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Original research article

Does local ownership matter? A comparative analysis of fourteen wind energy projects in the Netherlands

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ABSTRACT

Onshore wind energy projects are traditionally developed by commercial project developers. However, the development of these projects is increasingly encountering problems due to poor social acceptance and legal objections. In addition to commercial project developers, renewable energy cooperatives (REScoops) also develop onshore wind energy projects. These non-commercial entities are driven by local, ecological and egalitarian values and often strive for local ownership. This influences the rules-in-use they apply when planning and developing projects. In this paper, fourteen cases of onshore wind energy project development in the Netherlands are analysed using Elinor Ostrom's Institutional Analysis and Development framework. The objectives are: (1) to investigate how the rules-in-use differ between fourteen selected onshore REScoop wind energy projects and onshore commercial wind energy projects in the Netherlands, (2) to investigate how the project duration and the number of submitted views and appeals differ between these two types of wind energy projects, and (3) to determine to what extent the observed differences in rules-in-use can explain the differences in project duration and the number of views and appeals submitted. The research design involves a stepwise approach, including qualitative within-case analysis, followed by quantitative cross-case statistical analysis. The results show that projects developed by REScoops differ on six out of seven rules, especially pay-off, position, and aggregation rules. For projects with a higher percentage of REScoop ownership, the total duration of project planning and development is shorter, there are fewer submitted views during the permit application process and fewer appeals to the Council of State.

1. Introduction

Wind energy has gained importance in the sustainable energy transition [1], especially in countries such as the Netherlands, where policies have been introduced to accelerate its deployment. In large numbers, wind turbines can contribute significantly to a nation's efforts to achieve renewable energy and low carbon goals [2]. However, due to the perceived impact on many areas – visual disturbances, health risk, danger to birds, loss of place identity, and reduction in the monetary value of nearby properties – the planning and implementation of a wind energy project is prone to many problems [3,4]. The most common problems are resistance and political polarisation, which cause delay or even termination of plans and the downsizing of initially ambitious plans in order to reduce the impact on the nearby environment, thereby also reducing the generation of renewable energy and the financial feasibility of wind energy projects [5].

The planning and development of wind energy projects includes several stages, including: (1) inception of a wind energy initiative (preliminary stage), (2) spatial planning procedures, (3) coping with public authorities, (4) assessment of siting, (5) requesting permits, (6) plan and project decision-making, and finally (7) implementation, construction, and operation [6]. In several of these stages, stakeholders influence decision-making. This includes third parties voicing concerns, which may spur social resistance against plans to site and construct wind farms.

In many countries, wind energy projects are planned and developed by commercial project developers, who bring professionalism and industry expertise [7]. Commercial project developers are typically seen by local communities as outsiders who have short-term profit maximisation agendas that do not correspond well with local, egalitarian, and ecological interests local communities have [8]. Moreover, community outsiders often lack social ties, reputation, and trust locally. This makes it more difficult to gain access to local community members, on whom the (commercial) developers depend for social acceptance and legitimacy of the projects they are planning. In addition, it makes

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commercial project developers particularly likely to be accused that the revenues generated from projects do not benefit local communities, but rather foreign, commercial project operators who only seek to maximise their own profits and shareholder value without concern for local interests. Even if commercial project developers offer a community benefits package as compensation, this does not automatically lead to community acceptance of the wind farm plans. A poorly defined engagement process, combined with a benefits package that is not perceived as appropriate to the needs of the local community, can lead to negative perceptions [9].

However, commercial parties are not the only ones acting as project developers. For example, in Denmark, citizen energy collectives have been developing and operating wind energy projects since the 1970s [10]. More recently, citizen wind energy collectives have also grown in other countries [11]. In Belgium, for example, Ecopower has developed several wind farms [12] and similarly, in the Netherlands, Windvogel has been developing them since 1991 [13]. Often, these citizen collectives are legally organised as local energy cooperatives, also known under the more general term Renewable Energy Sources Cooperative (REScoop). These REScoops were initially run by inexperienced volunteers who promoted local renewable energy and quickly gained more experience. There has been significant growth in the number and size of Dutch REScoops since 2010 [14]. By definition, REScoops are energy cooperatives, a business model where citizens jointly own and participate in renewable energy or energy efficiency projects [15]. REScoops can be considered Renewable Energy Collectives (RECs) or Citizen Energy Collectives (CECs) according to EU directives (respectively, REDII and IEMD) [16].

REScoops operate based on seven guiding principles outlined by the International Cooperative Alliance [15]. These principles encompass facets such as voluntary membership, democratic control, economic participation, autonomy, education, inter-cooperative cooperation, and community concern [17,18]. Once part of a REScoop, members typically have access to electricity at reasonable rates and can share in its profits. They also play an active role in determining the cooperative's investment directions. REScoops often operate a cooperative business model, adopting egalitarian, collectivist, and democratic values, with benefits (of energy projects) being equally shared with shareholders and local communities [19]. This also holds for energy democracy in which citizens are considered to participate in energy transitions via financial ownership of (renewable) energy system assets [20], for example by owning shares of an energy cooperative that exploits wind energy projects or renewable energy projects. In countries like Denmark and the Netherlands this is, or has been, encouraged by national government. For example, in the Netherlands the 'Klimaatakkoord' proposes that 50% of renewable electricity production in onshore wind farms should be community-owned, aiming to enhance collaboration and project success [21].

REScoops often have at least some degree of (local) social capital. This is hardly surprising; they often consist of local community members who possess local trust and reputation, have the local know-how, and are more aware of local social structures, local values and issues that matter to local communities [19]. This access to local community members is a great asset when developing renewable energy projects that can have a major impact on the local environment. If REScoops use their access and social capital well, this can help them to develop projects faster. Although the positive link between community wind energy (i.e., REScoop) projects and social acceptance seems reasonably acknowledged, there is still empirical and conceptual ambiguity about why and how this works in detail [11].

In contrast, commercial project developers tend to be external parties to the local community. Without the same level of access, they often resort to offering monetary compensation as a means to persuade local public officials and ambivalent land and property owners. These payments have an incentive effect, but they can also backfire and in some cases be considered 'bribes' by some in the wider local community [22]. Ignoring local institutions, rules-in-use, values, and issues, as well as being perceived to be 'bribing' the local officials, can lead to negative media attention and formal legal action to delay, change, or terminate projects. The lack of understanding and connection to local values, rules-in-use, and structures can thus hurt commercial project developers.

When compared in this way, the REScoop business model seems an attractive alternative to the fully commercial project model. However, there is little empirical evidence to support the claim that the REScoop business model is indeed more suitable and effective than the fully commercial model in developing projects like wind farms. To date, one other study has made this comparison, using a statistical model to analyse why and how costs differ between community-owned and commercially owned onshore wind projects in the UK [23]. The study found that the most important factors are higher pre-planning costs and additional risks borne by community projects, largely due to not having a level playing field, which means the absence of rules ensuring fairness in wind energy markets, resulting in commercial parties having a significant advantage over REScoops, for example in the process of acquiring land for wind farm locations. This was witnessed in Germany following the introduction of competitive auctions [24,25].

This paper aims to address this empirical knowledge gap by answering three related research questions:

1. How do rules-in-use differ between onshore REScoop wind energy projects and onshore commercial wind energy projects based on evidence from fourteen REScoop projects in the Netherlands?
2. How do the project duration and the number of submitted views[1] and appeals differ between these onshore REScoop wind energy projects and onshore commercial wind energy projects?
3. To what extent can the differences in rules-in-use explain the observed differences in project duration and the number of submitted views and appeals for the two types of onshore wind energy projects?

This paper uses a mixed methods approach to make a cross-case comparison using both qualitative and quantitative data. We systematically investigate and compare the planning and development of wind energy projects between commercial project developers and REScoops, focusing on rules-in-use in these projects, as well as selected outcome variables, employing both rich descriptive within-case analysis and cross-case analysis with coding, data set development, and selected statistical tests.

The paper is structured as follows. The next section introduces the theoretical framework. This relates to the Institutional Analysis and Development framework by Elinor Ostrom [26]. Section 3 presents the research methods. The results are described in Section 4, and discussed in Section 5. Section 6 presents the conclusions and suggestions for future research.

2. Theoretical framework

From a governance perspective, commercial project developers follow the standard corporate organisational structure. Independent boards oversee and discipline senior corporate executives who are incentivised by linking their reward to shareholder returns [27]. In contrast, the institutional identity of REScoops as cooperatives is based on citizen membership [28]. Members govern cooperatives through a democratic process. Typically, REScoop leadership remains accountable

[1] A view is a first mandatory step to appeal the required permit [in Dutch: 'zienswijze']. Parties that do not lodge such a view in the process leading up to the permit decision do not have legal standing to challenge the permit decision afterwards.

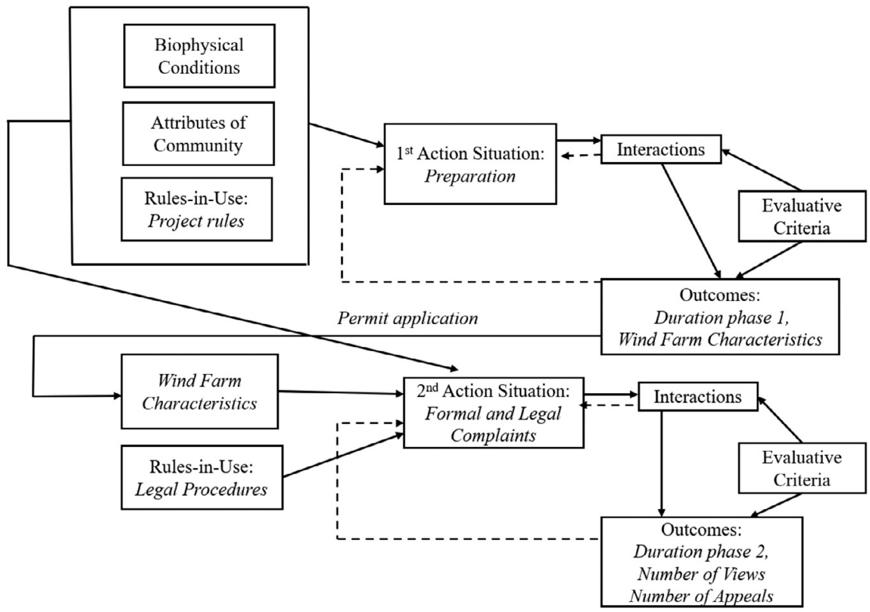

Fig. 1. Application of the Institutional Analysis and Development Framework (IAD) to wind farm development, adjusted from [34].

to all members, where one member equals one vote in decision-making procedures.

The high-level institutional and organisational differences between RES development by REScoops and commercial project developers can be further specified through the Institutional Analysis and Development (IAD) framework developed by Elinor Ostrom and her colleagues. The framework was first introduced to study the governance of commons in the natural environment [29]. In recent years, the IAD framework has found relevance in energy transition research, including studies focusing on renewable energy project development, including wind power [30–33].

The process of wind energy project planning and development has seven distinct stages that follow a detailed set of guidelines and directives, primarily established by the Netherlands Enterprise Agency [6]. In this study, this process was split into two main phases and, thus, two action situations. The first action situation starts with the project's inception and concludes when the permitting application is submitted with the relevant public authority (e.g., a municipality); it thus includes the planning and design of the wind farm (see Fig. 1; first action situation). The second action situation starts after the permit application and lasts until the start of construction of the wind energy project (see Fig. 1; second action situation). This phase thus includes all formal legal procedures for objections and complaints about the project.

The two action situations are affected by external variables: biophysical conditions, the attributes of the community, and the rules-in-use. In the 'planning and design action situation' the biophysical conditions refer to the surrounding neighbourhoods, the land upon which a project is developed, as well as the technical characteristics of the initial design of the wind farm. The attributes of the community affected by the wind project development include the interaction histories of inhabitants, as well as the social capital and knowledge of new actors such as the wind project developer. The rules-in-use refer to the rules that govern the interaction between the wind farm developer, the local community and the relevant municipality with respect to the first action situation. The situation's outcomes are characterised by its duration and the wind farm design as specified in the permit application. The characteristics of the wind farm design then form the biophysical conditions of the second action situation (see Fig. 1). The rules-in-use that govern the interactions between the same actors in the second action situation are characterised by legal procedures that guide wind farm development after permit application. The second action situation ends with the start of construction of the wind farm, and can be described in terms of its duration and the number of appeals filed.

The rules-in-use that govern the interactions between relevant actors in both action situations are defined and operationalised in Section 3.2. The differences in the way the rules-in-use are instantiated in REScoop and commercial project development affect their respective action situations, interactions, and outcomes. Due to the sequential relation between the two action situations, the outcomes of the first action situation feed into the external variables of the second action situation. To ensure that differences in wind farm characteristics do not affect the outcomes of the second action situation, we selected cases that are similar in terms of those technical characteristics (see Section 3.2).

3. Methods

A mixed methods research approach was adopted by employing a multi-case study approach of wind power projects in the Netherlands. Qualitative evidence can significantly complement quantitative research, offering a more holistic understanding beyond numerical data alone [35,36]. The present study used a sequential approach. It started with three exploratory interviews with domain experts, followed by case study research. The case study research included both within-case analysis and cross-case analysis (in a sequential manner) [37]. The former included causal process tracing and the reconstruction of key decision-making events [38] of onshore wind farm planning projects. The latter included coding, development of a case dataset, and systematic statistical analysis.

3.1. Case selection

The study primarily aimed to identify variations in the institutional context of wind farm development and to assess if these differences, shaped by the organisational structure of REScoops and commercial development, resulted in different outcomes. The case selection aimed to reduce variations in background conditions [37]; i.e., cases were chosen that faced analogous biophysical conditions, community attributes, and regulatory environments, and had similar wind farm characteristics. In this way, any variation in outcomes associated with commercial and REScoop wind farm development is more likely to be explained by the rules-in-use (see also Fig. 1). This approach favoured cases within the

Table 1
Key characteristics of the selected cases.

Case	Province	Percent age RES coop (%)	No. of turbines*	Turbine height (m)	Avg. cap.* (MW/ turbine)	Dist. first house* (m)	Dist. first res. area* (m)	Repower-ing
Kookepan	Limburg	100	3	132	4.5	450	2000	No
Ospeldijk	Limburg	50	4	135	4	435	2500	No
Greenport Venlo	Limburg	0	9	140	4.5	340	1800	No
Nijmegen-Betuwe	Gelderland	95	4	99	2.5	450	900	No
Koningspleij	Gelderland	50	4	120	3	500	720	No
Deil	Gelderland	36	11	140	4.2	430	2000	No
Avri	Gelderland	25	3	120	3.6	750	1500	No
Bijvanck	Gelderland	0	4	117	4.4	450	1500	No
Groene Delta	Gelderland	0	2	115	3.6	430	480	No
Oostzeedijk	Zeeland	100	3	85	5.7	500	1200	Yes
Jacobahaven	Zeeland	0	3	90	4.2	230	750	Yes
Battenoord	South Holland	50	6	95	3.6	500	2000	No
Oude Maas	South Holland	0	5	120	3.6	200	750	No
Jaap Rodenburg II	Flevoland	20	10	100	3.8	1500	1600	Yes

*No. of turbines: Total number of wind turbines installed.
*Avg. cap.: Average turbine capacity.
*Dist. first house: Distance from the wind farm to the nearest house.
*Dist. first res. area: Distance from the wind farm to the nearest residential area.

same Dutch province due to presumed shared regulations, community sentiments, and environmental contexts. Yet, given the limited number of wind farms with closely aligned similarities within a single Dutch province (i.e., geographical administrative jurisdiction), the inclusion was broadened to encompass multiple Dutch provinces. This led to selecting suitable cases across five Dutch provinces that met the set benchmarks (i.e., Flevoland, Zuid-Limburg, Gelderland, Zeeland and Zuid-Holland). Key parameters were identified to ensure consistency and comparability among the selected cases: i.e., number of wind turbines per project, wind turbine capacity, turbine height, proximity from nearby residences, and replacement of old wind turbines by new ones. Moreover, only onshore wind power projects were selected. In the end, fourteen onshore wind energy projects were selected. The key characteristics of the selected cases are presented in Table 1.

3.2. Operationalisation

This study focuses on the following variables: Ownership, institutional conditions (i.e., rules-in-use), and project outcomes. Ownership refers to ownership of a wind energy project either by a commercial project developer or by a REScoop (or a hybrid ownership model). Institutional conditions refer to the application of the seven rules-in-use from the IAD adaptation to both action situations (see Fig. 1). The operationalisation of the rules-in-use, wind farm characteristics, and project outcomes was preceded by a careful process. This included analysis of policy documents and interviews with three domain experts. The operationalisation of Ostrom's [39] rules-in-use (see Fig. 2) is discussed first. The scoring rules used to translate each wind farm case into quantitative scores can be found in Appendix F.

First, information rules pertain to the amount and type of information available to participants (e.g., about characteristics of the planned wind farm, relevant policies, planned meetings, and costs and benefits resulting from the planned wind farm development) and whether this information is freely and openly shared among all project participants and those affected. A higher score is given to wind farm projects where stakeholders are more informed and engaged in the development process, and where local relationships and trust are leveraged in the affected community.

Second, payoff rules relate to how the costs and benefits resulting from wind farm development outcomes are assigned to stakeholders. Here, a higher score is given to projects where the costs and benefits are clear, shared among participants, and perceived as balanced and fair by all stakeholders. Additionally, a higher score is also given if a wide range of options to offset the negative externalities of wind farm development are taken into account.

Third, position rules specify the roles that various actors hold in the process, including the project initiators, municipality and residents. The scoring considers whether the actors are aware of their positions and act according to their responsibilities, and whether relevant stakeholders have adequate involvement. A higher score is assigned if the relevant stakeholders are involved in decision making. In contrast, lower scores reflect more centralised and less participatory decision-making processes.

Fourth, choice rules define possible actions for actors in specific roles under certain conditions, whether due to informal agreements or driven by policy tools, laws, or regulations. The scoring is related to the flexibility of choices within each wind farm project development. A higher score reflects a greater range and flexibility of choices available to stakeholders and whether the choices made are consistently implemented.

Fifth, aggregation rules specify how decisions are made, either individually or jointly. The rules clarify the influence of each actor when multiple positions have partial control over the same decision, and influence how actors jointly influence collective decision-making. Scores on aggregation rules are coded with a higher score if key decisions are made via collective decision-making arrangements. Unilateral decision-making is scored lower.

Sixth, boundary rules determine: (1) who is eligible to engage in the decision-making process; (2) the process by which actors are allowed to participate; and (3) the ways actors can exit decision-making processes. A higher scoring reflects that there are clear rules determining whether and under what conditions the relevant stakeholder can enter the decision-making arena.

Seventh, scope rules define the range of feasible outcomes stemming from actor interactions in a specific action arena. Within the context of wind energy project development, these rules are related to evaluating the extent to which project details, such as location, number of turbines, and environmental measures, can be flexibly adjusted or are rigidly predetermined. If a wind farm development process offers a greater degree of flexibility in this respect, a higher score is assigned.

Project outcomes refer to the duration in months, the number of views lodged at the permitting authority, and the number of appeals to the Council of State (court of final authority). For action situation 1, the wind farm characteristics are also relevant outcomes (see Fig. 1). Characteristics measured in this study are the number of turbines installed, the maximum turbine height in metres, the average capacity of the turbines, the distance to the nearest house, the distance to the nearest

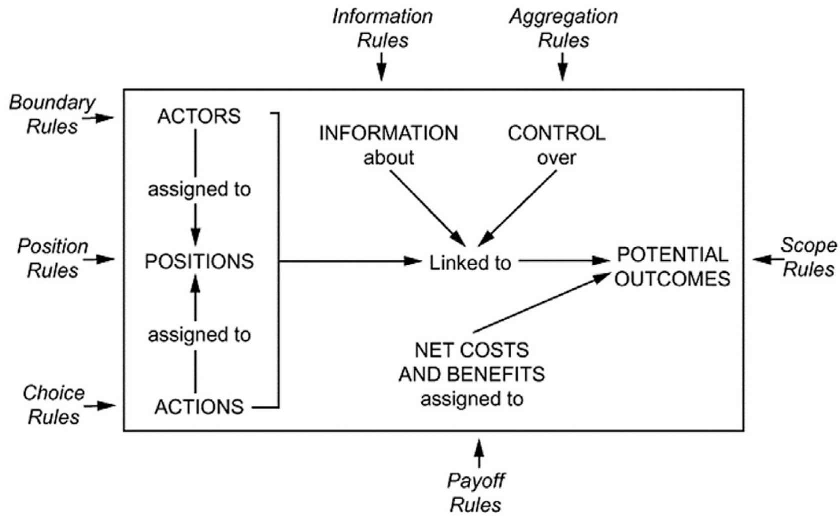

Fig. 2. Rules as exogenous variables affecting the action situation, adjusted from [34].

Table 2
Interviewees and their relation to the project.

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

residential area, and whether the project involves adapting an existing windfarm ('brownfield'), or installing a new windfarm ('greenfield').

3.3. Data collection

Data collection involved two primary steps: an exhaustive desk study of relevant text documents and interviews with stakeholders. These were organised for each of the fourteen case studies. The aim of the desk study was to gather essential information about the selected cases. A range of data sources, including institutional websites, reports, and newspaper articles, was used. Given the transparency associated with wind energy projects, a large number of governmental documents were accessible. These documents offered insights into aspects like project descriptions and permit applications. Notably, The National Location Platform ('Het Nationale Locatie Platform' in Dutch; translation by the authors) provided a comprehensive permit application overview for each case. This covered practical, legal, noise, and environmental aspects.

Interviews were conducted with stakeholders associated with the selected cases using a semi-structured interview technique. Interviewees – both experts and practitioners – held diverse roles which provided a multifaceted view of the cases (See Table 2). Their insights often revealed details not found in publicly available documents, bridging knowledge gaps and highlighting key societal dimensions. Given the intricacy of this study and the variety of stakeholders and projects, it was assumed that a minimum of two interviews per case would be needed for a thorough IAD analysis. Every interview was conducted after obtaining the participant's consent and was subsequently audio recorded and transcribed. Data collection took place from May–September 2023 involving five researchers (i.e., one per province). A total of 29 people were interviewed.

3.4. Data treatment

Interview transcriptions and text documents were analysed using Atlas.ti software (version 23.1.1). This allows for systematic qualitative data analysis and adopts a deductive coding approach to assess data against well-established theoretical concepts [40], notably the IAD's rules-in-use, and more particularly the way they were used in a similar study by [31]. In addition, ownership and project outcomes were also coded (See Section 3.2). These were used to establish a coding scheme, which was later enriched abductively by insights gained from the interpretation of the data. The detailed coding scheme can be found in Appendices Appendix E–Appendix F. To enable systematic cross-case analysis, information related to the fourteen case studies was stored in a case-ordered meta-matrix [41]. This meta-matrix, in numerical form, forms the raw data used for the quantitative analysis and can be found in Appendix F.1.

3.5. Data analysis

Data analysis consisted of two parts that were conducted in sequential order: (1) qualitative multi-case analysis; and (2) quantitative cross-case analysis using statistical tests.

3.5.1. Qualitative multi-case analysis

For each of the fourteen cases Causal Process Tracing (CPT) was used as a systematic approach to reconstruct and investigate complex processes, focusing on the impact of rules-in-use over time [42]. It was used to elucidate the interrelations between institutional structures and decision-making sequences when viewed through an IAD lens. By segmenting these sequences into action situations, the study aimed to discern the specific influence of rules-in-use at distinct wind energy project development stages. The analysis followed three main steps: developing case narratives, identifying significant moments, and evaluations of the motivations and actions of primary participants [42]. Initially, each case was systematically documented. Key events were identified and chronologically plotted to form a coherent narrative and timeline. The scope was narrowed to two universally occurring action situations. As explained in Section 2, the first action situation set off with a project's inception and concluded at its permit application submission, while the second spanned the time from permit application to the beginning of the project's construction. The decision to divide the process into two phases was based on the following considerations: consistency, efficiency, and allowing for comparison (between the two phases). For within-case analysis, the IAD was used as a theoretical framework employing its main variables, in particular, the 'rules-in-use.' In addition, ownership, project interventions, and project outcomes (see Section 3.2) were analysed. After data analysis, case study reports were established, covering the case study's background, chronology of events, project process, outcomes, and institutional analysis.

To ensure the internal validity of the qualitative case study research, several measures were taken [43,44]. To cope with selection bias, multiple (fourteen) case studies were conducted. Multiple case studies are considered more convincing and robust because they allow comparison between cases, which helps to strengthen understanding of where a particular case is positioned among a larger set of cases [37]. Construct validity was addressed by operationalising key theoretical constructs and applying them to the research domain. This was done as a team effort including multiple junior and senior researchers, with several team meetings to discuss the appropriateness of constructs and to align how they were interpreted and measured. This was then laid down in a coding scheme. The face-value validity of questions in the questionnaire used for interviews was checked, adapted and validated prior to conducting the main set of interviews by having our interview approach and questions checked, discussed, and adapted following validation interviews with three sector experts. The reliability of the study was ensured by using a rigorous research design and case study protocol, and by data triangulation (e.g., text documents and expert interviews) and cross-verifying facts and perspectives. In addition, a thorough documentation of files, transcripts, and additional data was kept, including detailed records of how data were collected to ensure transparency. The project also featured a continuous review process within the project team, which regularly revisited data, methods, and findings.

3.5.2. Quantitative cross-case analysis using statistical tests

To facilitate statistical analysis, the qualitative data was coded to provide a quantitative data set. The scoring method used is explained in Section 3.2 and Appendix F. In all statistical tests, the relatively low number of observations used (N=14) was accounted for in three ways. First, we used non-parametric tests over their parametric counterparts since we could not rely on the central limit theorem to provide normality within the limits of our distributions [45, Section 7.1]. Second, we used a significance threshold of $p < 0.10$ since low numbers of observations tend to have less statistical power. Third, an important consideration was the specificity of collecting data. As Fig. 1 shows, our theoretical model highlights a set of important covariates, summarised in the results of action situation 1 as 'Wind Farm Characteristics'. By selecting projects that have similar characteristics, we reduced the need to control for these covariates when analysing our main variables of interest. This made us better able to make the comparisons we were interested in, at the cost of focussing exclusively on a specific type of project: onshore wind energy projects for which both commercial and non-commercial construction interest exists. The choice to focus on the internal validity of the test [46,47], potentially at the expense of the external validity does imply that the size of the estimated coefficients is unlikely to be generalisable directly to other categories of projects, such as off-shore, or very large projects, or projects in different jurisdictions. For continuous linear data, the one-sided Spearman-rho correlation test was used. This test was chosen because of its ability to handle the limited sample size and the test's one-sided nature aligned with the predetermined direction of interest. The relationship between the ownership and the rules-in-use scores was analysed using the Fisher's Exact Test to account for the categorical scoring of the rules-in-use. For comparisons between the ownership and outcome variables, the Mann–Whitney U test was used to account for the non-normal distribution.

4. Results

4.1. Results of the qualitative multi-case analysis

The qualitative multi-case analysis provides insights in the nature of rules-in-use affecting onshore wind energy project planning and development, the ways commercial project developers and REScoops differ from each other in applying these rules, and the project outcomes they realise.

Results on the rules-in-use

Information rules: The analysis showed that REScoops consistently kept stakeholders informed and engaged, leveraging local relationships and trust. Here, the Kookepan case (100% REScoop owned) stands out. To maintain transparency, the REScoop distributed detailed updates on the project's progress through various channels, including regular meetings, individual discussions, its own website, newsletters, and public sessions. This approach ensured that all stakeholders were consistently informed and involved throughout the project. Those who needed more information or had questions knew where to go. As a representative of the REScoop explained, "It is important to inform and involve everyone well to reduce resistance. Once the plan seemed feasible, consultations started with the local community, landowners, and other stakeholders. Information sessions were organised to inform the community and recruit potential members and investors." The Nijmegen-Betuwe case (95% REScoop owned) showcased efficient communication between initiators and the community, with minor setbacks due to inter-municipal differences. Across these projects, communication between project initiators and public authorities remained open and consistent. Importantly, REScoop representatives went door-to-door to inform and persuade local residents. They conducted 'living room' and 'kitchen table' conversations to convey information and involve the local residents in the project. On the other hand, commercial project developers showed variation in transparency levels, revealing gaps in communication.

Payoff rules: REScoops often prioritised financial compensation for local residents to promote community buy-in, which reduced potential project delays. Commercial project developers were sometimes perceived by residents as providing inadequate compensation. For example, the Bijvanck, Greenport Venlo, and Oude Maas cases (all 0% REScoop owned) indicated that commercial project developers did not distribute the potential financial benefits of the projects equally among local communities and did not sufficiently take into account negative externalities. As noted by a representative of a local action group in the Bijvanck case, "The compensation given to nearby residents was a joke. Out of the 30 households that received it, two or three even turned down the money on principle". REScoops on the other hand presented a range of compensation options. Although the primary goal was to ensure a fair distribution for local residents, this approach potentially reduced project delays caused by objections in later stages of the project. For example, in the Kookepan case a community fund was established in addition to a fund for sustainability and to bring about compensatory local environmental improvements.

Position rules: From the analysis, REScoop projects were found to adopt a more participatory and distributed decision-making approach, contrasting with the centralised decision-making observed in most of the commercially developed projects. For example, in the Greenport Venlo and Bijvanck cases commercial project developers largely dictated the process, with minimal involvement from government entities and the local community. By not creating roles or positions for public participation in the early stages of the project, they created more public opposition in the second stage of the project development process. As a representative of a commercial project developer from Greenport Venlo noted, "Challenges were encountered, including strong community resistance due to insufficient resident involvement". In contrast, REScoop-owned projects involved more stakeholders early on. The Kookepan case (100% REScoop owned), for instance, developed well-defined roles for every stakeholder, from provincial authorities to locals.

Choice rules: The multi-case analysis revealed that while there were similarities between REScoops and commercial project developers in the level of decision-making flexibility, REScoops usually provided more space to discuss the wind farm characteristics than commercial project developers. Similarly, commercial project developers were found to present fewer options to other stakeholders to choose from. For example, in the Greenport Venlo case (100% owned by commercial project developers) inconsistencies emerged with varying support from local authorities. As a municipal council member explained, "The project was originally owned by another commercial project developer, but after significant resistance and a negative vote from the municipal council, it was sold. The council initially supported the permit application but later unlawfully rejected it. After the rejection, the commercial project developer turned to the provincial government, which helped with the permits because the municipal government had to comply with the regional energy strategy". In this process, Greenport Venlo did not change the project characteristics in response to the objections of the municipality and local stakeholders. The commercial project developer kept the choice rights for itself.

Aggregation rules: REScoops tended to adopt collective and inclusive modes of decision-making. In contrast, commercial project developers were found to be more prone to unilateral and individualistic decision-making. For example, the Greenport Venlo case (0% REScoop owned) predominantly employed individualistic decision-making that emphasised the project owner's authority. The Bijvanck case (0% REScoop owned) showed little collective decision-making and the action arena was predominantly influenced by one single regional business firm. On the other hand, REScoops predominantly displayed inclusive aggregation rule behaviour. The Ospeldijk case (50% REScoop owned) indicated the inclusion of a wide spectrum of actors already in the first phase, from provincial and municipal governments to REScoops and commercial project developers. A representative of the municipality commented, "The REScoop made significant efforts to engage the community. (....) The commercial project developer, in this case, was a highly professional entity that communicated effectively, never misused power, and always sought dialogue. They worked to create local support through a community fund and open days, demonstrating a professional approach that I found very pleasant to work with, while still maintaining a clear business focus". This shows that the decision-making was influenced by broad, community-based consultations and community engagement. The final decisions were therefore able to bring together the opinions and interests of many participants . This inclusive approach accelerated the completion of the project with little resistance from the local community and stakeholders.

Boundary rules: The analysis revealed that REScoop-led projects promoted inclusiveness in their action arenas, whereas commercial project developers were seen as more restrictive, which affected stakeholder sentiment and project timelines. The Jacobahaven project (100% owned by commercial project developers) possessed a relatively open action arena in the first phase of planning and project development. Early in the project, information evenings were organised where local residents could gather information and make arrangements concerning noise and shadow flicker. However, the action arena became somewhat restrictive in the second phase of project development, which resulted in residents showing increased reservations and filing more legal objections that prolonged the second phase of the process. Similarly, the Greenport Venlo and Bijvanck commercial project developer-led projects suffered from limited stakeholder involvement. A municipal council member from Venlo highlighted the issue of strict boundary rules in the decision-making arena, "In the vicinity of the planned wind farm, residents began to voice their concerns and complained that they were not being listened to". In contrast, REScoop-led projects like Kookepan showed more open boundaries, with the project's participation guidelines evolving over time. Starting with the REScoop, the project expanded to involve the municipality and later on included local residents, promoting more collaboration among stakeholders.

Finally, *scope rules:* The analysis showed that both REScoops and commercial project developers showed variation in the adaptability of projects. However, the former generally tended to be more flexible and open to change than the latter. For example, in the Koningspleij case (50% REScoop owned) the design of the project fell within the scope of the community's decision-making arena. The commercial project developer, who collaborated on the project, stated, "When the community expressed its needs, we worked with the REScoop to modify the design and eventually added a fourth turbine to meet stakeholder expectations".

Fig. 3 presents a quantitative overview of average scores on the rules-in-use for REScoops compared to commercial project developers.

Results on outcome variables

Table 3 presents an overview of the outcomes for the cases. The results for project duration indicate that projects led by REScoops appear to have a shorter completion time. This observation was particularly evident in the second phase of project development. The results for community engagement and disputes show that REScoops face fewer legal challenges than commercial project developers, such as legal appeals filed with the Council of State. REScoops were generally found to be more responsive to the interests of community members. Arguably, this led to fewer disagreements and fewer lawsuits. Additionally, cases in which the provincial authority took control were only observed in projects owned by commercial developers. The results for ownership dynamics suggest a possible negative relationship between degree of REScoop ownership and project duration, indicating that projects with a higher percentage of REScoop ownership generally progress more quickly through the project stages.

4.2. Results of the quantitative cross-case analysis

The first quantitative check verified that our case selection removed the variation in project outcomes that can be explained by wind farm characteristics in our dataset. The full test can be found in Appendix B. The test consisted of two parts. First, we tested whether the data showed any remaining relationship between wind farm characteristics and outcome variables. Second, we tested whether we found differences in wind farm characteristics between REScoop and commercial wind farms in our data. Consistent with the plan to remove any effect of wind farm characteristics in our selected data, we found neither. We therefore concluded that our selection process was successful.

Results on institutional rules-in-use

The scores on the rules-in-use of the fully commercial projects and projects with some REScoop ownership, shown in Figure 4, were compared using two-sided Fisher exact tests. Table C.13 in Appendix C.4 shows the results. Appendix C.1 shows the repeated test using a continuous variable for REScoop ownership instead of a dummy, and shows qualitatively the same results). Regarding payoff rules, REScoops often prioritised fair financial compensation for local residents (payoff rule, Fisher-exact, $p < 0.01$), which promoted community buy-in and reduced potential project delays. Commercial project developers were sometimes perceived as providing inadequate compensation for negative externalities. For the aggregation rule, REScoops were found to lean more towards collective and inclusive decision-making than commercial project developers (aggregation rule, Fisher-exact, $p = 0.063$). For the information rule, the qualitative analysis showed that REScoops consistently kept stakeholders informed and engaged, while in contrast, commercial project developers showed varying levels of transparency and communication gaps. This difference is not significant

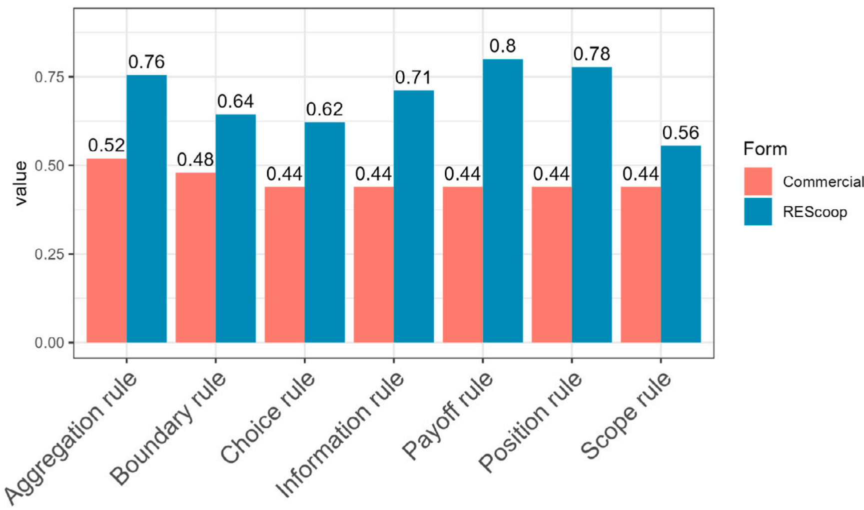

Fig. 3. Comparison of average scores on the rules-in-use.

Table 3
Outcomes of wind power cases: Project duration and legal procedures.

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

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

at the number of fourteen observations (information rule, Fisher-exact, $p = 0.101$), but does fit the larger pattern. For the other rules-in-use, the sign is positive, as expected, but the differences are not statistically significant at fourteen observations. This analysis was repeated by looking at the correlation between the percentage REScoop ownership and the rules-in-use in Table C.9 in the Appendix. In this test, all rules-in-use except the choice rules show a significant positive relation with the percentage of REScoop ownership, indicating that REScoops are more communally organised.

Results on outcome variables

The main test of the effect of rules-in-use on project outcomes is shown in Table 4. This table compares the median of the outcome variables using the Mann–Whitney U test (also know as Wilcoxon Rank-sum test) to determine whether the median process of the commercial projects was longer or had more legal objections, despite there being no statistical difference arising from the wind energy project characteristics. Appendix C.2 shows a repeated test using a continuous variable for REScoop ownership instead of a dummy, and shows the same results.

Table 4 shows that the total duration was longer for commercial project developers than for REScoops. The effect appears to be driven by the second phase of project development. This phase captures the process of dealing with legal objections from stakeholders, meaning that the number and duration of legal objections to the permit determine this effect. No difference was found in the first phase of project development, the planning period before the application of the permit.

The previous results show two things: REScoops organise wind energy projects differently from fully commercial projects; and commercial projects tend to take longer to develop than projects developed by REScoops. To determine if a statistical relation exists between the way projects are organised and the length of the process, we analysed the correlation between the organisational rules-in-use and the outcome variables. The results can be seen in Table 5.

A noticeable trend in Table 5 is that only a single correlation coefficient has a positive value (Duration phase 1 and Position rule), but is non-significant. The strongest relations are found between the organisational rules-in-use and Total duration and Duration phase 2. It appears that, although only minor effects are noticeable in the number of objections, the duration of the legal procedures initiated is strongly influenced by the rules-in-use. Projects organised in a more communal manner (i.e., score higher on the rules-in-use) tend to have shorter procedures after the application for a permit.

Comparing the effect sizes can give an indication of the importance of differences in institutional designs of REScoop and commercial projects. The median period spent on obtaining the required permit is

Table 4
One-sided Mann–Whitney U- test with the alternative hypothesis that the median outcome is larger in commercial cases. Significance levels are indicated at the 10% (+), 5% (*), and 1% (**) level.

	Total Duration	Duration Phase 1	Duration Phase 2	No. Views	No. Appeals
Median REScoop	58	27	29	22	1
Median Commercial	96	39	52	60	4
Difference	38	12	23	38	3
p-value	0.005**	.191	.005**	.041**	.076+

Table 5
Spearman's rho correlation results for the rules-in-use and outcome. Significance levels are indicated at the 10% (+), 5% (*), and 1% (**) level.

Spearman's Rho	Information rule	Payoff rule	Position rule	Boundary rule	Choice rule	Scope rule	Aggregation rule
Total duration	−0.737**	−0.770**	−0.492+	−0.533*	−0.500+	−0.339	−0.729**
p − value	(0.003)	(0.001)	(0.074)	(0.05)	(0.069)	(0.235)	(0.003)
Duration phase 1	−0.299	−0.206	0.090	−0.117	−0.069	−0.495+	−0.283
p − value	(0.299)	(0.481)	(0.759)	(0.691)	(0.813)	(0.072)	(0.327)
Duration phase 2	−0.669**	−0.756**	−0.533*	−0.486+	−0.536*	−0.212	−0.673**
p − value	(0.009)	(0.002)	(0.05)	(0.078)	(0.048)	(0.467)	(0.008)
No. views	−0.483+	−0.462+	−0.066	−0.267	−0.285	−0.354	−0.447
p − value	(0.08)	(0.096)	(0.822)	(0.355)	(0.323)	(0.215)	(0.109)
No. appeals	−0.481+	−0.428	−0.061	−0.147	−0.170	−0.123	−0.268
p − value	(0.082)	(0.127)	(0.837)	(0.616)	(0.562)	(0.674)	(0.354)

38 months less for a REScoop than for a commercial project developer. The difference in the median value for the information rule between the fully commercial and REScoop projects is 0.4. In a linear regression on the effect of the information rule on duration, increasing the information rule by 0.4 reduces the expected duration of the project by 33.5 months.[2] Given that this is only one of the seven coded rules and it already explains the majority of the difference between REScoop and commercial projects, it seems that the effects of the rules-in-use are large enough to explain the entire difference in duration between REScoop and commercial projects.

5. Discussion

The results show that a community energy (i.e., REScoop) approach to onshore wind energy planning and development can be beneficial when compared to commercial wind energy project development, especially in reducing the time spent on formal-legal objections by stakeholders. This appears to be related to the more communal organisation of REScoop projects in the pre-permit planning stage. When compared to the commercial project developer ownership model, the REScoop ownership model was found to require significantly less time to develop wind energy projects, especially during the second phase, which appears to be related to careful preparation during the first phase. In this phase, REScoops particularly appear to benefit from familiarity with the local culture, structures and citizenry as a result of engaging with the local community going door-to-door and having 'kitchen table talks' to inform and persuade citizens. Different patterns were identified from commercial wind energy project developers, who often appear to be considered as outsiders and have to resort to organising consultation meetings, which often have low attendance.

The study showed that the way institutional rules are implemented typically differs between the REScoop model and the model used by commercial project developers. This applies in particular to payoff rules, aggregation rules and position rules. For payoff rules, this study showed that REScoops were more successful in securing a fair distribution of costs and benefits than commercial project developers. With regard to aggregation rules, the study found that REScoops were better able to implement collective and inclusive decision-making modes than commercial project developers. Finally, concerning position rules, REScoops were found to make greater use of participatory and distributed decision-making approaches than commercial project developers. Information rules were also found to be important because they (positively) correlate with shorter duration of the second project phase, where the data indicate that REScoops generally make information more easily available and share information more actively.

One of the main academic merits of the study is that it addresses how institutional rules are implemented and have meaning, particularly with regard to the role of REScoops as a manifestation of social innovation in sustainability transitions [49] and not just instrumentally as a means for policymakers to frame and achieve social legitimacy [50]. The present work particularly provides insight into the ways in which institutional rules are used by REScoops and make a difference in the planning and development processes of onshore wind energy projects that face the challenge of gaining social acceptance among local communities who feel unfairly treated [51]. In this sense, the study shows the strategies that actors – in this case REScoops - undertake to reduce social resistance [52,53].

In addressing fairness and in particular the just distribution of costs and benefits to local communities, the findings are also interesting for the field of energy justice [54]. In particular, the analysis shows a number of ways in which REScoops safeguard the interests of local communities in terms of justice better than commercial project developers. This is consistent with previous studies which show that energy communities are well positioned and equipped to advocate and protect community values and interests in renewable energy projects [55–57]. Furthermore, this work shows ways in which REScoops use their agency to create social acceptance among local communities, while working to assure that costs and benefits are distributed fairly once wind energy projects are operational. In this sense, the work contributes to the literature on community energy, in particular on energy communities using their agency [58]. At the same time, it provides evidence of the strategies they use to achieve energy democracy goals by securing key

[2] Due to the small sample size, a repeated median estimation [48] was run to obtain the required slope. The regression is reported in Appendix C.3.

assets in local energy supply systems and ensuring that citizens have a say in decision-making about these assets [59–61].

However, the results also show that better results in terms of duration (especially in the second phase), and number of views submitted in the legal permit application process do not necessarily require a 100% community energy ownership model. Hybrid models were also found to perform well. For example, in the cases of Ospeldijk and Deil, where REScoops had ownership degrees of 50 and 36 percent respectively, with a relatively short duration and a relatively low number of submitted views. This finding is consistent with an earlier study by De Bakker et al. [62], which showed that energy communities successfully develop renewable energy projects, usually in partnerships or strategic alliances with private sector parties or public and semi-public partners like municipalities and grid operators. This showcases the fruitful interaction between REScoops as niche players and regime incumbents in the form of hybrid ownership models, and indicates that differences between niche innovators and regime incumbents may be less than is sometimes assumed in transition literature (e.g., [63] or [64]). In relation to understanding strategic alliances and the rules-in-use influencing these, the present study reiterates the importance of using position and aggregation rules. With regard to the latter, special attention is paid to the role of local and regional governments in onshore wind energy development projects and how they deal with, and respond to, the emergence of REScoops as actors in the energy transition [65,66].

The rules-in-use that distinguish the two models most decisively are pay-off rules, position rules, and aggregation rules. If commercial wind project developers were to make their wind project development more effective in terms of duration, views and legal appeals filed, they would need to make their decision-making less centralised and more open to stakeholder participation (position rules), assign clear rules on how to fairly allocate costs and benefits to stakeholders in projects (pay-off rules), assign clearer roles and rights to different stakeholders and make more transparent how they jointly influence decision-making (aggregation rules). In fact, there is empirical evidence of commercial project developers doing that. Vattenfall, for example, co-develops wind farms together with REScoops [67]. This highlights the importance of hybrid models in which commercial project developers and REScoops collaborate and it emphasises the importance of adopting clear pay-off, position, and aggregation rules with commercial project developers acknowledging the added value of collaborating with REScoops. Hence, it can be deduced that the way forward for commercial project developers is in embracing collaboration and partnerships with REScoops or other grassroots energy community organisations. This is also encouraged by the inclusion of local ownership in renewable energy projects in national regulatory frameworks — such as in Denmark and more recently also in the Netherlands.

This study contributes in several ways to the body of literature on the use of the IAD framework [68]. First, the framework is used to study ownership and rules-in-use in the domain of onshore wind energy project development. Whereas IAD has been used to understand how rules-in-use influence the development of renewable energy projects, whilst discerning which rules have an impact [31], this has not yet been done for onshore wind energy projects. Another novel feature concerns the comparative approach used in the present study. The comparison shows the distinct ways in which REScoops handle the organisation and planning of wind energy projects on the one hand, and the ways in which commercial project developers do this on the other. In the present study, we selected onshore wind project development cases in specific regions – i.e., Dutch provinces – with ownership varying between commercially owned, hybrid, and community-owned. Additionally, whereas most IAD studies adopt a single qualitative research approach, the present study also used quantitative analysis.

6. Conclusion

This study began with three related questions:

1. How do rules-in-use differ between onshore REScoop wind energy projects and onshore commercial wind energy projects based on evidence from fourteen REScoop projects in the Netherlands?

2. How do project duration and the number of submitted views and appeals differ between these onshore REScoop wind energy projects and onshore commercial wind energy projects?

3. To what extent can the differences in rules-in-use explain the observed differences in project duration and the number of submitted views and appeals for the two types of onshore wind energy projects?

Fourteen case studies were selected and analysed using the IAD framework [39], whilst employing a comparative mixed methods research design.

The results show that REScoop and commercial wind energy projects have different ways of involving the community, with the former tending to involve the local community more and earlier in the process. This particularly applies to pay-off, position, and aggregation rules, and to a lesser extent also to information rules, although the difference in the last category is not significant at the number of observations. Furthermore, for six out of seven rules-in-use, we found a correlation with the percentage of REScoop ownership, indicating that more REScoop ownership makes project management more communal. Moreover, projects with a higher percentage of REScoop ownership were found to experience shorter overall duration in project planning and development, especially during the second phase (from permit application to the beginning of the project's construction). This phase is primarily influenced by position rules, boundary rules, and choice rules. Additionally, projects with a higher percentage of REScoop ownership appear to attract fewer views during the permit application process. Meanwhile, increased REScoop ownership is associated with fewer appeals to the Council of State. However, the study shows that both full REScoop and hybrid ownership models have shorter project durations, which can be explained by the different rules-in-use. Furthermore, the estimation results indicate that within our sample the relationship between the rules-in-use and the duration of the process is strong enough to fully explain the difference in duration found between REScoop and commercial projects.

In summary, REScoop involvement can affect the outcomes of the onshore wind energy project development in two distinct ways. The first way is organisational; by using more open, transparent, and communal types of rules-in-use, REScoops can influence how the project is implemented and perceived by relevant stakeholders. If stakeholders have a more positive perception of the project, they are less likely to object and delay the project. The second way is through the characteristics of the wind energy projects themselves. Local community members involved in the development process of wind energy project might simply design different types of wind energy projects that raise fewer objections. This might occur, for example, by changing the location or physical characteristics of the wind turbines to reduce their negative externalities and thus suppress potential objections.

Like most studies, this work comes with several limitations. First, the study is located in the Netherlands, a country with a relatively high amount of installed onshore wind energy capacity, as well as a high number of energy communities. Regarding the latter, this study contributes to the "Eurocentric" bias in community energy research. Future research in the Global South, or at least not in Europe, would reduce this selection bias in the literature. Second, the set of cases selected included both 'greenfield' development of onshore wind projects and a few 'brownfield' cases (i.e., re-development with replacement of existing turbines amongst others). In our case dropping the four 'brownfield' cases lowers our statistical power considerably but does not change the results qualitatively. Future researchers are advised to take into account potential differences between 'greenfield' and 'brownfield' cases during their selection. We also suggest future researchers compile a data set on onshore wind energy project development and decision-making that goes beyond our current selection. This could be, for example, in terms of geographical scope (include other provinces, select cases outside the Netherlands or northwest Europe), type of wind energy projects (consider including offshore wind projects), temporal dimension, or size/capacity (consider including larger projects). This would allow for further fine-grained statistical analysis of (significant) differences between REScoop and commercial project developers, as well as use of institutional rules and other (exogeneous) factors that are expected to influence decision-making in wind farm planning and development. Recently, a similar dataset was compiled on citizen-led energy actions and projects that go beyond community energy wind farm development [69,70]. Third, we chose a data selection method that prioritised the strength of the comparison of our main variables of interest, at the expense of other effects. While this increases the internal validity of the comparison made, it comes at the expense of the generalisability of the results. It is unlikely that the effect sizes we found are representative of other types of projects that were outside our scope like nearshore wind energy projects, in which REScoops are also active (e.g., wind farm 'Krammer' in the Netherlands). It would be interesting for future research to determine if similar effects are found here as well.

Finally, we encountered an issue with the role of government in the operationalisation of the rules to make the governance style measurable. In the spatial planning projects discussed in this paper, government was sometimes found to play an active role, sometimes a supporting role, and sometimes a more passive role. Because the IAD was originally developed to describe the governance of common pool resources where government was not active, it is difficult to capture these differences in the IAD rules-in-use. In this study we decided to include the role of government in the aggregation rules. In future research, coding the role of governments separately in similar situations could provide more information on the role of government. It would also provide a cleaner measure of the inter-organisational governance of conflicting private sector interests in such projects.

CRediT authorship contribution statement

Bas Brouwer: Writing – original draft, Visualization, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Rutger van Bergem:** Writing – original draft, Visualization, Supervision, Project administration, Methodology, Formal analysis, Data curation, Conceptualization. **Sander Renes:** Writing – original draft, Visualization, Supervision, Project administration, Methodology, Formal analysis, Conceptualization. **Linda M. Kamp:** Writing – original draft, Supervision, Methodology. **Thomas Hoppe:** Writing – original draft, Supervision, Methodology, Conceptualization.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary material related to this article can be found online at https://doi.org/10.1016/j.erss.2024.103891.

Data availability

Data will be made available on request.

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