coöperatie was altijd om de lokale bevolking te laten profiteren. Omwonenden mochten ervan profiteren door mee te investeren en rente op hun investering te ontvangen. In 2002 werd al besloten dat het hele eiland windturbines moest hebben, en in 2012 kwam de rijkscoördinatieregeling. Als Deltawind, de enige coöperatie hier op het eiland, hebben we toen gezegd: “het kan dus gebeuren dat een externe partij hier naar het eiland komt en zegt, wij zetten 100 megawatt neer, dan heb je meteen een rijkscoördinatieregeling en dan hebben we op het eiland gewoon het nakijken, want dan gaat het volgens de normen van het rijk en komt er alleen windenergie.”

We hadden al een sterke band met Eneco. Samen besloten we: weet je wat? Op het eiland zijn er 18 initiatieven om windenergie te realiseren. We gaan deze 18 partijen aan tafel krijgen met twee duidelijke afspraken. Ten eerste, we gaan één gezamenlijk plan maken in plaats van 18 losse plannen, omdat dat ons eiland niet ten goede komt. Daar zetten we ons gezamenlijk voor in, richting de gemeente en provincie. Ten tweede, iedereen belooft nu al bij te dragen aan het eiland. In 2012 hebben we dus alle initiatiefnemers uitgenodigd om mee te doen, met de belofte van bijdrage aan het windfonds. Van de 18 initiatieven op het eiland zijn uiteindelijk maar zo'n 7 tot 8 gerealiseerd en de rest is afgevallen.

Alle windparken die na 2016 door Deltawind zijn gerealiseerd, dragen bij aan het windfonds. Dat was toen nog redelijk uniek, en vanaf het moment dat we dat hier zijn gaan organiseren, is ook door de NWEA (Nederlandse Windenergie Associatie) de bijdrage aan het windfonds opgenomen in de standaard gedragscode. Dat komt neer op 50 cent per megawattuur, los van verdere plannen voor de omgeving. Bovendien is dit een toezegging die men aan de voorkant al doet.

Blaakweg en Suyderlandt liggen enkele honderden meters bij elkaar vandaan. Blaakweg wordt door ons ontwikkeld samen met Eneco en Suyderlandt samen met Peijnenburg, een agrariër. Het windpark bij Suyderlandt is gevestigd op grond van Peijnenburg. We hebben destijds, in 2006, een overeenkomst gesloten met Peijnenburg. Natuurlijk betalen we voor het gebruik van de grond, maar Peijnenburg wilde ook deelnemen als mede-eigenaar. Hoewel wij het windpark hebben ontwikkeld, hebben we altijd in overleg met Peijnenburg gehandeld. Peijnenburg is een agrariër en heeft geen interesse in de energietransitie. Hij ziet het enkel als een verdienmodel door zijn grond beschikbaar te stellen voor het windpark.

We hebben om ons heen gekeken om te bepalen waar het logisch leek om een windpark te vestigen. De provincie richt zich enkel op de kaart en zet daar een streep, maar wij wonen daar, dus wij, als Deltawind, waren degenen die op dat moment de situatie echt begrepen. Als bedrijfsvoerder beoordeelden we of een locatie geschikt was. We zijn toen in gesprek gegaan met Peijnenburg en hebben gezegd: "Dit lijkt ons een geschikte locatie, kunnen we tot een overeenkomst komen?" Er waren tijden waarin ontwikkelaars gewoon door Nederland reden en zo te werk gingen. Eneco was bijvoorbeeld actief in Zuidwest Nederland en reed ook over ons eiland. Dat vonden we niet helemaal juist, dus hebben we op een gegeven moment

afspraken gemaakt met Eneco. We hebben afgesproken dat we niet allemaal apart naar dezelfde locatie zouden gaan, maar dat we de locaties 50/50 zouden delen. Dat was de overeenkomst die we met Eneco sloten.

Het oprichten van een BV was om verschillende redenen. We bezaten 50% van de aandelen in beide projecten. Dit was ook een manier om de coöperatie te beschermen; als de BV slecht functioneerde of failliet ging, zou de coöperatie niet worden meegesleept. Dit was ook bedoeld als bescherming voor het geld dat de leden in onze coöperatie hadden geïnvesteerd, waardoor het risico voor onze leden relatief beperkt was. Zelfs als we een grote investering deden, was het belangrijkste dat we hun geld konden terugbetalen, dus de kans dat ze hun geld zouden verliezen was niet erg groot.

Peijnenburg vertrouwde volledig op onze kwaliteiten. We hebben hem altijd volledig meegenomen in het proces; elk besluit werd samen met hem genomen. Hij had ook een zaakgelastigde, dus hij was altijd vertegenwoordigd door iemand anders, iemand die breder kon kijken dan alleen naar zijn eigen bedrijf. Dat hebben we als heel prettig ervaren. Hij was een goede sparringpartner, maar wij waren wel leidend. Bijvoorbeeld als het ging om de keuze van de turbines, vonden we het als coöperatie altijd belangrijk om turbines te kiezen die zo min mogelijk overlast veroorzaken in de omgeving. Dat betekent soms dat ze minder productie opleveren dan andere turbines, maar voor ons was dit van groot belang. Dit was ook een discussie die we met de agrariër hebben gevoerd. Eneco deelde dezelfde opvatting, dus daar was er minder discussie over de overlast. Maar bij Eneco hebben we bijvoorbeeld aangedrongen op het verkrijgen van een materialenpaspoort bij de aanvraag. Als je uiteindelijk naar een circulaire maatschappij wilt, wil je weten waar de materialen vandaan komen en wat er mee gebeurt als ze niet meer gebruikt worden. Dit was een eis die we bij Eneco hebben ingediend en uiteindelijk is dit ook overgenomen voor Suyderlandt. Dus de vereisten waren heel vergelijkbaar, en er werden ook dezelfde turbines gebruikt.

Het hielp ons ook om met Eneco in een vergelijkbare discussie te zijn, want daar leerden we ook van. Eneco bouwt tientallen parken en wij slechts een paar. We hebben daar een 50/50-verdeling in gehad, maar we hebben al vroeg besloten dat Eneco de technische kant zou oppakken. Dus zij hebben ook een offerte gestuurt aan de BV voor de technische aspecten, terwijl Deltawind zich richtte op de financiële kant.

Deltawind heeft al jarenlang ervaring met windturbines, al sinds 1991, dus we hebben een solide basis opgebouwd. In de coöperatie laten we aan onze leden zien wat de kosten zijn in de voorfase. Tot dan toe dragen ze 100% van het risico. Telkens informeren we onze leden over de voortgang: of we de vergunning hebben verkregen, SDE-subsidie hebben gekregen, of de financiering rond is, etc.. Op basis daarvan besluiten we of het verantwoord is om verder te investeren. Het is een stapsgewijze communicatie met onze leden.

Onze leden hebben door de jaren heen geïnvesteerd in onze coöperatie. Toen we begonnen met de bouw van de parken, hadden we ongeveer 6 miljoen euro aan ledenkapitaal beschikbaar. Dit geld was afkomstig van leningen van onze leden. Juridisch gezien was dit echter niet helemaal correct, omdat je niet zomaar geld van particulieren mag inzamelen om het vervolgens risicovol te investeren. In 2018 hebben we besloten om deze ledenleningen volledig om te zetten naar obligaties in de coöperatie. Dus nu hebben onze leden obligaties in de coöperatie. Daarnaast hebben ze ook obligaties in bepaalde projecten, maar niet in Suyderland en Blaakweg. Dit heeft te maken met het feit dat er in deze twee projecten 50%

andere investeerders zijn die geen behoefte hadden aan deze vorm van financiering, waardoor het financieel en organisatorisch te complex werd om dit te regelen. We hebben deze aanpak wel toegepast in projecten waar we meer zeggenschap hadden in de financiering, dus waar we meer dan 50% van de investeringen beheersten.

Er zijn in feite twee cruciale momenten in dat proces van ontwikkeling. Wanneer je de vergunning aanvraagt, moeten er leges worden betaald. Dat is altijd een grote som geld en een belangrijke financiële stap wanneer je begint met bouwen.

Als coöperatie hebben we eigenlijk een behoorlijk trackrecord opgebouwd. Toen we onze allereerste windmolen gingen bouwen, moesten we 50% eigen vermogen inbrengen, dat was voor de turbine in 1991. Na verloop van tijd is dat percentage gedaald, ergens tussen de 10 en 15% eigen vermogen, schat ik. De rest werd geleend van de bank. Als we kijken naar Blaakweg, hoe hebben we dat gefinancierd? Eneco kan soms geld lenen op basis van hun balans. Ze hebben soms zoveel kapitaal dat ze alles zelf kunnen betalen. Maar dat hebben wij nooit gedaan. Bij ons zijn alle windparken gefinancierd door de bank.

De kosten voor deze projecten bedroegen grofweg 3,5 miljoen per turbine, dus tussen de 10 en 12 miljoen in totaal, inclusief netwerkaansluiting en andere kosten.

Onze leden krijgen 6% rente op de leningen die ze aan ons hebben verstrekt. In de afgelopen jaren, toen de bankrente nul was, was dat natuurlijk heel aantrekkelijk. Voor de andere obligaties waar onze leden in hebben geïnvesteerd, varieert de rente tussen de 4,5% en 6%. Dat is wat de leden sowieso ontvangen. Daarnaast dragen we bij aan het omgevingsfonds en organiseren we vaak speciale acties voor onze leden, zoals kortingen of andere financiële voordelen.

Het windfonds is extern geplaatst. Het is een aparte stichting geworden met een eigen bestuur. Zij bewaken de doelstellingen van dat fonds en zorgen ook voor de uitkeringen aan de omgeving.

We hebben eigenlijk nooit veel weerstand ervaren. Het eiland is echt meegegroeid met wat er geleidelijk is opgebouwd en wanneer er werd opgeschaald. In 2016 hebben we nog een opschaling gedaan. Op dat moment stonden er 7 windturbines. Er is eigenlijk nooit bezwaar tegen gemaakt.

Terwijl we in gesprek waren met de bewoners, organiseerden we bijeenkomsten en presenteerden we visualisaties. Op dat moment werd ook het Windpark Krammer gebouwd. Vanaf het eiland zag je eerste Suyderland en Blaakweg, gevolgd door Battenoert, en daarachter stond Windpark Krammer. Dat waren er heel wat bij elkaar, kan ik je vertellen. De bouw van Windpark Krammer zorgde onder de bewoners voor bezorgdheid, vanwege het grote aantal windturbines. Vooral voor Windpark Blaakweg was dit een zorg, aangezien Suyderland minder impact had - daar stonden al twee kleine turbines. Blaakweg had oorspronkelijk ook nog 4 extra turbines gepland, waardoor het een rij van 7 turbines achter de andere twee parken zou worden. Dit leidde tot protesten in het dorp, wat resulteerde in het schrappen van 4 turbines.

Ik heb een chronologisch overzicht gegeven van de aarzelingen die destijds speelden. Het idee ontstond in 2002 vanuit de provincie. In 2006 hebben we de grondposities voor Suyderlandt vastgelegd, maar daarna is er eigenlijk zeven jaar lang niets gebeurd vanwege onenigheid

tussen de gemeentes. Pas in 2012 kwam het eerste plan naar voren, en naar mijn weten is Suyderlandt uiteindelijk in 2020 gebouwd. Voor Blaakweg verliep een vergelijkbare tijdlijn, waarbij mensen zelfs tot aan de Raad van State zijn gegaan om te procederen. Dat is in het kort de tijdlijn.

Als je een gunstige locatie hebt gevonden en alle benodigde vergunningen kunt verkrijgen, is het financieel haalbaar om een windpark te realiseren. Financiering is zelden een probleem, vooral niet met de huidige mogelijkheden. Echter, wat betreft coöperaties, zijn er nog steeds coöperaties in het land die geen eigen vermogen hebben. Voor hen wordt het risico alleen maar groter naarmate de turbines groter worden. Ze moeten het volledige risico zelf dragen, wat voor veel coöperaties een uitdaging vormt.

Als een coöperatie eenmaal een windpark heeft en er iets misgaat in bijvoorbeeld contracten, kan dat grote financiële gevolgen hebben. Neem bijvoorbeeld ons windpark Battenoert, dat subsidie kreeg in 2012 onder ongunstige voorwaarden. Toen de energieprijzen in 2016 sterk daalden, zou Battenoert een groot financieel risico hebben gevormd als het ons enige park was geweest. Gelukkig hadden we meerdere parken, waardoor we de verliezen daar konden compenseren met winsten elders. Het hebben van een windpark als coöperatie brengt dus aanzienlijke risico's met zich mee.Tot op heden hebben we coöperaties ondersteund met onze expertise, maar er komt mogelijk een moment waarop we meer voor hen zullen doen, bijvoorbeeld door financiering te verstrekken of in ieder geval een deel van het risico te dragen.

Appendix I: Consent Form

You have been invited to participate in a research study titled "An Exploratory Study on Institutional Design Configurations for Local Energy Communities in the Netherlands". This study is being conducted by Marleen Vink from TU Delft in collaboration with Blockchain Fieldlab B.V. (Docklab).

The purpose of this research study is to investigate the effect of different institutional design configurations of local energy communities in the Netherlands on their scalability, inclusivity and effectiveness of decision-making processes. This interview will take approximately 60 minutes to complete. The data gathered will be used for a masters end-of-study project report and may be reused for future research work.

To the best of our ability, your answers in this study will remain confidential. We will minimize any risks by storing and archiving all data collected during the study in a TU Delft institutional storage solution, under the responsibility of the research supervisor. Only Marleen Vink and the research supervisor will have access to the data collected during this study.

The collected information (contact information, audio recording, transcript of the conversation) will be stored for the duration of the Master project at TU Delft. The master's end-of-study project report will remain internal to TU Delft, and it will not contain any personal information allowing your re-identification. In the final research report, only your domain of activity, job description (if relevant), and approximate geographic location (region) will be reported.

The collected information (contact information, audio recording, transcript, and this proof of consent) will be preserved for up to 3 years after the completion of this project (estimated date: June 2027). During this period, the collected data may be reused for additional scientific publication and presentation. For such additional output, more members of the TU Delft research team will be granted access to the collected data. This access will be granted under the condition that the researchers abide by this consent form (purpose, and confidentiality). This extension of access rights will be supervised by Rutger van Bergem and it will only be granted on a need-to-know basis. You will remain anonymous in any output created during follow-up work. An anonymous summary of the conversation may be made publicly available along with such additional work.

Your participation in this study is entirely voluntary, and you can withdraw at any time. You are free to omit any questions. You can, before the data is deleted, contact Rutger van Bergem of the study to request information regarding the processing of your data, request deletion of this data, or retract your consent at any time. Should you choose to do this, we will erase all personally identifiable information we have about you. Your input will then not be used for future work. Should we want to use the collected information for research activities on a topic other than the institutional design configurations for local energy communities, we will contact you to obtain your consent for this specific use of the data.

I agree that my responses, views or other input can be quoted anonymously in research outputs

[ ] Yes [ ] No

_____	_____	_____
Name of participant [printed]	Signature	Date