Emiel Palsma

RES Rivierenland, more than symbolic integration?

A critical analysis of energy and spatial planning collaboration dynamics and policy integration

Master's Thesis for the Environment and Society Studies programme

Nijmegen school of management

Radboud University

June 2025

Colophon

Title	RES Rivierenland, more than symbolic integration? A critical analysis of energy and spatial planning collaboration dynamics and policy integration
Date	3rd October 2025

Author	E.P. Palsma
Contact	emiel.palsma@ru.nl
Institution	Radboud University, Nijmegen, the Netherlands
Faculty	Nijmegen School of Management

Master	Local Environmental Change and Sustainable Cities
Supervisor	Prof. dr. M.A. Wiering
Second assessor	Prof. dr. I.J. Visseren-Hamakers
Academic year	2024-2025
Word count	18.123

Preface

Dear reader,

Writing this master thesis has been learning experience. During my time as student at Radboud University, I often heard that doing research is an iterative process. I can now confidently confirm that this is true. Doing research on a RES region which is fluid, moving, and influenced by politics was a rewarding challenge, that sent me back to the drawing board more than once. Doing my internship at RES Rivierenland provided the insights needed for the research and was an experience I truly appreciate.

Having longstanding interest in energy, choosing Strategic Energy Planning for my thesis was a natural fit. The newly developed theory on SEP, combined with the rapid changing energy landscape made the research both enjoyable and highly relevant.

I would like to thank Annemieke Spit and all colleagues at RES Rivierenland for the warm guidance and opportunities they provided during the internship. The internship and the exploration of Rivierenland were great experiences. I am also grateful for my supervisor Mark Wiering, for creating an environment supporting experimentation and iterative research. Lastly, I would like to thank Martijn Gerritsen for the inspiring conversations and contagious enthusiasm.

Emiel Palsma,

Nijmegen, 27 June, 2025

Summary

The rapid electrification of the Netherlands is causing grid congestion, slowing innovation and jeopardizing the 2030 climate targets. The expansion of sustainable energy generation has significant spatial consequences, especially in a densely populated country. Energy and spatial planning can no longer function as separate domains. A more holistic approach is needed: Strategic Energy Planning (SEP). The Dutch government introduced RES Regions to guide the energy transition at the regional level. Due to grid constraints, integral energy solutions have to be implemented at the local level. This thesis explores how the spatial and energy planning domains differ and where friction arises between them. It examines the collaborative dynamics behind local integrative energy solutions and assesses the potential for successful policy integration to advance SEP in RES Rivierenland. The study combines a desk study to analyze the governance structure of spatial and energy planning domains, with a multiple-case study of local energy hubs. Findings suggest the friction between decentralized spatial planning and centralized energy planning form systemic barriers to collaboration. Furthermore, themes such as mutual trust, shared definition, leadership, and capacity, are success factors for full policy integration, revealing key challenges that must be addressed in the pursuit of effective SEP regionally.

Keywords: Strategic Energy Planning (SEP), Regional Energy Strategy (RES), policy integration, collaborative governance, grid congestion

Table of Contents

Colophon 2
Preface 3
Summary 4
List of figures and tables 7
1. Introduction 8
1.1 Research problem statement 8
1.2 Research aim and research questions 9
1.3 Scientific and societal relevance 9
2. Literature review 10
2.1 Energy planning and spatial planning 10
2.2 Strategic energy planning 11
2.2.1 Governance levels of SEP 11
3. Theoretical framework 13
3.1 Building the framework 15
3.1 Analyzing governance 15
3.2 Integrated collaborative governance 16
3.2.3 Collaborative dynamics 17
3.3 Heuristic for policy integration 18
3.3.1 Capacity 18
3.3.2 Leadership 19
3.3.3 Heuristic 19
4. Conceptual framework 20
5. Methodology 22
5.1 Research strategy 23
5.2 Research methods, data collection and data analysis 23
5.3 Validity and reliability of research 25
5.4 RES Rivierenland context 26
5.5 Cases within RES-Rivierenland 28
6. Results 30
6.1 Mapping the governance in the RES Region Rivierenland 30
6.1.1 Spatial planning governance in RES Rivierenland 30
6.1.2 Energy planning governance in RES Rivierenland 32
6.1.3 Analyzing the differences in system context 35
6.2 Collaborative dynamics 37

6.2.1 Principled engagement 37
6.2.2 Shared motivation 39
6.2.3 Capacity for joint action 42
6.2.4 Overall collaborative dynamics 45
7 Analysis 46
7.1 Integrative capacity 46
7.2 Integrative leadership 47
7.3 Level of policy integration 47
8. Discussion and recommendations 47
8.1 Interpretations 47
8.2 Limitations 48
8.3 Recommendations for future research 49
8.4 Recommendations for praxis 50
9. Conclusion 51
References 53
Appendix 57
Appendix 1 57
Appendix 2 59
Appendix 3 60

List of figures and tables

Tables

Table 1 11
Table 2 17
Table 3 19
Table 4 21
Table 5 25
Table 6 36
Table 7 45

Figures

Figure 1 16
Figure 2 20
Figure 3 26
Figure 4 27
Figure 5 29
Figure 6 29
Figure 7 32
Figure 8 35

1. Introduction

1.1 Research problem statement

In the Dutch Climate Agreement of 2019, the government formulated sustainability goals, including specific objectives regarding energy (Ministerie van Economische Zaken en Klimaat, 2019). To achieve these goals, energy generation, storage, and transport must be addressed all within a restricted space area, as space is scarce in the Netherlands (Dutch National Programme Regional Energy Strategies, n.d.). As a result, the national program of the Regional Energy Strategy (RES) was launched, dividing the Netherlands into thirty energy regions (RES-regions). The RES-regions have two goals: first, to build sufficient windmill parks and solar panel parks to meet desired electricity generation, and second, to form the Regional Structure Warmth (RSW), which looks into the applicability of supra-municipal heat sources (PBL, 2022).

By addressing the climate agreement objectives through thirty energy regions, each region can collaborate with its municipalities on how to best achieve the national objectives, thereby decentralizing the national approach. Key arguments for decentralization include the overloaded electricity grid in the Netherlands and the inherently decentralized nature of renewable resources (PBL, 2022; Stoeglehner et al., 2011). The RES regions are formed around collaboration between public authorities, residents, businesses, grid operators, energy collectives, and social organizations (Dutch National Programme Regional Energy Strategies, n.d.). The RES program forms a holistic approach through multi-actor, multi-layered, and multi-sector governance. This transition calls for policy change, new institutional structures and arrangements, and smart combinations with other land uses (Kempenaar et al., 2021). The integration of energy and spatial planning plays a significant part in the holistic strategy necessary to achieve the climate goals (Stoeglehner, 2016). Within the RES regions, the diversity of knowledge of energy and of spatial planning amongst the stakeholders has hindered in-depth conversations and collaborative efforts (Kempenaar et al., 2021). This integration of energy and spatial planning is also known as Strategic Energy Planning (SEP), which Gerritsen (2023) defined as a type of planning that: “foregrounds this energy–space nexus by systematically analyzing how producing, distributing and consuming energy impinges on using, interpreting, and planning space in a community, and vice versa.”.

The concept of multi-layered governance is actively used in the literature on SEP (Bale et al., 2012; Dobravec et al., 2021; Krog & Sperling, 2019; Sedlacek et al., 2020; Sperling et al., 2011). Krog & Sperling conducted a literature review on SEP and identified the four levels of governance on which SEP takes place: national, regional, municipal, and city. At the national level, financial aid or policy tools can be developed to support SEP across all levels (Krog & Sperling, 2019; Sperling et al., 2011; Kempenaar et al., 2021). At the city level, energy decision-making, implementation of ideas, and concrete action form the tangible aspects of the energy transition (Bale et al., 2012; Kempenaar et al., 2021). SEP needs a combination of the bottom-up and top-down perspectives to fulfil overall goals that consider local values and possibilities (Krog & Sperling, 2019). Collaborative governance is essential for the quality of energy transition (Gailing & Röhring, 2016). All four levels of SEP need to play their part to meet the goals of the climate agreement. However, collaboration of different SEP levels can experience challenges such as power imbalances, trust, and socio-materiality, the growing

interest in the mutual constitution of social and physical spaces (Backlund & Eidenskog, 2013; Gailing & Röhring, 2016; Purdy & Jones, 2012).

Secondly, the multi-actor nature of the RES regions increases the complexity of the SEP collaboration. To achieve the holistic approach, a multitude of actors need to collaborate, mandate, and provide all within the collaborative governance structure. However, collaboration with multiple actors could create 'administrative fuss', which makes task responsibility unclear, and inter-municipal collaboration is criticized for 'hollowing out' local government (Hoppe & Miedema, 2020).

Thirdly, the multi-sector governance does result in complex issues. Gerritsen (2023) identified multiple complexities of integrating spatial and energy planning, including different logics of planning, a relatively unknown territory of spatial implications of renewable energy transition for policymakers and planners, the need to look beyond generation and into transport and storage of energy, and limited knowledge of the opposite specialized fields.

Despite the recognized importance of integrating energy and spatial planning and a holistic approach towards the energy transition, existing governance structures of the RES face challenges in achieving effective collaboration (Kempenaar et al., 2021). Issues such as power imbalances, conflicting sectoral logics, and administrative complexities form a barrier to integrated energy planning within the RES regions. Understanding the effectiveness of the integration, particularly in addressing net congestion through decentralized energy systems, remains a relevant research area. This study aims to address these gaps by critically analyzing the collaborative governance and the policy integration of spatial and energy planning in RES Rivierenland.

1.2 Research aim and research questions

The objective of this research is to evaluate the effectiveness of the RES regions in integrating energy planning and spatial planning to address net congestion through decentralized energy systems. By examining the collaborative governance structure, bottom-up decentralization opportunities within the region, and future governance possibilities, this study provides insight into how the multi-actor, multi-level, and multi-sector dynamics influence policy integration.

To achieve understanding and gain insights, the research question of this thesis is:

"To what extent are RES regions effective in integrating spatial and energy planning to address grid congestion through decentralized energy systems?"

The sub-questions supporting the research question are:

- *What does spatial planning and energy planning look like in a RES region?*
- *How does integrative collaboration unfold within the spatial and energy planning domains?*
- *What governance conditions support or hinder policy integration between spatial and energy planning in RES regions?*

1.3 Scientific and societal relevance

Societal relevance

The Dutch energy transition is noticing a bottleneck: grid congestion is slowing down economic growth, and municipalities are postponing housing developments. Because new generation, storage, and

transport require physical space, as well as grid capacity, spatial and energy planning can no longer proceed in separate siloes. If the integration does not happen quickly, the Netherlands risks not reaching its 2030 climate targets, and regions like Rivierenland face a decrease in employment and economic loss. By examining how RES Rivierenland multi-actor governance actually functions, this thesis delivers insights for policymakers, aldermen, entrepreneurs, civil actors, and decentralized energy initiatives across the country. This research examines how energy and spatial planning are integrated in RES Rivierenland, how practical collaboration unfolds, and what conditions hinder and support regional policy integration. The study contributes original, practice-oriented knowledge to a debate that is no longer academic but an urgent socio-economic challenge.

Scientific relevance

The research contributes by providing empirical data and theoretical insights into the collaboration between energy planning and spatial planning within the RES Rivierenland. While existing literature acknowledges the multi-level nature of governance in SEP, this study delves into the specific collaboration dynamics of spatial and energy planning (Krog & Sperling, 2019). This focus on the regional friction between policy domains is a significant contribution. The research offers empirical evidence on how decentralized energy initiatives interact between the domains.

This thesis offers a new analytical lens for studying regional policy integration, based on governance and collaborative dynamics, by combining existing frameworks of Candel (2021), Emerson et al. (2012), and Steurer (2013).

Additionally, while civil participation in SEP is often framed in terms of democratic engagement in decision-making, this study shifts the focus towards the entrepreneurial role of the civilians. It highlights how the civilian is not just a participant but an active agent shaping the energy transition through local initiatives, energy communities, and decentralized solutions.

2. Literature review

In the literature review we first discuss the difference of energy planning and spatial planning, then look into strategic energy planning, followed by examples of SEP governance already in place.

2.1 Energy planning and spatial planning

Energy planning and spatial planning operate within distinct governance and decision-making logics. The planning system primarily functions according to political-administrative and jurisdictional logics. Integrated in the form of spatial planning strategies at the national, provincial, or local levels of government, dubbed Environmental visions or *Omgevingsvisies*. Additionally, spatial planning strategies include permit approval. In contrast, the energy system is predominantly driven by principles of optimization and efficiency, in the form of grid infrastructure impact analyses and projections for material investment costs (Gerritsen, 2023).

Stoeglehner et al (2011) advocate that energy planning and spatial planning should no longer be treated as two sides of the same coin, but rather as two interdependent sectors that must be integrated for effective support of the energy transition. In addition, De Pascali & Bagaini (2019) strive

for a holistic approach towards energy-efficient land-use and integrated energy planning, considering the inter-scalar character of energy. The integrated planning and holistic approach has a vision and principles: strive for compactness, promote sustainable transport, pursue adequate density, implement mixed land uses, support solar design, and aim at green infrastructure supply (Jabareen, 2006). These principles are justified by a higher quality of life and well-being for the residents (Stoeglehner, 2020).

Together, these studies demonstrate that while principles of integrated planning are established, the challenge remains operationalizing them with governance systems that separate energy and spatial planning.

2.2 Strategic energy planning

In this section, SEP on both the regional and municipal governance levels are discussed. The recent literature on SEP provides the insights to form a comprehensive understanding of the challenges of both regional and municipal governance. Krog & Sperling (2019) conducted a literature review and created a list of elements they found in their analysis used in SEP (Table 1). SEP is still a developing concept. For this research, we used the definition of Gerritsen (2023): "'Strategic energy planning' is a type of planning that foregrounds this energy–space nexus by systematically analyzing how producing, distributing, and consuming energy impinges on using, interpreting, and planning space in a community, and vice versa".

Table 1

Elements in strategic energy planning

Elements	
Flexible energy system	Inter-disciplinary
Interplay between energy demand and supply	Renewable energy
Short-term	Local energy conditions
Sustainable development	Long-term
Stakeholder involvement	Community goals
Comprehensive energy system	Reliability
Energy effective	Security of supply
Whole energy chain	Energy savings
Mid-term	Holistic
Reduce end-use energy demand	National goals
Improving welfare	Cost structure of energy production

Source: Krog & Sperling (2019)

Building on the conceptual elements, the next section examines how SEP plays out at different governance levels, focusing on regiones and municipalities.

2.2.1 Governance levels of SEP

Regional governance

Region-based governance has gained recognition in the Paris Agreement and by the EU (Current Funding, n.d.; Paris Agreement on Climate Change, n.d.). Knowledge sharing and regional networks are essential for SEP, or as Sedlacek et al., (2020) put it: "If the overall transition goal is to initiate profound, long-term changes in dominant practices, policies and ways of thinking, then bringing

together relevant stakeholders and establishing a network for collaboration and exchanging knowledge are essential components for facilitating the necessary individual and collective learning.". This is particularly true in early transition phases where uncertainty, open-ended learning, network building, and niche developments are dominant characteristics (Van Dijk et al., 2022).

Studies on the regional level are scarce; Sedlacek et al (2020) pointed out that while the intrinsic motivation of individual stakeholders is present within the region, hardly any exchange of knowledge and information takes place. The author claimed only to reach their findings because they, as researchers, were outsiders looking into the region, warning of regional path dependencies and blind spots.

Gailing & Röhring (2016) conducted a case study at two energy regions in Germany. During the research, they identified power and socio-materiality as the two factors for understanding the differences in outcomes per region. With our approach, we could confirm the importance of collaborative governance for the quality of implementation processes of energy regions, especially if the role of individual key actors in these processes is addressed.

Municipal governance

Reaching climate goals through SEP on a municipal governance level is challenging. While national or regional governance can support energy transition through frameworks or finance, the role of municipalities is more focused on bottom-up initiatives and the enabling of the energy transition within their municipality (Britton et al., 2022; Kempenaar et al., 2021). Municipalities often struggle with the trade-off of autonomy and collaboration (Wretling et al., 2018).

Bale et al. (2012) conducted a case study on strategic energy planning in Leeds. The local SEP took the form of a "strategic energy body". With the UK's energy policy being highly centralized, possibilities of decentralization were being explored. Bale et al. (2012) identified four key barriers to the development of the strategic energy body: financial resources, cultural norms, skills, and political will. Climate change was not at the top of the agenda because energy prices and funding needed for projects were deemed more important by the strategic energy body. Bale et al. (2012) found the need for initial investment, funding tools, and a lack of technical understanding within local authorities form key barriers to strategic energy planning.

Sperling et al., (2011), recognizes the frameworks needed by municipal governance to implement SEP efficiently and created a typology: (1) a clear institutional framework is in place to which municipalities have clearly defined responsibilities, (2) an incomplete framework where responsibilities are only partially defined, and (3) a largely absent framework where the tasks and roles of municipalities remain unclear. Sperling et al. (2012) make the argument that effective decentralization of strategic energy planning can only be achieved by a simultaneous centralization within the institutional framework. The research was conducted in Denmark, where climate goals were formed on a national level, while municipalities were expected to manage SEP efforts independently.

Similarly, Wretling et al (2018) found that in Sweden, municipalities suffer the same challenges due to their autonomy. Municipalities strive for a revision of the Act of Municipal Energy Planning, introducing clear standards and temporal guidelines. Municipalities in Sweden did find co-operation between municipalities a useful strategy to address inter-municipal energy issues, such as large-scale energy

infrastructure, exchange knowledge and best practices (Wretling et al., 2018). The co-operation provides potential solutions for the key barriers of SEP identified by Bale et al (2012).

While collaboration can be useful, municipalities differ in energy and space, which can complicate the cooperation. Stoeglehner et al (2011) created an archetype categorizing spatial elements within the spatial-resource-planning continuum. The four types are: Urban centers, Suburban areas, Small towns as centers of rural areas, and rural areas. Municipalities are created out of different combinations of these archetypes. These archetypes have all their own qualities, resulting in inter-municipal collaboration potential and challenges (Stoeglehner et al., 2011). In the Netherlands, the intermediary regional approach of the RES does provide a stepping stone towards decentralization, but there is a lack of national frameworks.

Overall, the studies shed light on the potential of regional collaboration; empirical insights into how institutional asymmetries affect integration remain scarce, particularly in the Dutch RES context.

3. Theoretical framework

This section introduces theoretical concepts that frame this research, highlighting which frameworks will be applied and which will serve as contextual background.

RES Rivierenland operates as an energy region that interacts with local, regional, and national actors to address the energy transition. This interaction happens across multiple governance levels and sectors. Hooghe & Marks (2020) define multi-level governance (MLG) as “the dispersion of authority to jurisdictions within and beyond national states”. MLG highlights vertical friction between jurisdictions, such as municipalities, RES Rivierenland, and the national government. At the same time, MLG aims to empower separatist movements and create opportunities for cooperation (Hooghe & Marks, 2020).

A related but distinct perspective is the multi-level perspective on socio-technical transitions (Geels, 2011). MLP provides a lens to understand how local innovations, dubbed ‘niches’, energy hubs in this case, can influence the sociotechnical regime, and ultimately transform the socio-technical landscape of the Netherlands. MLG and MLP are introduced to situate this study within broader governance and socio-technical debates. The theories provide context on multi-level interactions and dynamics, but are not used as analytical lenses due to the lack of measurability needed to capture collaborative governance. The mapping of the governance structures is instead operationalized via Steurer (2013).

Steurer’s (2013) framework is applied to capture governance mechanisms of the energy and spatial planning domains. Steurer (2013) maps out arrangements and interactions between three actor constellations: public, private, and civil spheres. This provides a solid foundation for examining the collaborative dynamics that emerge from these governance arrangements.

Collaboration is essential to address the multi-actor, multi-sector complex challenge of the energy transition.

Ansell & Gash (2008) define collaborative governance as:

"A governing arrangement where one or more public agencies directly engage non-state stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or manage public programs or assets."

This definition formalizes collaboration between government and non-state actors. Ansell & Gash emphasize public agencies as the central drivers of collaboration. This emphasis makes the framework less suited for analysing decentralized multi-sphere initiatives such as energy hubs.

Emerson et al. (2012) define collaborative governance as:

"the processes and structures of public policy decision making and management that engage people constructively across the boundaries of public agencies, levels of government, and/or the public, private and civic spheres in order to carry out a public purpose that could not otherwise be accomplished."

The definition of Emerson et al. (2012) fits better with our research for two reasons. It encompasses the public, private, and civic spheres, which align with the framework of Steurer. Furthermore, Emerson et al. (2012) stress the importance of the public and community, which is key in decentralized energy solutions such as energy hubs.

Building on this definition, Emerson et al. (2012) proposed a collaborative governance framework that includes collaborative dynamics, conceptualizing collaboration as consisting of three interactive components: principled engagement, shared motivation, and capacity for joint action.

These three components work together to produce collaborative action. This research uses collaborative dynamics to look into how collaboration between energy planning and spatial planning in energy hubs unfolds in 'practice'. While Emerson et al. (2012) conceptualize collaboration dynamics, practice theory helps ground the dynamics in everyday practice, routines, and interactions in RES Rivierenland. Schatzki (2005) defines practice as: "*… the patterned, routinized behaviors and interactions through which actors co-create meaning, build trust, and coordinate action*". Closely related is the definition by Hopf (1998): "*Practices reproduce actors through identity, but also reproduce an intersubjective social structure*". This definition highlights the mutual relationship between actors and the social structure that shapes action. Actors' identities shape their actions, while repeated actions reinforce the social structures in which they operate.

For example, an energy cooperative may act as a driver for local initiatives because its members identify as proactive community members. Through these actions, they also reinforce the social structure of the energy transition.

This research understands practices as both the visible, patterned behaviours and interactions, through which actors create meaning, build trust, and coordinate action, and as the underlying social structures that shape and are reproduced through these interactions (Hopf, 1998; Schatzki, 2005).

In the context of this research, practices refer to concrete actions, meetings, negotiations, and shared routines that shape the energy hubs in RES Rivierenland.

While MLG addresses vertical friction, where national policies coincide with local context, horizontal friction emerges when siloed governance structures hinder coordination across policy domains, such

as energy and spatial planning. Horizontal friction of siloed governance and policy making is addressed through the theory of integrative governance (IG), which focuses on the relationships between governance instruments and/or systems (Visseren-Hamakers, 2018). IG is in line with the holistic pursuit of the integration of spatial and environmental planning. Visseren-Hamakers (2018) developed a 3-step analysis of the relationships and performance of governance systems. Lah (2025) provides the SCALE framework, aiming to break down silo's by addressing the disconnects among actors and sectors. Although both IG and SCALE provide valuable insights into addressing siloed governance, they remain too broad to capture the mechanisms of spatial and energy planning. Therefore, this study aligns with Candel (2021) heuristic, which offers a more operational framework. The developed heuristic weights integrative capacity and integrative leadership to establish the extent to which policy integration is feasible. The collaborative dynamics by Emerson et al. (2012) will inform the extent of integrative capacity, and integrative leadership is present in RES Rivierenland, which will shape the degree of spatial and energy planning integration.

The theoretical concepts are operationalized in Table 4, which is discussed alongside the integrated framework presented in Figure 2.

3.1 Building the framework

Based on the conceptual overview, this section details how the theoretical frameworks are applied to RES Rivierenland to analyze governance, collaboration, and policy integration. The framework consists of three parts. First, the Steurer (2013) typology of governance will help formulate the current governance practices of spatial and energy planning in RES Rivierenland. Secondly, the collaboration dynamics of the framework of Emerson et al. (2012) will help explain the actual collaboration experienced when building energy hubs. Lastly, the framework of Candel (2021) will guide the answer to what degree the current collaboration practices and governance instances are ready to undergo policy integration, needed to achieve the holistic energy approach of SEP.

3.1 Analyzing governance

To analyse the distribution of governance roles and relationships in RES Rivierenland, this thesis draws on the typology proposed by Steurer (2013). Steurer distinguishes seven types of governance based on who regulates (government, civil society, and business) and how the regulation occurs (individually or jointly). This model allows for the disentanglement of complex governance environments, in settings where multiple actors coexist and co-steer policy making, like in RES Rivierenland.

The government types Steurer (2013) defined are:

Public regulation: Government imposes rules and standards through hard regulation (laws, decrees, and economic instruments like taxes), soft regulation (not formally binding)

Civil Regulation: Civil society actors (e.g., NGOs, communities, energy cooperatives) initiate and enforce norms and practices, often based on values

Private regulation: Businesses regulate by developing their own rules, such as standards and codes of conduct, on an industry level or per business

Public-private co-regulation: Government and business actors jointly regulate and implement policies through PPP (public-private partnerships)

Private-civil co-regulation: Businesses and civil society organizations jointly govern or develop initiatives (e.g., co-financed local projects, certification schemes, and partnerships)

Public-civil co-regulation: Government and civil society organizations work together to shape and form policy and projects, usually on common-pool resources

Tripartite co-regulation: All three sectors, governments, business, and civil society, are involved in shared governance arrangements

Finally, meta-governance refers to the "governance of governance". Meta-governance oversees, reflects, and orchestrates different types of governance.

In the Dutch RES context, governance is not exercised by a single dominant actor. Instead, a multitude of actors, from different actor constellations, form and influence planning decisions and policy making, particularly in the domains of climate, energy, and space. This aligns with the work of the academic notion of striving towards a holistic strategic energy planning governance, where multiple dimensions, such as energy and space, are integrated (see Gailing & Röhring, 2016; Kempenaar et al., 2021; Krog & Sperling, 2019; Stoeglehner et al., 2011, 2016). The definition of strategic energy planning by Gerritsen (2023) also explicitly includes the role of local communities.

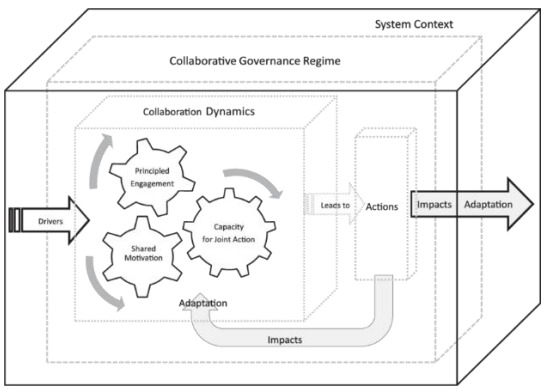
The framework will be applied to both spatial planning and energy planning domains, allowing for a systematic mapping of how governance is structured in the RES.

3.2 Integrated collaborative governance

To help explain the collaborative efforts of spatial and energy planning in RES Rivierenland, this study applied the collaborative dynamics out of the integrated collaborative governance framework by Emerson, Nabatchi, and Balogh (2012). The framework aims to conceptualize integrated collaborative governance through a set of nested dimensions: system context, collaborative governance regime (CGR), collaborative dynamics, and actions that can generate impact and adaptations across the systems (Emerson et al., 2012) (see Figure 1).

Figure 1

The integrative Framework for Collaborative Governance



Source: Emerson et al. (2012)

While the broader framework offers an overview of collaborative governance, this research focuses on the collaboration dynamics within the CGR. These dynamics are most relevant for understanding how collaboration unfolds in the three energy hubs, in practice (See 3. Theoretical framework).

3.2.3 Collaborative dynamics

Emerson et al. (2011) view the stages within collaborative dynamics as cyclical or iterative interactions. Differentiating the CGR as an ongoing process from the drivers as initial components. The collaborative dynamics are based around three interacting components: principled engagement, shared motivation, and capacity for joint action. The collaborative dynamics help identify the strengths and weaknesses of the collaboration between energy and spatial planning in energy hubs in RES Rivierenland.

Principled engagement

Through principled engagement, actors with diverse content, logics, and goals work across the boundaries to solve problems and create value. Principled engagement occurs over time. In the context of RES Rivierenland, key actors, such as grid operators and municipalities, engage across organizational boundaries to address collaborative governance and create value through principled engagement.

The subcomponents of principled engagement are discovery, definition, deliberation, and determination as displayed in Table 2. The discovery aims to reveal individual and shared interests, concerns, and values, while the definition process concerns the continuous efforts to build shared meaning through common purpose and objectives. This also involves agreeing on concepts and terminology participants use to describe opportunities and problems in the CGR. Deliberation is the key to successful engagement. The CGR creates a “safe” space where reasoned communication takes place. Deliberation is not merely the aggregation of interests but requires critical discussions and conflict resolution. Deliberation leads to determinations, where procedural decisions, such as agenda setting, and substantive determinations are made over time.

Table 2

Sub-components, forming the three interactive components of collaborative dynamics

Principled engagement	**Shared motivation**	**Capacity for Joint Action**
Discovery	Mutual trust	Procedural/Institutional Arrangements
Definition	Mutual understanding	Leadership
Deliberation	Internal Legitimacy	Knowledge
Determination	Shared Commitment	Resources

Note. Derived from Emerson et al., (2012), edited by author

Shared motivation

The second interactive component of collaborative dynamics is shared motivation. Shared motivation consists of the sub-components: mutual trust, mutual understanding, internal legitimacy, and shared commitment. Mutual trust forms over time as parties show predictable and reasonable traits through collaboration. This forms the basis for mutual understanding. Trust enables people to open up and see and value differences between actors. In turn, this leads to internal legitimacy. The collective trust and credibility, with compatible and interdependent interests, legitimizes the collaboration. The legitimacy

turns into shared commitment, which enables parties to cross the boundaries of the multiple sectors of RES Rivierenland.

Capacity for joint action

The reason for collaboration is to generate outcomes that could not be generated individually. The collaborative dynamics should therefore generate a new capacity for joint action. The capacity for joint action consists of the sub-components: procedural and institutional arrangements, leadership, knowledge, and resources. Procedural and institutional arrangements encompass the organizational structures required to manage repeated interactions over time. These arrangements should be made both at the intraorganizational and interorganizational levels. This interplay between the RES as an organization and the collaboration of the individual actors within the RES is key to answering the research question. Leadership is necessary to cross boundaries and can take the form of a sponsor, convener, facilitator/mediator, representative of an organization, science translator, technologist, and public advocate, among others. Knowledge is defined by Emerson et al. (2012) as "the currency of collaboration". Knowledge that is shared in a trusted environment and new knowledge that is generated through collaboration are valuable to reach desired outcomes. Resources are necessary to take action in the CGR. Resources may include funding, time, and technical and logistical support.

3.3 Heuristic for policy integration

As Kempenaar et al. (2021) stated regarding the energy transition, there is a need for policy change and new institutional structures and arrangements. The formation of new policy is complex since the RES functions on a multi-scalar, multi-actor, and multi-sector level. Still, all different parties try to form policies to ensure the goals of the climate agreements will be met. Additionally, the various logics of energy planning and spatial planning form the complexity of policy integration. We use the heuristic of Candel (2021) on policy integration to capture an understanding of the feasibility of policy integration. First of all, Candel (2021) starts out by addressing the desirability of policy integration, weighing the pros and cons of policy integration. In our case, integration of fields is necessary to achieve the holistic approach needed to achieve the climate goals (Kempenaar et al., 2021; Stoeglehner et al., 2016). Secondly, Candel (2021) states that the possibility of policy integration is based on two key determinants: capacity and leadership.

3.3.1 Capacity

Candel (2021) describes capacity as the set of analytical, operational, and political skills and competences necessary to perform policy integration. The capacities are distinguishable into three levels: individual, organizational, and systemic. Analytical capacities ensure policies are technically sound to contribute to the common goal. This is done through the availability and exchange of knowledge and information across sectors, including the machinery, processes, and skilled people required to do so. Additionally, a shared problem understanding is needed in order to work towards the common goal. In this case, reaching the objectives of the Dutch Climate Agreement is the common goal.

Second, Operational capacities align resources with actions to facilitate implementation. This is achieved through cross-sectoral structures and coordination mechanisms, a flexible strategic

management process that involves all relevant entities, an evaluation process based on an overarching set of indicators, and the availability of funds. Third, the political capacity is needed to obtain and sustain political support for actions. This is achieved through a political configuration that is favorable to a holistic approach, learning relationships with governance partners and the public, and broader trust and legitimacy. Candel (2021) states that the means through which these capacities are achieved are exemplary and not exhaustive. The preconditions for capacity provide an overview for assessing whether a governance system has the skills, competences, resources, and structures needed for attempts at strengthening policy integration. The mere presence of the capacities is insufficient; leadership is needed to achieve policy integration (Candel, 2021).

3.3.2 Leadership

Leadership is defined as the second critical determinant of successful policy integration. Leadership is also identified as the determinant that is most often lacking in policy integration. Integrated leadership is needed for governing crosscutting problems and organizing across various boundaries to tackle problems and achieve the common good. Integrative leadership is not restricted to collaborative forms of governance. Hierarchical governance can steer behavior towards desired outcomes. Furthermore, the presence of integrative leadership at the administrative level is equally important.

3.3.3 Heuristic

Candel (2021) developed a heuristic to judge the chances of successful policy integration. The heuristic is developed through juxtaposing integrative capacity and leadership. Candel (2012) identified four starting positions of feasibility of policy integration, which can be found in Table 3.

Table 3

Heuristics policy integration

		Integrative leadership	
		Low	High
Integrative capacity	Low	Limited integration potential/ sectoral policy making	Symbolic integration potential
	High	Administrative integration potential	Full policy integration potential

Source: Candel (2021)

First, capacity and leadership may be low. In such instances, there is no or limited potential for strengthening policy integration. Policy is made in subsystems. A call for policy integration is not warranted because the problem at hand is not understood as crosscutting.

Second, the integrative capacity may be sufficient, but the integrative leadership is lacking at one or more levels. In this case, there is potential for administrative capacity. Administrative integration refers to a state in which various crosscutting subsystems are involved and goals and instruments are aligned. Collaborative structures exist, but do not proceed beyond good intentions. Leaving policy integration a “paper reality”. This is a common recurrence in the literature on environmental policy.

Third, a high level of integrative leadership but low capacities is a case of symbolic integration. With symbolic integration, mostly political leaders commit to an integrated approach to address crosscutting problems, but the capacities are insufficient. This shows in ambitious agreements, without the administrative changes. Symbolic integration costs less than administrative integration, but

administrative integration provides a better foundation through architecture and skills to develop policy integration.

Fourth, it becomes possible to pursue full policy integration when both integrative capacity and leadership are available. This type of policy integration prioritizes objectives and interventions related to crosscutting issues.

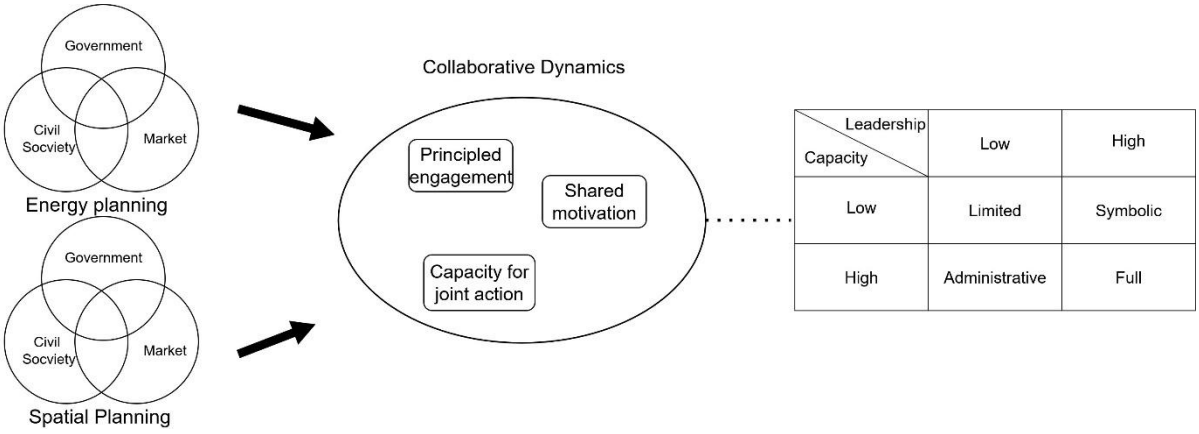
The heuristic by Candel (2021) offers an analytical lens to evaluate the chances of policy integration in the RES Rivierenland. Applying this heuristic provides valuable insight into the current stance of the policy integration potential and what is needed to move towards a full policy integration potential.

4. Conceptual framework

The aim of the framework is to analyze and assess the integration of spatial and energy planning in RES Rivierenland. The framework integrates three analytical components to understand governance practices, collaborative dynamics, and potential for policy integration. Each component is linked to the three parts of the analysis of the research (see Figure 2). Table 4 provides the operationalization of the theoretical concepts used in this framework. For detailed definitions of all components operationalized, see Appendix 1.

Figure 2

Analytical framework for assessing policy integration in RES Rivierenland



Note. Framework developed by author, based on Steurer (2013), Emerson et al. (2012), and Candel (2021)

Table 4

Operationalization of theoretical concepts in framework

Type of governance modes	Public regulation	Government-led regulation through laws, decrees, or soft instruments
	Civil regulation	Norms and actions led by NGOs or communities
	Private regulation	Industry or firm specific standards and internal codes
Collaborative Dynamics	Principled engagements	Includes discovery, definition, deliberation, and determination
	Shared motivation	Includes mutual trust, mutual understanding, legitimacy, and shared commitment
	Capacity for joint action	Combination of institutional/procedural arrangements, leadership, knowledge, and resources
Heuristic	Integrative leadership	The work of integrating people, resources, and organizations across various boundaries to tackle complex public problems and achieve the common good
	Integrative capacity	The set of analytical, operational and political skills and competences necessary to perform policy functions, which can be discerned at three levels: individual, organizational, and systemic

Note. For detailed definitions of all components, see Appendix 1.

The first part of the analysis builds on the framework of Steurer (2013) to map and interpret governance practices within two parallel domains: spatial planning and energy planning. These are treated as two distinct, yet interrelated spheres. Each involves actor constellations of government, civil society, and market. By applying this twofold perspective to the RES Rivierenland, we gain an understanding of how decision-making and responsibilities are distributed across the actor types. This mapping reveals the overlap, tension, and gaps between the two parallel governance systems.

Governance practices in the spatial and energy planning system context shape the conditions for collaboration in RES Rivierenland. This is represented by the two arrows pointing from the sphere representing energy and spatial planning to the collaborative dynamics. The second part of the framework analyzes the collaboration among actors. Here, the focus shifts from institutional arrangements to interactive processes. Drawing on the framework of Emerson et al. (2012), this part of the framework explores how capacity for joint action, principled engagement, and shared motivation unfold in practice. The analysis is supported by empirical evidence. Using three local energy hubs as case studies and drawing on interviews with relevant stakeholders, this section explores how collaborative dynamics materializes in the RES Rivierenland.

In the third step, the findings from the analysis on collaborative dynamics are assessed using Candel's (2021) framework for policy integration. This framework identifies four states of possible policy integration: limited integration, symbolic integration, administrative integration, and full policy integration, which are based on the presence of integrative leadership and integrative capacity. While

this step builds on insights from step two of the analysis, as indicated by the dotted line, it does not assume that collaborative dynamics directly cause integration. Instead, the collaborative dynamics serve as empirical input to weigh whether the conditions for policy integration are present, and to what degree. This allows the analysis to position RES Rivierenland in Candel's (2021) typology and reflect on its implications for the integrative governance of spatial and energy planning.

This study expects that when both integrative leadership and integrative capacity are present, effective policy integration between spatial and energy planning is more likely to occur in RES Rivierenland. If one or both dimensions are weak or absent, integration is limited, symbolic, or administrative. Applying this heuristic to RES Rivierenland, the analysis evaluates whether the interactions of energy and spatial planning observed meet the conditions for integration. This allows the study to identify barriers within the planning landscape and reflect on what is needed to move towards full policy integration.

Together, the three components form a coherent analytical framework that moves from mapping governance context, to examining how collaborative dynamics unfold, to assessing the potential for integrated policy outcomes. While insights from collaborative dynamics inform the assessment of policy integration, Step 3 does not assume that collaboration causes integration. By combining empirical cases with the conceptual framework, this model offers both analytical clarity and practical relevance in addressing the development of integrative and creative energy systems in RES Rivierenland.

5. Methodology

The methodology section entails the research strategy, research methods, data collection, and data analysis. Lastly, the section concludes with an overview of the context of RES Rivierenland and the three cases: the energy hubs. During the research, the researcher was an intern at RES Rivierenland. To address the research question, the empirical analysis was divided into two parts. First, the governance structures of spatial and energy planning were analyzed to understand the governance and policy context in Part 1 **Governance structures of spatial and energy planning**. Second, the collaboration dynamics within energy hubs and their implications for policy integration were analyzed through qualitative data collection and analysis in Part 2 **Collaboration dynamics and policy integration**.

Table 5 includes the overview of the research design. During the internship, the researcher attended RES steering group meetings, identified interviewees, conducted semi-structured interviews, and did desk research. After the data collection the researcher analyzed the data via inductive coding.

5.1 Research strategy

Theoretical perspective

Case studies are not inherently tied to specific ontological, epistemological, or methodological positions (Harrison et al., 2017). Instead, selecting an appropriate research design requires alignment between both the study's aim and the researcher's worldview (Harrison et al., 2017). For this research, a post-positivist approach was adopted, aligning with Yin's perspective on case studies. Yin describes his approach as grounded in a 'realistic perspective', emphasizing the objective investigation of real-world phenomena (Yin, 2014).

The research aimed to produce robust insights into the integration of spatial and energy planning and the collaborative dynamics of decentralized integrative energy solutions. Post-positivist qualitative research embraces the ideals of objectivity and the generalizability of results (Denzin & Lincoln, 2017). Through these ideals, the research aimed to provide generalizable results applicable in municipalities and RES-regions.

Ontology and epistemology

This research was grounded in a critical realism ontology. It acknowledged that a real world exists, but it is only imperfectly measurable due to the limitations of human perception and the tools used to study it (Guba & Lincoln, 1994). The researcher should get as close the reality as possible by using a variety of methods (Harrison et al., 2017).

The research utilized an objectivist epistemology, which assumes that reality exists independently of the human mind (Moon & Blackman, 2014). This perspective claims that the research can discover objective truths about the differences in collaborative dynamics between the energy hubs through scientific methods. The researcher aimed to remain detached from the research and not let prior knowledge, values, and biases influence the result (Moon & Blackman, 2014). This aligns with the post-positivist approach, where objectivity is a goal, although it is recognized that achieving perfect objectivity is impossible (Harrison et al., 2017; Yin, 2014).

5.2 Research methods, data collection and data analysis

The research adopts an embedded multiple-case study, which investigates the three energy hubs within RES Rivierenland. Each hub represents a distinct case, while collaboration dynamics are the embedded unit of analysis. Energy hubs were chosen deliberately because they represent an integrative decentralized energy solution where spatial and energy planning meet. This makes them relevant for examining collaborative dynamics and potential policy integration. In order to identify suitable energy hubs, the researcher consulted with employees of RES Rivierenland during an internship. All three existing energy hubs were included were included to ensure complete coverage within the region and to enhance the analytical generalizability of the findings (Yin, 2014).

The three energy hubs differ in their collaborative arrangements and actor constellations. WattHub Geldermalsen demonstrates a civil-private arrangement between energy cooperative BetuweWind

and private developers, with support from the municipality. Energy Hub Medel reflects a public-private arrangement in which the Medel board, a private energy system developer, and the grid operator jointly created the energy island. Energy Hub Medel is part of business park Medel which is organized as a joint arrangement between the municipalities of Tiel and Neder-Betuwe. By contrast, Energy Hub Neder Betuwe is a private-led arrangement, with limited public-sector involvement. These differences provided a basis for comparison of collaboration dynamics and conducting a holistic analysis of energy hubs in RES Rivierenland.

After the cases were identified, the researcher made an interview guide. The interview guide was built around the predefined themes of Emerson et al. on collaborative dynamics (see Table 2). This ensured the interviews would fit the thematic analysis.

Part 1 Governance structures of spatial and energy planning

To analyse the governance structures of spatial planning and energy planning using Steurer's (2013) actor constellations, desk research was conducted. This focused primarily on documents published by the government, such as the NOVI (the national environmental vision), the provincial environmental vision, municipal environmental visions, and documents covering energy planning, such as reports by grid operators and the provincial infrastructure report, the pMIEK.

Part 2 Collaboration dynamics and policy integration

The purpose of the qualitative data analysis is to explore the 'how' and 'why' of energy and spatial planning policy integration, and collaboration dynamics within RES Rivierenland. Multiple data sources were employed to enhance the robustness of the findings and reduce potential biases (Yin, 2014). The data collection includes observations of experienced dynamics in board meetings, semi-structured interviews, and desk research.

- The main focus of this research was collecting data through semi-structured interviews which allowed for in depth explorations of the research question (Harrison et al., 2017). The interviewees were selected using purposive sampling to ensure representation of all three actor constellations per energy hub. These include municipal officials, energy cooperatives, grid operators, and entrepreneurs. Five interviews were face-to-face interviews and one was held online. Prior to the interviews, participants provided consent for audio recording. The interviews lasted between 54 and 168 minutes. The interviewees are referred to anonymously because of privacy agreements. The interviews and affiliation of the interviewees with the energy hubs are listed in Appendix 2.
- Observations of RES steering group meetings were conducted during the internship of the researcher at RES Rivierenland. Two steering board meetings were attended, and observations were held. During those observations field notes were taken. Details about these meetings can be found in Appendix 3. The observations were conducted to validate whether the collaboration dynamic reported in interviews were also present in steering board meetings.
- Desk research primarily focused on documents such as the environmental vision of the region and municipalities corresponding to the energy hubs. These reports covered energy and spatial planning, reports by grid operators, and published RES documents. These documents were used to strengthen, validate, or challenge thematic findings of the interviews.

After all the data was collected, thematic analysis was conducted using deductive coding, guided by the collaboration dynamics framework of Emerson et al. (2011), and inductive coding was used to discover new themes emerging from the data. Coding was carried out systematically in Excel. The coding process was refined iteratively, and findings were triangulated with desk research and observations to ensure validity. Interviews served as the main source for collaboration dynamics, while the observations and desk research helped identify points of convergence, which confirmed validity, and divergence, which revealed tensions and differences between stakeholders.

Table 5

Overview of research design

Part	Focus	Data sources	Purpose
Part 1	Governance structures of spatial and energy planning	-Desk research: NOVI, provincial and municipal environmental visions, pMIEK, grid operator reports	To map actor constellation and governance arrangements (Steuer, 2013)
Part 2	Collaboration dynamics in energy hubs and policy integration	- Semi-structured interviews with municipal officials, grid operators, cooperatives, entrepreneurs - Observations of RES steering group meetings - Desk research: RES documents, regional/municipal plans, reports	To explore collaboration dynamics (Emerson et al. 2012) and assess integrative capacity and leadership (Candel, 2021)

5.3 Validity and reliability of research

This section outlines the specific methods and practices the research employed to ensure the quality and reliability of the findings, following Yin's (2014) criteria: construct validity, internal validity, external validity, and reliability.

Construct validity entails that the research measures what it intends to measure. Triangulation of multiple sources, interviews, observations, and documents (see 5.2 Research methods, data collection and data analysis) helped confirm findings. Key informants were asked to review a draft of the case study report to enhance construct validity.

Internal validity examines whether observed relationships are genuine causal and not influenced by other factors. Pattern matching will improve internal validity. This was done by identifying patterns in the data collected and comparing these to the expected patterns provided in the theoretical framework. Additionally, the research systematically considers and addresses alternative explanations for the observed relationships. Instead of testing a pre-hypothesis, we developed an explanation of the case iteratively.

External validity addresses the generalizability of the findings. Analytical generalization was employed, linking the case study to the theory of SEP, collaborative governance, or the combination of the two. Using replication logic in the multiple-case study will reveal if similar results occur across different cases, especially relevant for an embedded multiple-case study, such as the internal legitimacy

influence on collaboration. The context of the case selection should be examined and accounted for (Harrison et al., 2017), which is done in section 5.4 RES Rivierenland context.

The reliability ensures that the study can be replicated, providing transparency in procedures. A case study protocol was developed, detailing the screened cases, the procedures for conducting interviews or surveys, and the approach for data analysis, including a coding scheme (see 5.2 Research methods, data collection and data analysis).

5.4 RES Rivierenland context

The RES Rivierenland is one of the 30 RES Regions of the Netherlands, consisting of 8 municipalities: Buren, Culembourg, Maasdriel, Neder-Betuwe, Tiel, West Betuwe, West Maas en Waal, and Zaltbommel. The region has a population of 250.000 inhabitants. According to the urbanity typology of the CBS, all municipalities are classified as non-urban, except for Tiel, which is classified as minimal-urban (Statistiek, n.d.). The ambitions of the RES 1.0 are shaped by integral considerations, addressing themes such as housing, safety, nature, the impact of new sustainable energy on the electricity grid, public support, and municipal policy.

The RES region formulated the ambition to generate 1,2 TWH through rooftop solar panels, solar panel fields, and wind turbines. This increase in sustainable energy generation is expected to decrease CO2 emissions by 34% by 2030, with 16% of this reduction coming from energy savings (RES-team FruitDelta Rivierenland, 2021). The RES seeks to adopt a holistic collaborative approach by integrating actors of different sectors, including organizations, entrepreneurs, public authorities, entrepreneurial civilians, and research (Partners, n.d.). The steering committee of the RES Rivierenland includes representatives from: Greenport Gelderland, Samenwerkende Woningcorporaties Rivierenland (the umbrella association of the regional housing corporations), Liander, VNO-NCW Rivierenland (association representing the entrepreneurs), the regional energy cooperative, the eight municipalities, waterboard Rivierenland, and the Province of Gelderland.

One of the main challenges faced by the RES Rivierenland is finding the space for large-scale sustainable energy generation and heat sources distribution (RES-team FruitDelta Rivierenland, 2021). This challenge confirms the RES as an energy spatial planning nexus. The goal of 1,2 TWH is based on the installation of 154 hectares of rooftop solar panels, 200 hectares of solar panel fields, and 31 additional wind turbines by 2030.

Figure 3

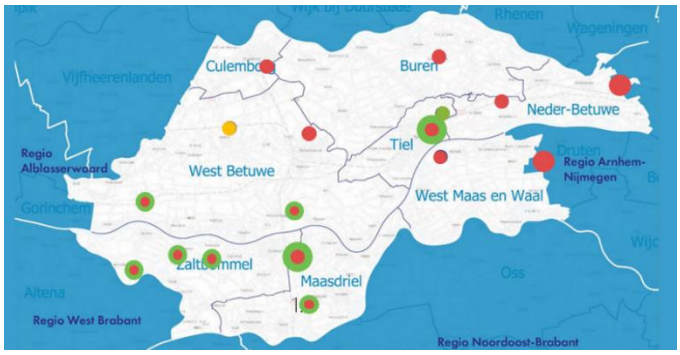
The RES Regions and the RES - Rivierenland circled

Source: RES Regio's op de kaart (2025) edited by author

The spatial implications of new sustainable energy generation initiatives go beyond generation alone, extending to storage and distribution. Liander, the low- to mid-voltage grid operator, has assessed the impact of new energy generation on the existing station capacity. Liander predicts that nearly all stations within the region will exceed their maximum capacity by 2030, with most stations reaching their limit before 2025.

Figure 4

The impacts of the RES 1.0 on the current station capacity.



Note. The green circles indicate sufficient capacity, the red-green-outlined circles represent sufficient capacity through realization of the planned grid expansions, the orange circle represents that the capacity limit is nearly reached, and the red circles represent the insufficient capacity and need for additional grid expansion.
Figure by Fruitdelta Rivierenland (2023)

TenneT is working on an extra 380kv station in Rivierenland to increase the capacity needed for substations of Liander. This includes building a new 380/150 kV station in the Rivierengebied and reinforcing the 150kv connection between Druten, Dodewaard, Tiel, and Zaltbommel, as well as reinforcing the 380kv connection between Dodewaard and Doetinchem. Despite the ongoing expansion of energy infrastructure, the increasing electricity demand will lead to further capacity problems, grid congestion, and uncertainty. This is why the umbrella cooperative of the energy cooperative within Rivierenland advocates for integral solutions and increasing collaboration (ESR, 2024):

"Rivierenland is at a standstill. And this will last for years. TenneT and Liander are building at a good pace, but without changing our behavior as local users and producers, adding more infrastructure will be pointless, and congestion will persist."

(ESR, 2024).

The expression for integral collaboration and local solutions is prominent in the pMIEK and the Energy Board, and the RES is pushing the local ownership narrative (Provincie Gelderland, 2024; RES-Rivierenland, 2023):

"Congestion is caused by the increasing unpredictability of supply and demand, and by the transportation of energy over longer distances. And the rise in electricity demand is yet to come. This will only succeed if we collaborate better."

(ESR, 2024)

In line with these challenges, the following section examines the three identified energy hubs that represent integral decentralized energy solutions.

5.5 Cases within RES-Rivierenland

The following section presents the three cases Energy Hub WattHub Geldermalsen, Energy Hub Medel, and Energy Hub Neder-Betuwe.

WattHub Geldermalsen

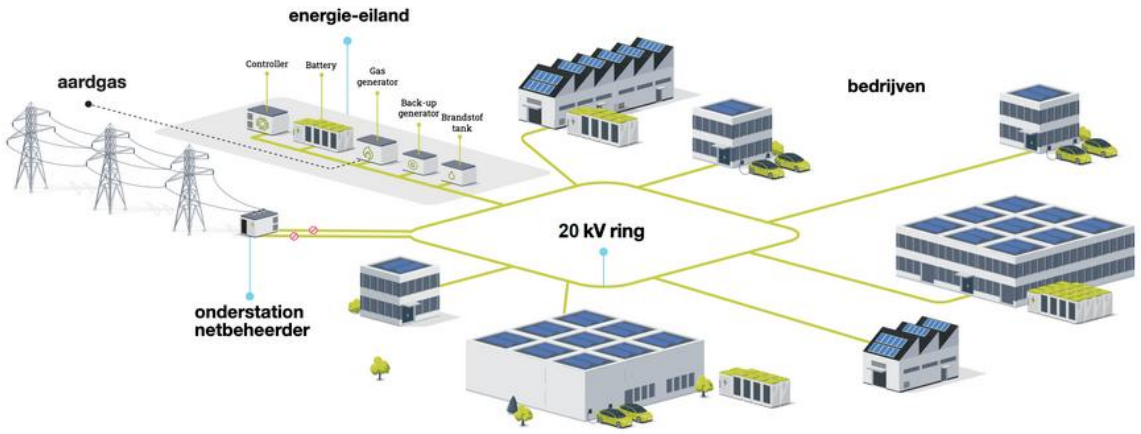
WattHub Geldermalsen was derived from the dike reinforcement project in Tiel-Waardenburg. The plan was to use electric excavators, which would make the dike reinforcement free of CO2, motor noise pollution, and odor (Dieten, 2022). This idea led to the realization of a charging station for heavy material and battery packets powered by local windmills: WattHub Geldermalsen. WattHub Geldermalsen is the first fast-charging hub for heavy construction machinery and electric trucks. The hub has a capacity of 10 MW and has 42 charging points of 400 kW (*WattHub*, n.d.). WattHub Geldermalsen is located in the municipality of West Betuwe. Energy cooperative BetuweWind uses its windmills and solar energy park to power WattHub Geldermalsen, which is located next to the WattHub. WattHub shows how local initiative can work out through the collaboration of private partners and energy cooperatives. A smart behind-the-meter solution that couples local generation, charging, and discharging, affecting the community positively. The hub is dedicated to charging vehicles. Energy Hub WattHub Geldermalsen illustrates a civil-private collaboration between energy cooperative BetuweWind and private developers.

Energy Hub Medel

Business park Medel, located in the municipality of Tiel, is the first self-sufficient energy hub in the Netherlands. Business park Medel is a joint venture of the municipality of Tiel and Neder-Betuwe. By including a self-sufficient energy hub, Medel addresses problems like CO2 emissions and net congestion, allowing businesses to expand (Joulz, 2024). The innovation is possible through collaboration between the industrial development agency Medel, Joulz, and Liander. Joulz is a company that builds energy systems. Liander is the local grid operator. Despite being physically connected to the grid, Energy hub Medel is not allowed to receive electricity from the grid, nor feed electricity back into it. Energy Hub Medel is a clear example where private actors collaborate amongst themselves to regulate their energy needs and create their own electricity system. The hub is dedicated to the distribution of electricity to businesses. Energy Hub Medel illustrates a public-private collaboration between municipalities, the Medel Board, a private developer, and the grid operator.

Figure 5

Energy Hub Medel



Source: Joulz (2024)

Energy Hub Neder-Betuwe

The Energy Hub Neder-Betuwe consists of an integrated system where a 10 MWp floating solar park is combined with the consumption of dike reinforcement, EV charging, sand extraction, and shore power. The use of a battery as a storage system ensures a balanced and reliable energy system (Solinoor, n.d.). Solinoor is a private company that specializes on energy systems and solar energy on water. Solinoor strives for local production and consumption of energy (Solinoor, n.d.). To match the local production and consumption, Solinoor collaborated with local private actors, such as Dekker Groep. The hub illustrates a private collaboration between private energy providers and consumers.

Figure 6

Energy Hub Neder-Betuwe

Source: Solinoor (n.d.)

6. Results

The results and analysis section consists of three parts: mapping of current governance configurations within the RES Rivierenland regarding energy and space, understanding how the collaborative dynamics of integral energy solutions unfold in practice, and weighing the integrative policy capacity of spatial and energy planning in RES Rivierenland.

6.1 Mapping the governance in the RES Region Rivierenland

In order to capture the governance dynamics, the governance of energy and spatial planning within Rivierenland, relevant actors and their interrelations will be put into the three actor constellations and the four corresponding overlaps provided by Steurer (2013). The analysis is structured in three parts: spatial planning, energy planning, and comparison. This section provides the necessary context for understanding how collaborative dynamics unfold in

6.2 Collaborative dynamics. Even though the insights generated are directly relevant to the first sub-question, the answer will be further developed in 8. Discussion and recommendations.

6.1.1 Spatial planning governance in RES Rivierenland

Government

Given the multi-level structure of governance in the Netherlands, this section organizes the public actors in RES Rivierenland according to their level of jurisdiction, using the secondary characteristic of scale (Steurer, 2013). This allows for understanding how different public actors influence the governance of the RES Rivierenland.

The Rijksoverheid has formulated a national environmental vision (NOVI), which formulated its future perspective, including four priorities: space for climate adaptation and energy transition, sustainable growth potential, health and strong cities and regions, and future-proof development of the rural areas. These priorities will be strived for through three collaboration principles: working together evenly, a challenge-driven approach no jurisdictional boundaries, and an adaptive regional-based approach. The Rijksoverheid aims to achieve future-proof developments by taking on the role of facilitator, collaborator, and steering and framework-setter (Zaken, 2020). The collaboration includes provinces, waterboards, and municipalities.

The province of Gelderland, in the case of Rivierenland, develops an environmental vision. This vision outlines how the province will be organized. The developed environmental vision '*Gaaf Gelderland*' has the goal to make Gelderland future-proof and strives for its future generations. The vision includes themes such as biodiversity, mobility, energy, and urbanization (*Gelderse omgevingsvisie*, n.d.). Accompanying the environmental vision is the Environmental Bylaw '*Omgevingsverordening'*, which encompasses all maps and regulations needed to make the vision 'Gaaf Gelderland' a reality (*Omgevingsverordening*, n.d.).

At the regional level, the FruitDelta Rivierenland area operates through agenda-setting and funding programs. Each of these regions contains multiple municipalities, each of which must formulate its own environmental vision based on local ambitions and policy goals, as well as an environmental plan that sets out the rules governing the physical environment. The municipal environmental vision and

plan has a mandatory participation policy recording the participation process of local civilians and entrepreneurs ("Omgevingsvisie, omgevingsplan en participatiebeleid Omgevingswet," n.d.). The RegioDeal, accepted in early 2025, includes €22.5 million in subsidies granted by the national government and focuses on the three principles: future-proof residing, future-proof entrepreneurship, and future-proof living. The region is still in its "deal-making" phase. The desired pragmatic approach is still to be developed (Regio Deal 6e tranche, n.d.). The RegioDeal is embedded in the broader regional agenda Fruit Delta Gebiedsagenda (2020-2030), which aims to stimulate innovation and flexibility through multi-sector collaboration through networking within and outside of the region (Fruitdelta, 2022). Both the agenda and the RegioDeal primarily promote networking and integral project initiation, without establishing enforceable rules or decision-making mandates.

Each of these regions contains multiple municipalities, which each must formulate its own environmental vision based on local ambitions and policy goals. Additionally, the municipalities must create an environmental plan that sets out the rules governing the physical environment. The municipal environmental vision and plan has a mandatory participation policy tracking the participation process of local civilians and entrepreneurs ("Omgevingsvisie, omgevingsplan en participatiebeleid Omgevingswet," n.d.). Even though this structure involves all three actor groups, market, civil society, and government, it is not a full tripartite co-regulation. The municipality retains the central decision-making role, while market and civil society provide input through participatory processes.

Waterboard Rivierenland also formulated their water vision for 2050, *'Watervisie'*. Similar to the other visions, Waterboard Rivierenland strives for resilient Rivierenland. Waterboard Rivierenland is governing at arm's length, functioning as a legal autonomous body, specializing in water governance. Water infrastructure management and permits controlled by the waterboard have implications for the spatial planning in the region. Additionally, the waterboard contributed to the *omgevingsvisie* by providing its expertise.

Market

The businesses in Rivierenland have to adhere to the vision and bylaws when requesting permits needed for actions that require physical space. The bylaws and vision set by the municipality function as rules to which the companies have to adhere. If a business requests a plan that is in accordance with these plans, the municipality has to accept the plan ("Omgevingsvisie, omgevingsplan en participatiebeleid Omgevingswet," n.d.). When a company wants to build on ground managed by the water board, the business has to meet the same bylaws and vision to which the water board has contributed ("Omgevingsvisie," n.d.). While civilians and entrepreneurs are actively involved in the formation of the spatial planning vision, developers can additionally reach out to local civilians to align their plan with local needs and concerns ("Omgevingsvisie, omgevingsplan en participatiebeleid Omgevingswet," n.d.).

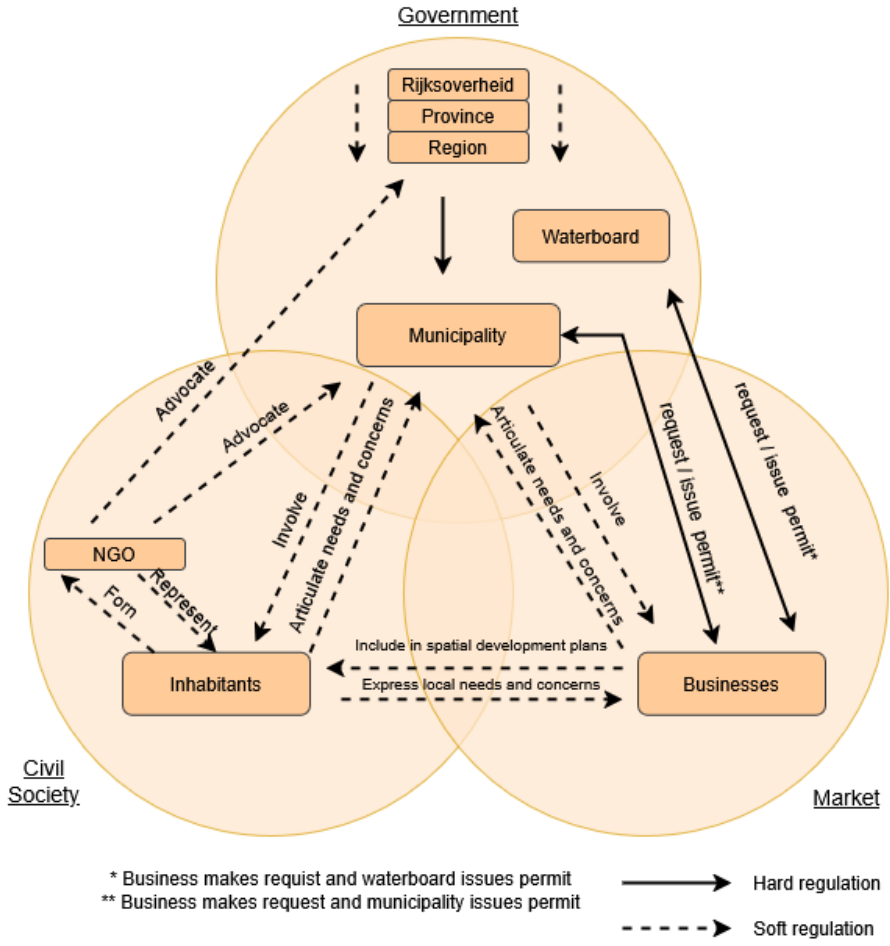
Civil society

The civilians of Rivierenland are involved in the decision-making of the *omgevinsvisie*. Civilians play an important role in formulating and expressing local needs towards the municipality and the market. Within the civil society constellation, civilians are represented by NGOs. Gebiedscoöperatie Rivierenland is an central umbrella association for civil organizations within the region.

Gebiedscoöperatie Rivierenland under the motto "*Samen zijn we slimmer*" (*Together we are smarter*). The regional cooperative aims to stimulate regional circularity and resilience through six themes: energy, housing, food, mobility, social cohesion, and finance. Local residents, entrepreneurs, and community groups are actively encouraged to contribute bottom-up innovation and collective solutions tailored to the community's needs (*Gebiedscoöperatie Rivierenland*, 2025).

Figure 7

Spatial planning context within RES Rivierenland



Source: graph by author

6.1.2 Energy planning governance in RES Rivierenland

Government

As in the preceding analysis on spatial planning governance, this section classifies the government actor constellation by jurisdictional layer, using Steurer's (2013) second characteristic of scale.

At the European level, the EU sets goals and frameworks through hard law, such as commitments made, such as the *Paris Agreement* (2015), where the EU pledged a 55% reduction in emissions compared to 1990 levels (*Paris Agreement on Climate Change*, n.d.). While the EU provides regulatory

direction through hard regulation, it also relies on soft regulation in the form of funding mechanisms, such as the European Regional Development Fund, that help regional energy transition (*Current Funding*, n.d.).

At the national level, the Dutch Climate Agreement (Klimaatakoord, 2019) translates EU commitment into national legislation, setting binding sectoral targets. Additionally, providing economic incentives in the form of subsidies, like the SDE++, provides subsidies to businesses and non-profit organizations that create large-scale renewable energy projects or reduce CO_2 emissions (*Stimulering Duurzame Energieproductie en Klimaattransitie (SDE++)*, n.d.).

At the provincial level, Gelderland created the energy board, which exercises steering through strategic coordination instruments such as the pMIEK and GEIS. The recent pMIEK 2.0 (Provincial Multi-Year Program on Energy Infrastructure and Climate)clearly defines and centralizes the role of energy in spatial planning: “Energy becomes a co-determining factor in the spatial planning of Gelderland: In Gelderland, we position energy as one of the guiding elements for spatial planning.” (Provincie Gelderland, 2024). Principles of energy savings, decentralization with attention for the combination of local generation, local storage and local use, a diverse energy mix, stimulating civil involvement via participation and possible local ownership of generation and storage are all part of the ‘rules of the game’ that define the energy-space nexus.

The pMIEK includes the GEIS (Gelderland’s Energy-Infrastructure Program), a policy framework that evaluates projects based on three criteria: Importance within the energy system, social impact, and feasibility. Decision-making is handled by the Energy Board of Gelderland, which consists of representatives from the province, municipalities, grid operators, and other stakeholders. The Energy Board is focused on three areas: (I) accelerating, the acceleration of the execution of developments and the realization of (new) energy-infrastructure projects, (II) Integral programming, working towards a robust energy system through clear, and integral decision making about the development of the energy-infrastructure, and (III) Smart solutions, striving for solutions that use the availability of the net grid as efficient as possible (Provincie Gelderland, 2024).

These tools guide spatial prioritization and energy infrastructure alignment within the region but rely heavily on cooperation with grid operators and municipalities. The province acts as a meta-governor, coordinating action rather than enforcing rules.

Lastly, at the municipal level, most municipalities have a policy on solar energy. Policy on wind energy is more complex: three municipalities still lack a policy framework for wind energy (RES-Rivierenland, 2023).

"And that’s also the big difference between the first level of government, which is the municipality, and the provincial government, and especially the national government. In the end, something always ends up landing somewhere in the Netherlands, and that is always within a municipality. That’s where everything comes together."

(RES, personal communication, n.d.)

Market

During periods of grid congestion, market actors in Rivierenland are driven by necessity to develop creative alternative solutions to meet energy demand. Regional stakeholders pursue circularity and sustainability as a means to stimulate growth and increase employment opportunities ("Energie en Circulair," n.d.). When grid operators are unable to meet the energy demand of market actors, these actors may resort to self-regulation or enter into collaborative arrangements with energy cooperatives.

Self-regulation can take the form of a closed energy circuit, as seen in Medel. A notable example of collaboration with energy cooperatives is WattHub Geldermalsen, where electricity from Avri's solar park and the BetuweWind energy cooperative's wind turbines powers a battery system used for charging electric vehicles (admin, 2024; WattHub, n.d.).

Civil Society

Civil society of energy planning is mainly represented by NGOs and energy cooperatives. NGOs advocate for better integrated solutions and collaborations, as stated in the report on grid congestion by the ESR:

"Congestion is caused by the increasing unpredictability of supply and demand, and by the transportation of energy over longer distances. And the rise in electricity demand is yet to come. This will only succeed if we collaborate better."

(ESR, 2024)

Furthermore, active energy cooperatives, like BetuweWind, work towards a more sustainable Rivierenland. They achieve this through various sustainability projects, including energy generation through windmills and solar panel parks. Additionally, a margin of the project earnings goes towards local initiatives to improve the quality of life within the region. These initiatives aim for local electricity generation and local ownership ("Onze missie en visie" n.d.). Energy corporations work together with private market actors and grid operators to realize their projects.

Public-private co-regulation

One significant distinctive overlap of actor constellation in energy planning is the public-private partnership. The regional grid operator Liander, responsible for the low- and medium-voltage grid, is legally a corporation and functions as a private company; however, Alliander is 100% publicly owned. Its shareholders are made up of the provinces and municipalities in which it operates ("Corporate Governance," n.d.). TenneT, responsible for the high voltage grid, is legally a company as well, and publicly owned. However, TenneT is owned by the central government (*Onze Organisatie*, n.d.).

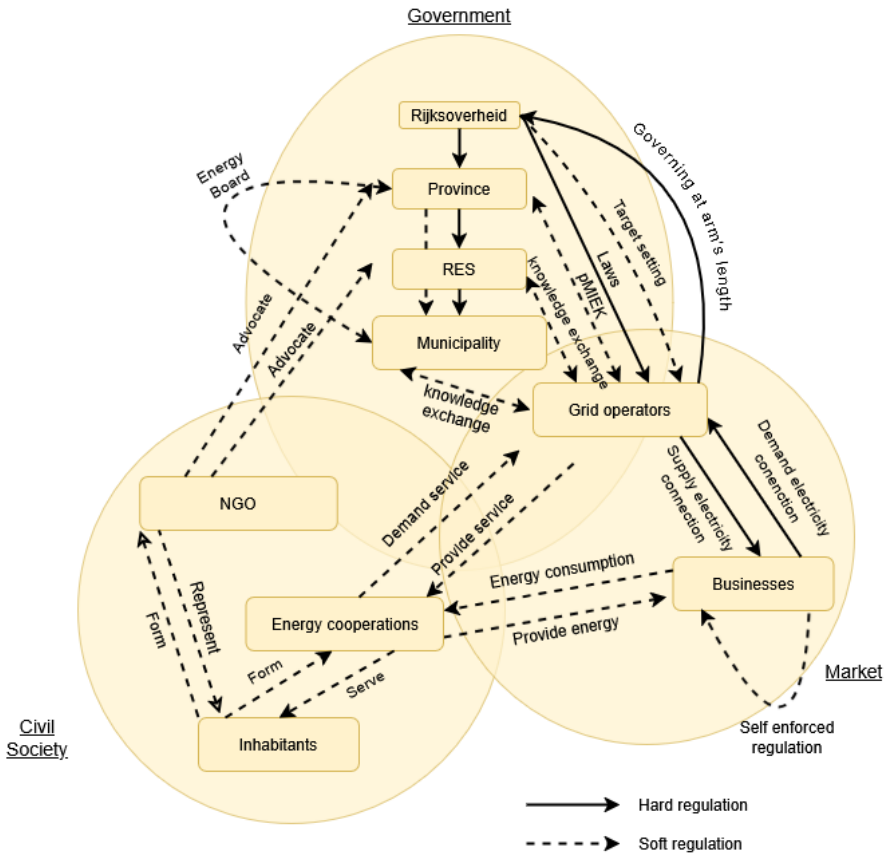
The governance of grid operators in the Netherlands exemplifies governing at arm's length. The government delegates the public task of managing electricity grids to independent companies. Although the grid operators function autonomously, the government enforces both hard and soft regulatory measures over their activities (Alliander, 2023).

Based on the preceding analysis, the energy planning landscape of the RES Rivierenland is dominated by strategic planning instruments with a strong visioning character but limited regulatory enforcement.

Documents such as Omgevingsvisie, pMIEK, GEIS, RegioArrangement, and Omgevingswet frequently articulate goals, such as integral and creative solutions, but contain limited concrete mechanisms or binding commitments, with the exception of the RES electricity generation targets assigned to each municipality.

Figure 8

The energy planning context within RES Rivierenland



Source: graph by author

6.1.3 Analyzing the differences in system context

Having mapped the governance landscape of energy and spatial planning in RES Rivierenland, the next step is to compare them side by side. Doing so will help identify the main points of convergence and friction.

As shown in the preceding analysis, spatial planning in Rivierenland is shaped by decentralized and participatory governance, with municipalities, waterboards, and regional cooperatives actively producing vision through soft, non-binding instruments like Omgevingsvisie and RegioDeals. In contrast, energy planning is embedded in a more centralized, top-down structure, guided by hard

regulatory frameworks such as the Klimaatakoord and SDE++ subsidies, with limited local steering capacity and rigid targets.

As shown in Figure 8, top-down hard-regulated energy planning, presented by bold arrows, differs from the bottom-up soft-regulated, spatial planning, represented by dotted arrows in Figure 7. Furthermore, the public-private grid operators functioning between the market and the governance form a distinct difference in governance operation, as seen in Table 6. While spatial planning involves closer ties and soft regulation within the triangle of municipality, market, and inhabitant, energy planning governance is characterized by interactions primarily between grid operators and both government and province, visualized in Figure 8.

In conclusion, the Steurer mapping identifies differences between spatial and energy planning domains. Spatial planning in RES Rivierenland is characterized by decentralized, enabling participatory and soft regulatory approaches, while energy planning is shaped by top-down, centralized, and hard-regulated structures. These characteristics are treated as general tendencies rather than fixed realities, which allows for analytical comparison between the two domains. This distinction is necessary to assess how differences in regulation, governance logic, and arrangements influence collaborative dynamics. Notably, there are cases that diverge from these general tendencies, such as the development of WattHub Geldermalsen, which will be examined in section 6.2 Collaborative dynamics.

While this analysis distinguished between the following characteristics: centralized/decentralized, rigid /enabling, and hard/soft regulation, these factors are deeply interrelated and mutually reinforcing. The following section adopts an integrative approach to examine how these dynamics unfold in practice.

Table 6

Important governance actors and types in RES Rivierenland

Actor	**Constellation**	**Governance type**
Dutch National Government	Public (national)	Public regulation (hard and soft)
Province of Gelderland	Public (provincial)	Soft co-regulation & meta-governance
Municipalities (8)	Public (local)	Public regulation & participatory co-regulation
Waterschap Rivierenland	Public (regional)	Arm's length regulation & public regulation
NGOs (e.g., Gebiedscoöperatie Rivierenland)	Civil	Civil self-organization & soft co-regulation
Energy cooperatives	Civil	Civil self-organization & private-civil co-regulation
Liander	Public-Private	Public-private co-regulation under oversight
TenneT	Public-Private	Public-private co-regulation under oversight
Businesses	Market	Self-regulation & co-regulation

6.2 Collaborative dynamics

This section of the analysis will apply the framework of collaborative dynamics formulated by Emerson et al. (2012) (see Table 2) to the three cases jointly to point out similarities and differences. Additionally, each dimension of collaborative dynamics will entail both characteristics of decentralized, enabling and soft-regulated governance, and centralized, rigid, and hard regulated.

6.2.1 Principled engagement

Discovery

The energy hub Medel interviewee stated that grid congestion was a new problem, but local actors are used to challenges like PFAS, nitrogen legislation, or other matters that forced Medel to identify challenges and develop innovative solutions (Hub 3, personal communication, n.d.).

All three energy hub interviewees mentioned the importance of the entrepreneurial spirit in discovery (Hub 1, personal communication, 2025; Hub 2, personal communication, n.d.; Hub 3, personal communication, n.d.). This theme was also mentioned by the RES chairman, who stated:

"… entrepreneurs don't just sit still; they take matters into their own hands."

(RES, personal communication, n.d.)

This finding is consistent with FruitDelta Rivierenland policy documents stating the entrepreneurial culture is above average in Rivierenland (Fruitdelta, 2022). Additionally, this is further evidenced by the participation of the VNO-NCW, which represents entrepreneurs, as a partner of RES Rivierenland and as a member of its steering board (RES Rivierenland, n.d.).

Two energy hubs mentioned 'short lines' of communication to be helpful during the discovery phase. Energy Hub West Betuwe stated that the local alderman helped link necessary actors (Hub 1, personal communication, 2025). WattHub Geldermalsen was initiated when a manager of Mekante Diek, who wanted to reinforce the local dikes sustainably, ran into the director of energy cooperative BetuweWind (Hub 2, personal communication, n.d.; *WattHub*, n.d.).

While policy documents do not directly mention 'short lines' of communication, they do aim to facilitate an environment of local engagement (RES-Rivierenland, 2023, 2025; RES-team FruitDelta Rivierenland, 2021).

Two out of three energy hubs expressed concern regarding the lack of awareness of the implications of grid congestion by grid operators (Hub 2, personal communication, n.d.; Hub 3, personal communication, n.d.). Grid operator Alliander does create "loading prognoses" based on local plans; however, the interviewee states having trouble keeping up with the discovered demand (Grid operator, personal communication, n.d.). One interviewee states the numerous prognoses and research by grid operators frustrate local stakeholders who plead for immediate action and points out there are consequences of indecisiveness when it comes to grid congestion (RES, personal communication, n.d.). This concern was also raised by Energy Hub Medel, who pointed out the incompatibility of the appointed RES targets with the grid congestion in the Netherlands.

"So it's really impossible to explain that the national government, which is ultimately responsible for ensuring sufficient capacity in our electricity system, is calling on everyone to come up with ideas that actually can't even be connected to the grid."

(Hub 3, personal communication, n.d.)

The interviewee of Liander emphasizes the efforts by the grid operator to stay in touch and inform clients (Grid operator, personal communication, n.d.). Furthermore, Liander and TenneT are formulating plans to battle grid congestion at the provincial scale through the pMIEK and informing stakeholders through congestion reports (Provincie Gelderland, 2024; TenneT, 2024).

Definition

Energy Hub Medel is part of the business park Medel. Business park Medel has formed a cooperative with mandatory membership for all businesses located at Medel. Energy Hub Medel Interviewee said this platform has been used for learning and collaboration on shared problems. Furthermore, the interviewee claimed the platform contributed to addressing grid congestion by formulating common goals and problems (Hub 3, personal communication, n.d.). The interviewees of municipality Tiel emphasized the importance of Medel's governance system for joint problem solution (Mun 1, personal communication, n.d.).

While the interviewees of Medel and the municipality of Tiel highlighted the collaborative benefits of the Medel platform, the WattHub Geldermalsen noted that diverse agendas among actors can become challenging (Hub 2, personal communication, n.d.). According to the interviewee, these different agendas can be bridged if actors are aware of each other's interests (Hub 2, personal communication, n.d.).

These findings are consistent with RES policy documents, which also promote the development of energy hubs on business parks as a strategy to seek alternative search areas and manage grid congestion (RES-Rivierenland, 2023, 2025).

The Liander interviewee stated that the definition in energy planning is often legally defined rather than collaboratively constructed (Grid operator, personal communication, n.d.). However, Liander tries to collaborate on the grid congestion issue by being actively involved with the RES program since RES 1.0 and has participated in various working groups (RES-team FruitDelta Rivierenland, 2021).

Deliberation

The interviewee of Energy Hub West Betuwe described a process in which Solinoor reached out to the public to reach an understanding of added value in the community (Hub 1, personal communication, 2025). This way, Energy Hub West Betuwe aimed to improve the approval rate of the solar panel on water and prevent a decrease in the value of the land. RES document principles of local-4-local and community are in line with reaching out to the public (RES-Rivierenland, 2023).

Both municipalities mention the role of the alderman in integral and inclusive problem solutions (Mun 1, personal communication, n.d.; RES, personal communication, n.d.). Energy Hub West Betuwe was created through the collaboration of multiple parties addressing their energy needs and the involvement of the public. This process was initiated and facilitated by the local alderman, who helped align different interests and ensure community participation (Hub 1, personal communication, 2025).

The process of connecting multiple stakeholders to form integrative solutions is a present theme in regional and municipal environmental vision (Provincie Gelderland, 2024; West Betuwe, 2025).

According to the grid operator interviewee, opportunities for deliberation are constrained by existing regulations and frameworks. The company operates under a "non-discriminatory" principle, which means it prevents making exceptions for any party, even if it seems beneficial, as it could lead to legal challenges (Grid operator, personal communication, n.d.). This is in line with EU regulation (EU, n.d.).

Determination

Local actors demonstrate the capacity for joint determination. Energy cooperative BetuweWind works together with contractors to bundle capacities (Hub 2, personal communication, n.d.). Cooperative of Medel, which includes members of both municipalities, Tiel and Neder-Betuwe, jointly looked into the possibilities of the Energy Hub after traditional grid connection was denied. This involved data sharing, optimization of energy profiles, and commitment to mandatory participation (Hub 3, personal communication, n.d.; Mun 1, personal communication, n.d.). The interviewee of Energy Hub West Betuwe believes in a step-by-step approach. This involves including stakeholders at each step, in order to reach the end goal (Hub 1, personal communication, 2025).

From the energy planning side, determination is often constrained by regulatory and institutional procedures. Grid operators, such as TenneT and Liander, must follow a strict protocol that involves technical assessment, approvals, and prioritization based on existing grid capacity (Grid operator, personal communication, n.d.). At the provincial level, the pMIEK and GEIS framework define decision-making for energy infrastructure projects, requiring compliance with criteria for feasibility, social impact, and energy system relevance (Provincie Gelderland, 2024). As a result, energy actors are constrained by institutional procedures, preventing local flexible solutions.

6.2.2 Shared motivation

Mutual trust

The energy hubs have shown various ways of building trust with other stakeholders. The interviewee of Energy Hub West Betuwe mentioned that the process of reaching out to the community and offering tangible benefits builds trust, even if not everyone agrees (Hub 1, personal communication, 2025). Additionally, Energy Hub West Betuwe gained the support of the local alderman, which helped gain trust:

"Well, then those council members also gain more confidence, because they say: 'Alright, it's not just an initiator telling a nice story, the alderman actually knows what they're talking about too.'"

(Hub 1, personal communication, 2025).

According to the interviewee of WattHub Geldermalsen, Energy cooperative BetuweWind has successfully built a portfolio of various sustainability projects, which helped gain the trust of actors such as grid operators and contractors (Hub 2, personal communication, n.d.). BetuweWind is mentioned in a RES report as a "*successful example*" and their involvement in a new project regarding energy infrastructure, confirming their trustworthiness (RES-Rivierenland, 2023, 2025).

Furthermore, the interviewee of WattHub Geldermalsen highlighted transparency as a key factor for building mutual trust (Hub 2, personal communication, n.d.). In particular, they mentioned transparency regarding organizational horizons, stating that project developers and contractors operate within a shorter, project-specific timeframe, while grid operators and energy cooperatives plan for decades (Grid operator, personal communication, n.d.; Hub 2, personal communication, n.d.).

Two of the three energy hub interviewees said they have little trust in grid operators. The interviewees of WattHub Geldermalsen and Energy Hub Medel state they have little trust in TenneT. Both interviewees criticize the fact that TenneT makes congestion reports that influence the possibilities of realizing new energy projects (TenneT, 2024). They noted that after the publication of one such report, TenneT revealed that it had found additional space on its grid. (*TenneT stelt 9 gigawatt ruimte op het hoogspanningsnet beschikbaar voor partijen op de wachtlijst*, n.d.). In line with the findings, the interviewee of municipality West Betuwe mentioned the ivory-tower-like position of TenneT (RES, personal communication, n.d.). The interviewee of Liander emphasized the increased stakeholder management to foster better relations (Grid operator, personal communication, n.d.). The interviewees of municipality Tiel also reported increased efforts of stakeholder management and communication by Liander, which increased mutual trust.

Mutual understanding

Mutual understanding experienced by the energy hubs is diverse. The interviewee of Energy Hub West Betuwe understood the difficulty of the problem of the grid operators and recognized that net congestion will take time to overcome (Hub 1, personal communication, 2025). On the contrary, the interviewee of WattHub called the grid operators out and blamed them for the grid congestion:

"No, that's not the fault of local generation, that's the fault of sitting on your [behind] for 50 years."

(Hub 2, personal communication, n.d.)

All Energy Hubs believe that mutual understanding between all involved local stakeholders is important for realizing projects. Energy Hub Medel uses its cooperative platform to reach mutual understanding (Hub 3, personal communication, n.d.). WattHub is critical of

The concern of the grid operators is national reliability (Alliander, 2023; Grid operator, personal communication, n.d.). While Liander attempts to communicate rules and possibilities, one energy hub described the work of Liander as complex and states that constant changes make it hard for local actors to keep up (Grid operator, personal communication, n.d.; Hub 3, personal communication, n.d.).

Legitimacy

According to the interviewee of Energy Hub West Betuwe, involvement and support of the local alderman helped gain legitimacy, signalling the project was in line with municipal priorities (Hub 1, personal communication, 2025). This integrative energy project aligns with the published environmental vision of the municipality, West Betuwe (West Betuwe, 2025).

The established portfolio of BetuweWind, previously mentioned in the context of mutual trust, was also perceived as contributing to their legitimacy, as stated by the Liander interviewee who recognized them as a credible actor (Grid operator, personal communication, n.d.). Additionally, the interviewee of WattHub Geldermalsen stated that their technical innovations contributed to their perceived

legitimacy. WattHub Geldermalsen had to invent non-existent technologies, like bi-directional fast chargers and smart charging software (Hub 2, personal communication, n.d.). The interviewee expressed pride in the agility and speed, noting that completing projects within a year was seen internally as demonstrating strong execution capabilities and as a factor of contributing to their legitimacy (Hub 2, personal communication, n.d.). The innovative capacity of WattHub Geldermalsen was recognized by the RES as they reported it as a "Smart contribution to avoiding grid congestion" (RES-Rivierenland, 2023).

All three Energy Hub interviewees reported a decrease in the perceived legitimacy of the grid operators, calling out the operators' lack of preparedness in accommodating decentralized energy solutions (Hub 1, personal communication, 2025; Hub 2, personal communication, n.d.; Hub 3, personal communication, n.d.). One interviewee also reported a perceived decrease in the legitimacy of national politics, due to the reversals and retroactive invalidations:

"In the Netherlands, we are quite adaptive and flexible. However, the government needs to play a role that is sufficiently serious, sufficiently visionary, and provides enough consistent predictability."

(Hub 3, personal communication, n.d.)

This experience is supported by the RES, which reported that the June 2021 ruling invalidated national wind park standards due to an incomplete environmental assessment, temporarily putting projects like Burgerwindpark A2Lage Rooijen and the overall wind strategy on hold (RES-Rivierenland, 2023).

Shared commitment

Interviewees of two Energy Hubs reported a strong sense of commitment and willingness to collaborate at the regional and local level (Hub 1, personal communication, 2025; Hub 3, personal communication, n.d.). The alderman of West Betuwe noted the willingness to cross sectors by formulating a multi-actor integrative solution, like the Energy Hub West Betuwe, which created shared commitment across various stakeholders (RES, personal communication, n.d.). Additionally, they stated municipalities see collaboration as a bitter necessity to overcome limitations in resources, body, and expertise (RES, personal communication, n.d.). These claims support the foundational concept of shared commitment present in RES Rivierenland. Where they define RES not only as a document but also as a collaboration where all actors share a sense of urgency (RES-Rivierenland, 2025). A documented RES report highlights that individual municipalities lack the means to overcome grid congestion (RES-team FruitDelta Rivierenland, 2021). However, municipalities have stated to feel little ownership of the RES region (Observation 1, 2025).

The interviewee of Liander explained that the limited grid capacity was allocated to "autonomous growth", which includes, for example, EVs, and housing:

"So, no capacity is made available for businesses. Everything that is found to be scarce goes entirely toward housing development."

(Grid operator, personal communication, n.d.)

The non-discriminatory principle and the prioritization of autonomous growth made the interviewee of Energy Hub Medel question the actual shared commitment of the grid operator to decentralized

energy solutions (Hub 3, personal communication, n.d.). RES Rivierenland has reported planned residential developments of 1440 homes annually, which indicates further autonomous growth (RES-Rivierenland, 2025). On the other hand, the interviewees of municipality Tiel had noticed an increase in stakeholder management by Liander, creating an increase in perceived shared commitment (Hub 3, personal communication, n.d.).

6.2.3 Capacity for joint action

Procedural/institutional arrangements

The interviewee of the Energy Hub West Betuwe credited the "rules of the game" set out by the municipality to realize the project (Hub 1, personal communication, 2025). Because the municipality formed their forward-thinking spatial vision accompanied by bylaws, Solinoor had no additional barriers when building solar energy on water (Hub 1, personal communication, 2025). The environmental vision of municipality West Betuwe emphasizes support for local initiatives regarding sustainable energy generation (West Betuwe, 2025). The RES report of 2021 reports that municipality West Betuwe is one of four municipalities in Rivierenland that took initiative in formulating policy regarding wind and solar energy (RES-team FruitDelta Rivierenland, 2021). The interviewee of Energy Hub West Betuwe confirms the support of the municipality, stating:

"I notice that this is what they also call 'collegial governance.' So we don't need to go to every alderman each time. If we reach an agreement with one, in our experience, they would ensure it was coordinated on their side, so to speak."

(Hub 1, personal communication, 2025)

The interviewee of WattHub Geldermalsen said the only use of the municipality was the environmental process of Environmental Impact Assessment, zoning plans, and building permits (Hub 2, personal communication, n.d.).

RES reports emphasize the need for local initiative: "This RES provides opportunities to manage the energy supply independently and to increase regional employment." (RES-team FruitDelta Rivierenland, 2021). Furthermore, the RES formulated the ambition of 50% local ownership of energy projects, supported through structures like co-operatives, funds, and direct participation (RES-Rivierenland, 2023).

Two energy hub interviewees noted that the national RES framework placed too much emphasis on energy generation without accounting for grid capacity, which they perceived as contributing to plans being difficult to implement (Hub 1, personal communication, 2025; Hub 3, personal communication, n.d.). The original RES reports did set out targets for energy generation (RES-team FruitDelta Rivierenland, 2021). Furthermore, progress reports confirm grid congestion, slowing down the realization of energy generation projects.

The Liander interviewee states that the centralized institutional arrangement operates under rigid regulations and is slow in nature (Grid operator, personal communication, n.d.). Illustratively, the interviewee of the municipality of West Betuwe said Liander's standard application times for connections can take up to 18 months or more (RES, personal communication, n.d.). The interviewee

of Energy Hub Medel noted that because grid operators are bound by the non-discriminatory principle of treating all parties with first-come-first-served, this prevents them from innovative project-specific solutions, even when technically feasible (Hub 3, personal communication, n.d.). Furthermore, the interviewee claimed that grid congestion is not purely a technical issue but an administrative decision declared by TenneT or Liander (Hub 3, personal communication, n.d.).

Interviewees of both municipalities described policies in practice operating in "silos", meaning that different policy areas are addressed separately rather than integrative (Mun 1, personal communication, n.d.; RES, personal communication, n.d.). The interviewee of municipality West Betuwe elaborates further by claiming that municipalities have the task to transform national policies into local integrative solutions:

"And that's also the big difference between the local government, the municipality, and the provincial or especially the national government: in the end, something always ends up having to land somewhere in the Netherlands, and that place is always within a municipality."

(RES, personal communication, n.d.)

Policy documents like the environmental vision of Gelderland, Rivierenland, Tiel, and West Betuwe all address the importance of integral solutions (Fruitdelta, 2023; Provincie Gelderland, 2024; Tiel, 2025; West Betuwe, 2025). However, the interviewee of WattHub Geldermalsen highlighted a perceived gap between these visionary statements and practical implementation, expressing the need for integral solutions, for instance, heat systems that combine both private and public facilities, such as schools and sports halls. (Hub 2, personal communication, n.d.). He further argued that municipalities should take a more proactive role and have the courage to take action and formulate a vision rather than waiting around (Hub 2, personal communication, n.d.).

Lastly, the interviewee of Energy Hub Medel expressed critique, noting that current legislation, with the "energie wet" in particular, does not anticipate complex energy-sharing models. According to the interviewee, such limitations hinder future advancements of decentralized energy solutions (Hub 3, personal communication, n.d.). One RES rapport recognizes a limited availability of energy-sharing models by Liander (RES-Rivierenland, 2023). The Liander interviewee states they have only time for a few pilots, further exploring the contractual, administrative, and technical challenges of these energy-sharing models (Grid operator, personal communication, n.d.).

Leadership

Local alderman of the municipality of Tiel and West Betuwe are described by a second interviewee of the municipality of Tiel as "drivers of innovation" and "forerunners" (Mun 1, personal communication, n.d.). The interviewee of the municipality confirms this by stating to actively push for integrated, local solutions, encourage dialogue, and connect different stakeholders (RES, personal communication, n.d.). Interviewee of Energy Hub West Betuwe confirmed the proactive alderman's stimulating role in getting project approval and fostering local benefits (Hub 1, personal communication, 2025). Furthermore, two interviewees of WattHub Geldermalsen and the municipality of West Betuwe credited the entrepreneurial spirit as an intrinsic drive that activates leadership within the community (see Discovery 6.2.1 Principled engagement). Specifically, the interviewee of WattHub Geldermalsen credited the intrinsic motivation of all members of BetuweWind as a crucial characteristic in

establishing the energy cooperative's credibility and recognized leadership (Hub 2, personal communication, n.d.).

Interviewees of two energy hubs and one municipality experience grid operators prioritization of a 100% reliable energy grid as robust and decreasing their perceived leadership role for context-specific decentralized energy solutions (Hub 2, personal communication, n.d.; Hub 3, personal communication, n.d.; RES, personal communication, n.d.). Additionally, the leadership role of the national government was questioned. The interviewee of the municipality of West Betuwe criticized the national government for "failing tremendously" in providing clear, consistent, and predictable long-term policy (see legitimacy 6.2.2 Shared motivation) (RES, personal communication, n.d.). Both Energy Hub West Betuwe and Medel pointed out that the lack of leadership from the national government creates uncertainty, which hinders investments (Hub 1, personal communication, 2025; Hub 3, personal communication, n.d.).

Knowledge

The interviewee of Energy Hub Medel stated, "there is no manual" for solving the current energy problems (Hub 3, personal communication, n.d.). All interviewees of the three Energy Hubs valued knowledge generation highly (Hub 1, personal communication, 2025; Hub 2, personal communication, n.d.; Hub 3, personal communication, n.d.). Two energy hubs collaborated with external partners with expertise within their own domain; Energy Hub Medel consulted Joulz, which is specialized in energy islands, and BetuweWind sought professional expertise in wind turbine construction to realize WattHub Geldermalsen (Hub 2, personal communication, n.d.; Hub 3, personal communication, n.d.). Furthermore, the Medel interviewee stated that businesses often possess more advanced knowledge in sustainability and energy business cases than government bodies, which, according to him, highlights the need for policy to catch up with market innovations (Hub 3, personal communication, n.d.). RES reports recognize that regulatory policy lags in some cases, for example, they reported solar heat and aquathermie are technologically feasible, but policy has not developed sufficiently in the Netherlands for actual implementation (RES-team FruitDelta Rivierenland, 2021).

Liander and the municipality of West Betuwe have started sharing data, enabling both municipalities and grid operators to plan the building of charging stations and other infrastructure more effectively (RES, personal communication, n.d.). Additionally, the RES steering group expressed their desire to create a shared definition of concepts such as energy cooperative (Observation 2, 2025). The Liander interviewee described the complexity of grid congestion. According to the interviewee, the effects of regional energy solutions on TenneT's high-voltage grid are hard to predict and are relatively unknown. This uncertainty and lack of knowledge lead to the strict regulatory framework in which Liander and other regional grid operators operate (Grid operator, personal communication, n.d.).

One interviewee named the RES as a platform which aims to bridge the knowledge gaps between silo's and create a shared understanding of challenges and potential integral solutions through communication of local stakeholders (Mun 1, personal communication, n.d.). The original RES rapport states that the primary goal of collaboration is to jointly acquire knowledge, share information, and gather input (RES-team FruitDelta Rivierenland, 2021). Furthermore, RES Rivierenland takes on pilots to generate new knowledge, for instance, the aquathermie project in Enspijk (RES-Rivierenland, 2025). In line with the RES Rivierenland, the interviewee of the municipality West Betuwe states to do as many pilots as possible (RES, personal communication, n.d.).

Resources

Two energy hubs have demonstrated that the time it took to realize their projects was relatively short. The Medel Energy Hub was conceived, elaborated, and contracted within one year, with engineering completed in the second year (Hub 3, personal communication, n.d.). WattHub Geldermalsen's battery charging station was opened by the king within a year of the initial concepts drawn on a beer coaster (Hub 2, personal communication, n.d.).

The progress report of the RES states that grid operators have a shortage of technical staff and materials (RES-Rivierenland, 2023). Additionally, both interviewees of energy hub Medel and municipality West Betuwe mention that while national funds are directed to grid operators to expand infrastructure, the impact of inflation makes these investments increasingly expensive the longer they are delayed (Hub 3, personal communication, n.d.; RES, personal communication, n.d.). The interviewee of Liander stated, in line with previous findings, that the current grid congestion problem is too complex and needs further analysis and planning (Grid operator, personal communication, n.d.).

6.2.4 Overall collaborative dynamics

The contrasting governance domains of spatial and energy planning shape how collaboration unfolds in practice. Spatial planning is characterized by a decentralized approach that supports locally grounded coordination, while energy planning is characterized by centralization, formal procedures, and regulatory constraints. Across the cases, several dimensions of collaboration, such as mutual trust, shared problem definition, legitimacy, and capacity for joint action, emerged as recurrent themes. Table 7 summarizes the observed findings in collaborative dynamics between the two domains.

Table 7

Observed collaborative dynamics in Energy and Spatial planning

	Spatial planning: decentralized, enabling, soft regulated	**Energy planning: Centralized, strict, hard regulated**
Principled engagement		
Discovery	Opportunity-driven, entrepreneurial, short-lines of communication. Local actors identify challenge and test solutions quickly	Challenge-driven, constrained by regulatory procedures. Grid operators perform analyses which slow down discovery
Definition	Shared meaning constructed through cooperation	Technocratic, legally defined, and reliability-driven
Deliberation	Iterative and context-specific engagement integrating local interests facilitated by alderman and municipalities	Rule-bound consultation constrained by regulations, like the non-discriminatory principle, and legal frameworks
Determination	Procedural or substantive decision realized through adaptive coordination, step-by-step planning, and local commitment	Procedural decision constrained by technical assessments, approvals, prioritization, and institutional procedures. Limited flexibility for project-specific solutions
Shared motivation		
Mutual trust	Build through proximity, transparency, iterative	Trust varies: perceived lack of policy instability and stakeholder

	collaboration, and community engagement	detachment. Some efforts to improve stakeholder relations exists
Mutual understanding	Necessity-driven shared goals foster respect for diverse local perspectives	Divergent mandates and complex regulations, and priorities hinder consistent shared understanding
Legitimacy	Enhanced by local benefits, community interaction, and technical or social innovations	Reduced by a perceived misalignment with local priorities, national policies and rigid rules
Shared commitment	Locally driven by necessity, risk-taking, and cross-sector collaboration	Institutionally constrained by rigid mandates, first-come-first-serve principle, and fragmented policy priorities. Some increase due to stakeholder management efforts
Capacity for joint action		
Institutional procedures/arrangements	Adaptive governance via cooperative frameworks, iterative implementation, and supportive municipal policy	Regulatory rigidity, sequential procedures, and slow approval processes. National frameworks define constraints.
Leadership	Proactive, entrepreneurial, local leaders connect actors and stimulate initiatives	Bureaucratic, risk-averse grid and national leadership. Lack of long-term vision and policy consistency hinder context-specific initiatives
Knowledge	Continuous learning, knowledge-sharing with local stakeholders, experimentations via pilots	Knowledge gaps due to complex grid effects uncertainty. Regulatory frameworks reinforce slow adaption
Resource	Agile, rapid deployment, effective use of local capacities	Personnel shortages, high costs, reliance on national funds. Technical and regulatory constraints limit flexible deployment.

7 Analysis

To position RES Rivierenland into the heuristic, developed by Candel (2021), this section assesses integrative and leadership and capacity, using the collaborative-dynamics findings.

7.1 Integrative capacity

Local actors demonstrate growing analytical and operational capacity. The energy hubs engage in learning-by-doing and develop “behind the meter” solutions to bypass grid limitations. Institutional arrangements like the Medel cooperative foster adaptive governance and the creation of a collaborative habitat that enables flexible planning, while energy cooperatives like BetuweWind demonstrate how civil-private collaboration can advance local sustainability projects. However, grid operators TenneT and Liander continue to operate under strict legal and procedural constraints, prioritizing planning and risk aversion over innovation. Their limited operational capacity, combined with the ambitious electricity generation goals, produces an implementation gap.

Shared trust and mutual recognition of legitimacy among local stakeholders, support collaboration and local solutions. In contrast, limited trust in and perceived lack of legitimacy of grid operators constrain cross-sector coordination and undermine integration efforts.

7.2 Integrative leadership

At the higher governmental level, political leadership to integrate domains remained weak. Siloed domains of energy, spatial planning, and others, like mobility, are present and constrain local innovation. Local leaders, such as aldermen or entrepreneurs, do attempt integrative initiatives, but are limited due to the rigid foundations of energy planning and systemic barriers. The RES steering committee, with the multi-actor composition of the 5 O's, represents an attempt to overcome siloed governance, yet the RES functions more as a thinking tank than a decision-making body.

7.3 Level of policy integration

Taken together, these dynamics suggest that RES Rivierenland practices symbolic policy integration of spatial and energy planning, rather than full integration. Integrative leadership is present within the RES, but not at higher governance levels. Local experimentation and adaptive strategies create integrative capacity, but the absence of political leadership and rigid frameworks centralized actors prevent systemic alignment across domains.

8. Discussion and recommendations

8.1 Interpretations

This study contributes to the energy transition by applying a combined framework to RES Rivierenland to analyze the potential for policy integration of spatial and energy planning, aiming for a holistic SEP approach. By carefully selecting elements of the frameworks of Candel (2021), Emerson et al. (2012), and Steurer (2013), this framework enables an integrated analysis of governance structures, collaborative dynamics, and integration conditions across both domains. Furthermore, the researcher reflects on the findings by applying Multi-Level Perspective (MLP), Multi-level Governance (MLG), and Integrative Governance (IG).

Steurer's governance framework showed how spatial planning and energy planning are characterized by contrasting logics: spatial planning is decentralized and participatory, while energy planning is centralized and technocratic. These differences explain why the integration of energy planning and spatial planning is challenging in RES Rivierenland. From an MLG perspective, this reflects the dispersion of authority across jurisdictions (Hooghe & Marks, 2020) that creates institutional complexity and competing mandates. This left municipalities and the RES body without the authority to rework planning required by the energy transition and grid congestion.

The tension between the two domains affects the collaborative dynamics on the ground. Building on Emerson et al. (2012), the findings show that principled engagement, shared motivation, and capacity for joint action are constrained. Shared motivation was weakened by ambiguity in roles, limited trust between entrepreneurs and grid operators, and the weak legitimacy of grid operators. Local actors showed creativity and entrepreneurship creating decentralized energy solutions. These efforts clashed with national-level risk-averse energy planning. This is in line with IG theory, which stresses that integrative capacity requires both an institutional structure for cross-domain coordination and the active involvement and alignment of diverse stakeholders (Lah, 2025). Notably, the GEIS and pMIEK

represent integrative attempts at the provincial level. However, they remain technocratic and miss out on local innitatives. In RES Rivierenland, these cross-domain coordination arenas were weak or absent, resulting in fragmented rather than integrative governance.

Candel's heuristic further explains these outcomes. Full policy integration requires both integrative capacity and integrative leadership. Integrative leadership was present within the energy hubs, and at the RES level, integrative capacity was lacking, particularly, the legal authority of RES Rivierenland and shared governance mechanisms. Furthermore, the knowledge and resources of grid operators are lagging due to rapid electrification and grid congestion. This confirms the integrative insight that leadership without institutional capacity rarely produces durable integration.

The MLP serves as an explanatory layer which situates the findings in a broader transition context. Energy hubs occupy the position of local "niches", experimenting with integrative solutions and generating knowledge. However, these niches clash with the socio-technical "regime" structures of centralized energy planning, which remain resistant to change or at a slower pace. The mismatch between decentralized, experimental practices and the rigid regime of energy planning explains why local initiatives, such as energy hubs, struggle to institutionalize. This suggests that failures in integration are not the result of insufficient local effort but rather of systemic regime lock-in.

This study contributes to theoretical debates on governance and energy transition in four ways. First, the study shows that fragmentation in RES Rivierenland cannot be solely explained by vertical dispersion of authority (MLG), but also by the mismatch between decentralized participatory spatial planning and centralized, technocratic energy planning (Steuer). Second, it builds on collaborative governance insights (Emerson et al.) by demonstrating that fragmentation is not only based on weak trust and ambiguous roles, but also from rigid, risk-averse energy planning procedures that constrain principled engagement. Third, it confirms empirically Candel's argument that leadership without integrative capacity leads to symbolic rather than full policy integration, illustrating how this plays out in practice. Finally, through the linking of governance perspectives with transition theory, the study links governance with transition theory, the study shows how institutional fragmentation and jurisdictional dispersion influence whether local niches such as energy hubs can scale up and influence regime dynamics, which adds a governance-sensitive dimension to transition studies.

8.2 Limitations

TenneT was not included as an interviewee. However, over the course of the research, it became clear that TenneT was a central energy actor in the region. TenneT's actions had severe implications for regional and local stakeholders. The lack of TenneT as an interviewee may have resulted in the underrepresentation of grid operators, potentially limiting the completeness of observed collaboration dynamics. Future research could benefit from including TenneT as an interviewee because of its regional impact and critical position as the national high-voltage grid operator.

Even though an objectivist epistemology was applied during the research, the focus on local decentralized solutions, in combination with the researcher at RES Rivierenland as part of an internship, may have introduced biases. The role of the researcher in this context could have

influenced the data collection methods and affected the analysis of national policy and stakeholder dynamics.

In addition, while the first step of the analysis distinguished between central/decentralized, rigid/enabling, and hard/soft regulation, these were not applied as separate analytical levels because of the degree to which they are intertwined. This choice may have resulted in limited analytical clarity or cross-case comparison.

Lastly, the semi-structured interview questions were not applied with full consistency across all interviews. During the research, deviation from the formulated questions provided unforeseen, useful individual perspectives of interviewees, resulting in new qualitative information for the analysis. However, better consistency during interviews could have resulted in a better alignment of qualitative data.

8.3 Recommendations for future research

Unpack multi-level silos

This study has shown how national, siloed policymaking hinders local integration. Future research should examine inter-ministerial dynamics and policy integration using a multi-governance lens. Researchers could interview civil servants and policy advisors at ministries like the Ministry of Economic Affairs and Climate Policy, the Netherlands Environmental Assessment Agency, or the Ministry of Infrastructure and Water Management, and analyze interdepartmental coordination structures.

Examine the strategic role of grid operators under net congestion

Grid congestion puts Liander and TenneT at the center of decision-making, yet they function independently from the government at arm's length. Future research could analyse how grid operators negotiate priorities with provinces and municipalities and what governance models improve decision-making. Case studies could be conducted in RES regions experiencing grid congestion.

Additionally, future research could examine the discrepancy between the responsibilities and capacities of grid operators owned by municipalities and provinces to better understand accountability and constraints.

Conduct a cross-regional comparison

Building on the findings of limited policy integration in RES Rivierenland, future research could conduct a comparative research across multiple RES-regions to improve generalizability. This could help distinguish the context-specific obstacles from systemic barriers in the Dutch energy and spatial planning frameworks, enhancing the generalizability of the findings.

Add mobility as a third policy domain

While e-mobility merged as a relevant dimension in some energy hubs, its integration with spatial planning and energy planning was not included due to the scope of the research, which focused on analysing the energy-spatial interactions. Cases such as WattHub and Energy Hub Neder-Betuwe show that electric mobility (e-mobility) is integrated with energy and spatial planning. Integrating a mobility governance domain could reveal new pathways towards holistic SEP. Future research could look at the

implementation of integrated hubs where energy storage, e-mobility, and spatial planning come together for improved quality of life regionally.

8.4 Recommendations for praxis

The findings of the three case studies revealed recurring themes that were crucial for the implementation of decentralized energy solutions. Based on these findings, this research offers the following recommendations to the RES Rivierenland on decentralized integral energy solutions:

Promote socially inclusive energy initiatives

In all cases, the sense of community was present and played a role in the development of the local energy hubs. These communities can take various forms, such as the cooperative in Medel, or a broader energy cooperative like BetuweWind. However, despite these legitimate efforts and growing regional awareness, civil society remains underrepresented.

To ensure a more socially inclusive energy transition, it is recommended to strengthen and expand community engagement around energy systems, particularly in small-scale projects, such as heating districts, where local involvement can be especially valuable.

Strengthen regional coordination under grid constraints

While the RES region is intended to function as a platform for integrated planning, it is not fully realized in practice. Much of the coordination still occurs at the provincial level, and integrated planning remains underdeveloped, especially when it comes to addressing grid congestion through decentralized alternatives. Recent developments, such as TenneT joining the steering board and early efforts of knowledge sharing, form a foundation for institutional learning and collaboration.

Findings suggest that strengthening cross-sectoral collaboration mechanisms could improve integration. It is recommended to build on these early efforts to strengthen and operationalize cross-sectoral collaboration mechanisms at the regional level. Institutionalize joint planning processes and platforms, and support the development of a shared definition of jargon, challenges, and goals.

Improve trust and foster reciprocal engagement

Grid operators' stakeholder relations in the region are often challenged by top-down decision-making and limited transparency. TenneT's participation in the RES Rivierenland presents an opportunity to establish a more reciprocal relationship with municipalities and other regional actors.

Based on the analysis that energy planning is often top-down, it is recommended to enhance reciprocal engagement. Ensure that stakeholder engagement by the grid operators is genuinely reciprocal, including bottom-up communication. Platforms such as the steering board create a platform where representatives of municipalities, entrepreneurs, or other local stakeholders can express their economic and social concerns regarding grid operator actions during periods of grid congestion. This can help to address legitimacy, trust issues, and foster a sense of shared commitment, thereby strengthening the quality of collaborative governance in RES Rivierenland.

Apply democratic utility principles to energy governance

Based on the findings, collaborative dynamics could improve if legitimacy issues and "ivory tower" mentality of the grid operator were addressed. One conceptual insight arises when comparing the role of the grid operators with that of the Dutch waterboards. Waterboards are regionally organized public authorities, responsible for water management, structured around democratic principles and long-term collective responsibility. In contrast to grid operators who operate as technocratic monopolies, the water boards are selected by stakeholders representing residents, agriculture, industry, and environmental interests. Additionally, water boards are allowed to make regionally specific decisions.

9. Conclusion

This chapter revisits the sub-questions that guided the analysis in order to answer the main research question.

Sub-question one: "What does spatial planning and energy planning look like in a RES region?"

Spatial planning in RES Rivierenland is characterized by decentralization and participation, through the *omgevingsvisie*. Local inhabitants and businesses play an active role, and enabling governance is central. In contrast, energy planning is more centralized, technocratic, and regulated. Grid operators take a central but rigid position governing at arm's length. This contrast in governance logics, participatory versus technocratic, shapes the context for collaboration.

Sub-question two: "How does integrative collaboration unfold within the spatial and energy planning domains?"

While local actors aim for innovative solutions for the grid congestion, centralized, rigid energy planning stakeholders slow the pace of innovation. Centralized decision-making and risk-averse reasoning hinder context-specific solutions, limiting room for experimentation beyond a few pilot projects. Collaboration dynamics experience a tension in mutual trust, shared problem definition, legitimacy, and capacity for joint action. Grid operators are understaffed and face accelerating electrification. Municipalities and their inhabitants experience the impact of congestion without perceiving accountability from grid operators.

Sub-question three: "What governance conditions support or hinder policy integration between spatial and energy planning in RES regions?"

Local experimentation and iterative strategies support integration. The RES platform facilitates dialogue. However, structural barriers remain dominant. The absence of political capacity and integrative leadership at higher levels, combined with rigid national energy frameworks and understaffed grid operators, results in symbolic policy integration. Without institutional change, integration efforts remain weak.

Answer to the main research question

The analysis of the three sub-questions contributes to answering the central research question: "To what extent are RES regions effective in integrating spatial and energy planning to address grid congestion through decentralized energy systems?"

Based on the conceptual framework, this thesis expected that if integrative leadership and integrative capacity were present, then policy integration would be more likely to occur effectively in RES Rivierenland. The findings show that elements of integrative leadership were present in local energy hubs and within the RES platform. However, integrative capacity was lacking in terms of authority, resources, and institutionalized arenas. As a result, policy integration remained symbolic. The asymmetry between decentralized, participatory spatial planning and centralized, highly regulated energy planning created friction that the RES lacked the means to resolve.

Contribution and implication

This study showed how symbolic integration unfolds in practice and highlights institutional asymmetry as the key barrier. Additionally, it reflects on collaborative governance and policy integration theory by showing that integrative leadership, while present in RES Rivierenland, cannot form full policy integration without sufficient capacity and institutional authority.

The findings suggest that RES regions can foster local innovation but cannot scale solutions without wider reform. Stronger integrative leadership at higher governance levels, harmonized regulations, and resourced grid operators are necessary to move beyond symbolic integration. Integration requires more than improved collaboration. Realignment of spatial planning and energy planning so that the domains reinforce rather than obstruct one another.

The challenge is not only to improve collaboration, but to realign governance structures so that energy planning and spatial planning reinforce each other instead of obstructing one another.

References

Ansell, C., & Gash, A. (2008). Collaborative Governance in Theory and Practice. *Journal of Public Administration Research and Theory*, *18*(4), 543–571. https://doi.org/10.1093/jopart/mum032

Bale, C. S. E., Foxon, T. J., Hannon, M. J., & Gale, W. F. (2012). Strategic energy planning within local authorities in the UK: A study of the city of Leeds. *Energy Policy*, *48*, 242–251. https://doi.org/10.1016/j.enpol.2012.05.019

Britton, J., Woodman, B., & Webb, J. (2022). Ideational bricolage as a route to transforming local institutions for heat decarbonisation: Heat networks and local government in England. *Journal of Environmental Policy & Planning*, *24*(4), 449–462. https://doi.org/10.1080/1523908X.2022.2082932

Candel, J. J. L. (2021). The expediency of policy integration. *Policy Studies*. https://www.tandfonline.com/doi/abs/10.1080/01442872.2019.1634191

De Pascali, P., & Bagaini, A. (2019). Energy Transition and Urban Planning for Local Development. A Critical Review of the Evolution of Integrated Spatial and Energy Planning. *Energies*, *12*(1), Article 1. https://doi.org/10.3390/en12010035

Dieten, S. van. (2022, September 20). Nieuw laadpleinconcept voor duurzame dijkverzwaring. *RES Rivierenland*. https://www.resrivierenland.nl/nieuw-laadpleinconcept-voor-duurzame-dijkverzwaring/

Emerson, K., Nabatchi, T., & Balogh, S. (2012). An Integrative Framework for Collaborative Governance. *Journal of Public Administration Research and Theory*, *22*(1), 1–29. https://doi.org/10.1093/jopart/mur011

Energie en Circulair. (n.d.). *VNO-NCW Midden*. Retrieved June 26, 2025, from https://www.vno-ncwmidden.nl/themas/energie-circulair-groeien/

EU. (n.d.). *Electricity grids: The backbone of the EU energy system*. Retrieved October 3, 2025, from https://www.europarl.europa.eu/doceo/document/TA-10-2025-0136_EN.html

Fruitdelta. (2022). *Fruitdelta gebiedsagenda*.

Fruitdelta. (2023). *Regioarrangement Rivierenland*.

Gailing, L., & Röhring, A. (2016). Is it all about collaborative governance? Alternative ways of understanding the success of energy regions. *Utilities Policy*, *41*, 237–245. https://doi.org/10.1016/j.jup.2016.02.009

Geels, F. W. (2011). The multi-level perspective on sustainability transitions: Responses to seven criticisms. *Environmental Innovation and Societal Transitions*, *1*(1), 24–40. https://doi.org/10.1016/j.eist.2011.02.002

Gerritsen, M. (2023). *Energy and strategic energy planning* (pp. 133–135). https://doi.org/10.4337/9781800889002.000049

Grid operator. (n.d.). *Liander* [Personal communication].

Hooghe, & Marks. (2020). *Multilevel governance*.

Hopf, T. (1998). The Promise of Constructivism in International Relations Theory. *International Security*, *23*(1), 171–200. https://doi.org/10.2307/2539267

Hub 1. (2025). *Solinoor* [Personal communication].

Hub 2. (n.d.). *WattHub Geldermalsen* [Personal communication].

Hub 3. (n.d.). *Tiel Medel* [Personal communication].

Jabareen, Y. (2006). *Sustainable Urban Forms*. https://journals.sagepub.com/doi/10.1177/0739456x05285119

Joulz. (2024). *Primeur: Zelfvoorzienend bedrijvenpark met nul op de meter*. Joulz. https://joulz.nl/nl/nieuws/zelfvoorzienend-bedrijvenpark-met-nul-op-de-meter

Kempenaar, A., Puerari, E., Pleijte, M., & van Buuren, M. (2021). Regional design ateliers on 'energy and space': Systemic transition arenas in energy transition processes. *European Planning Studies*, *29*(4), 762–778. https://doi.org/10.1080/09654313.2020.1781792

Krog, L., & Sperling, K. (2019). A comprehensive framework for strategic energy planning based on Danish and international insights. *Energy Strategy Reviews*, *24*, 83–93. https://doi.org/10.1016/j.esr.2019.02.005

Lah, O. (2025). Breaking the silos: Integrated approaches to foster sustainable development and climate action. *Sustainable Earth Reviews*, *8*(1), 1. https://doi.org/10.1186/s42055-024-00102-w

Mun 1. (n.d.). *Interview municipality* [Personal communication].

Observation 1. (2025).

Observation 2. (2025).

Provincie Gelderland. (2024). *pMIEK 2.0*.

RES. (n.d.). *Interview chair* [Personal communication].

RES-Rivierenland. (2023). *RES-Rivierenland VGRAPP*.

RES-Rivierenland. (2025). *RES VGRPAPP*.

RES-team FruitDelta Rivierenland. (2021). *REGIONALE ENERGIESTRATEGIE 1.0 FruitDelta Rivierenland*.

Schatzki, T. R. (Ed.). (2005). *The practice turn in contemporary theory* (Online-Ausg). Taylor and Francis.

Sedlacek, S., Tötzer, T., & Lund-Durlacher, D. (2020). Collaborative governance in energy regions – Experiences from an Austrian region. *Journal of Cleaner Production*, *256*, 120256. https://doi.org/10.1016/j.jclepro.2020.120256

Solinoor. (n.d.). *Innovative Energy Hubs | Solinoor Innovative Energy Solutions*. Retrieved April 16, 2025, from https://solinoor.com/solutions/innovative-energy-hubs

Sperling, K., Hvelplund, F., & Mathiesen, B. V. (2011). Centralisation and decentralisation in strategic municipal energy planning in Denmark. *Energy Policy*, *39*(3), 1338–1351. https://doi.org/10.1016/j.enpol.2010.12.006

Steurer, R. (2013). Disentangling governance: A synoptic view of regulation by government, business and civil society. *Policy Sciences*, *46*(4), 387–410. https://doi.org/10.1007/s11077-013-9177-y

Stoeglehner, G. (2020). Integrated spatial and energy planning: A means to reach sustainable development goals. *Evolutionary and Institutional Economics Review*, *17*(2), 473–486. https://doi.org/10.1007/s40844-020-00160-7

Stoeglehner, G., Niemetz, N., & Kettl, K.-H. (2011). Spatial dimensions of sustainable energy systems: New visions for integrated spatial and energy planning. *Energy, Sustainability and Society*, *1*(1), 2. https://doi.org/10.1186/2192-0567-1-2

Tiel. (2025). *Tiel VTH*.

Van Dijk, J., Wieczorek, A. J., & Ligtvoet, A. (2022). Regional capacity to govern the energy transition: The case of two Dutch energy regions. *Environmental Innovation and Societal Transitions*, *44*, 92–109. https://doi.org/10.1016/j.eist.2022.06.001

Visseren-Hamakers, I. J. (2018). A framework for analyzing and practicing Integrative Governance: The case of global animal and conservation governance. *Environment and Planning C: Politics and Space*, *36*(8), 1391–1414. https://doi.org/10.1177/2399654418788565

WattHub: Snellaadplein voor zwaar materieel! (n.d.). Watthub. Retrieved April 16, 2025, from https://watthub.nl/

West Betuwe. (2025). *West Betuwe Omgevinsvisie*.

Wretling, V., Gunnarsson-Östling, U., Hörnberg, C., & Balfors, B. (2018). Strategic municipal energy planning in Sweden – Examining current energy planning practice and its influence on comprehensive planning. *Energy Policy*, *113*, 688–700. https://doi.org/10.1016/j.enpol.2017.11.006

Appendix

Appendix 1

Conceptualization of theoretical concepts

Type of governance modes	Public regulation	Government-led regulation through laws, decrees, or soft instruments
	Civil regulation	Norms and actions led by NGOs or communities
	Private regulation	Industry or firm specific standards and internal codes
	Public-private co-regulation	Joint regulation and implementation by state and market actors
	Public-civil co-regulation	Collaboration between government and civil society in planning or project execution
	Private-civil co-regulation	Initiatives co-developed by businesses and civil society
	Tripartite co-regulation	Shared governance, involving public, private and civil actors
Principled engagement	Discovery	The revealing of individual and shared interests, concerns, and values, as well as to the identification and analysis of relevant and significant information and its implications
	Definition	The continuous efforts to build shared meaning by articulating common purpose and objectives
	Deliberation	Skillful advocacy of individual and represented interests and the effectiveness of conflict resolution strategies and interventions It requires thoughtful examination of issues, listening to others' perspectives, and coming to a public judgment on what represents the common good.
	Determinations	The processes of making enumerable joint determinations, including procedural decisions (e.g., setting agendas, tabling a discussion, assigning a work group) and substantive determinations (e.g., reaching agreements on action items or final recommendations).
Shared motivation	Mutual trust	The level of trust experienced is the development of trust, which happens over time as parties work together, get to know each other, and prove to each other that they are reasonable, predictable, and dependable.
	Mutual understanding	The ability to understand and respect others' positions and interests even when one might not agree

	Legitimacy	The confirmation that participants in a collective endeavor are trustworthy and credible, with compatible and interdependent interests, legitimizes and motivates ongoing collaboration.
	Shared commitment	Enabling of participants to cross the organizational, sectoral, and/or jurisdictional boundaries that previously separated them and commit to a shared path
Capacity for joint action	Procedural and institutional arrangements	The range of process protocols and organizational structures necessary to manage repeated interactions over time
	Leadership	The presence of leadership which can take the role of sponsor, convener, facilitator/mediator, representative of an organization or constituency, science translator, technologist, and public advocate, among others
	Knowledge	The social capital of shared knowledge that has been weighed, processed, and integrated with the values and judgments of all participants
	Resources	Resources that may include: funding, time, technical and logistical support; administrative and organizational assistance; requisite skills for analysis or implementation; and needed expertise
Heuristic	Integrative leadership	The work of integrating people, resources, and organizations across various boundaries to tackle complex public problems and achieve the common good
	Integrative capacity	The set of analytical, operational and political skills and competences necessary to perform policy functions, which can be discerned at three levels: individual, organizational, and systemic
Practice		The visible, patterned behaviors and interactions, through which actors create meaning, build trust, and coordinate action, and as the underlying social structures that shape and are reproduced through these interactions

Appendix 2

Interviews

Interview	Affiliation at the time of interview	Date	Place	Duration
1	Chairmen RES and alderman of the municipality of West Betuwe	2025-04-14	Face-to-face (Opheusden)	125 min.
2	Project manager Energy Hub Neder-Betuwe	2025-05-06	Face-to-face (Ijzendoorn)	66 min.
3	Director BetuweWind	2025-05-13	Face-to-face (Geldermalsen)	168 min.
4	Director Business park Medel	2025-05-16	Face-to-face (Tiel)	151 min.
5	Regional manager Liander	2025-05-28	Online (Microsoft Teams)	57 min.
6	Two alderman of the municipality of Tiel	2025-06-05	Face-to-face (Tiel)	54 min.

Appendix 3

Observations

Date	Meeting type	Date	Place	Duration
2025-04-03	Steering board RES Rivierenland		Office Regio Rivierenland (Tiel)	120 min.
2025-05-15	Steering board RES Rivierenland		Conference room Waterschap Rivierenland (Tiel)	120 min.