Defining Criteria to Improve Collaboration and Integration of Energy and Spatial Planning

Exploring perspectives from stakeholders in the province of Gelderland

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By

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Preface

In front of you lies my master's thesis, exploring the key criteria for integrating energy and spatial planning—a topic that was unfamiliar to me first, but has since grown into a personal interest. Over the past six months, I have learned to understand the urgency and importance of this subject, especially as it continues to gain attention in the media and public discourse. This thesis also marks the end of my Master's degree in Engineering & Policy Analysis, and with it, the end of my time as a student. My time in Delft shaped me professionally and personally, and I am grateful for the experiences and the people who became such an important part of my journey.

I would like to thank Andersson Elffers Felix (AEF) for the opportunity to conduct my thesis research with them. It was a pleasant and stimulating environment where I truly enjoyed working. I was welcomed with open arms and given the chance to gain insight into their projects and culture. I am also thankful to everyone who helped me to get in contact with the right people. A special thanks to all the people who took the time to participate in the interviews. I understand that completing the sorting process and making choices was not always easy, and I truly appreciate your openness in sharing your experiences and perspectives. Each of the 35 interviews was inspiring and invaluable—the cornerstone of this research. Without your contributions, this thesis would have been impossible.

This thesis would also not have been possible without the support, feedback, and meaningful discussions that have helped me refine my ideas and strengthen my work. First and foremost, I would like to thank my first supervisor, Ellen. Our meetings gave me a space to share my thoughts and ask questions—but more than that, they allowed me to express my feelings, and you always provided the support I needed. Having a supervisor who truly understands you makes a world of difference, and your guidance helped push this thesis to the next level. I would also like to thank my second supervisor, Leon, for his critical insights and valuable feedback at key moments. Additionally, I would like to thank Maarten van Poelgeest and Floortje Jorna from AEF. Thank you for introducing me to this topic and welcoming me into the *Energieplanologie* team. I appreciated the check-in moments, your availability for questions, interesting discussions, and your consistently positive attitude towards my research.

Finally, I want to thank my family, friends, and roommates for their constant support. You have given me new insights, helped test my interview format, engaged in thoughtful conservations when I had doubts, and reminded me to occasionally step back and take a break from the research.

This is the end of an era, and I am excited to see what the future holds!
Enjoy reading!

Doortje Bos
April 29, 2025

Summary

The capacity map of NetbeheerNL is colored red, emphasizing that there is no available transportation capacity for new connection requests in nearly all regions of the Netherlands. In other words, the electricity grid reached its maximum capacity, also called *Grid Congestion.* This results in a higher demand than supply, preventing new companies from connecting to the energy grid. The issues in the province of Gelderland are additionally worse, resulting in affecting also households by 2026. In addition to grid congestion, the energy transition is a relevant topic within the energy system. The energy system is transitioning from a traditionally centralized model to a hybrid system, incorporating both centralized and decentralized elements. This shift is accompanied by the development of a more diverse energy infrastructure, moving beyond the traditional reliance on pipelines and grids to include decentralized technologies such as solar panels, wind turbines, battery storage, and local heat networks. The energy transition has become increasingly critical due to grid congestion. The current shutdowns underscore the urgency of accelerating the energy transition to increase energy supply to meet the growing demand. These energy issues elevate the importance of integrating energy considerations into spatial planning processes: the decentral aspect of the energy transition demands more space and to combat grid congestion energy needs to become a more essential criterion in the decisions of spatial planning.

However, at the moment energy and spatial planning operate independently. Traditionally, energy is installed after developments, such as new neighborhoods, were built, resulting in delays because often the connection to the electricity grid is not possible. This is the result of the current reactive approach between the energy and spatial planning sectors. In addition, the complex stakeholder landscape makes the collaboration and integration between the two domains even more challenging. Many stakeholders across several levels and sectors are involved, leading to high fragmentation, due to cross-sectoral settings, diverse interests and objectives, distributed decision-making, and fragmented ownership and knowledge. In addition, communication is challenging as they do not understand each other and speak a different language. These aspects undermine the efficiency and effectiveness of collaboration and, therefore, improving collaboration is a crucial step toward effective integrated programming. As stakeholders must externalize their expectations and assumptions to clarify collaboration boundaries and dependencies, the objective of this research was to gain insight into stakeholder perspectives on the integration of energy and spatial planning. The goal was to identify perspectives on essential criteria to improve collaboration and ultimately facilitate the integration. Therefore, the main research question of this research was: *What are the perspectives on how to improve the integration of spatial planning and energy in Gelderland in The Netherlands?*

To define these perspectives, Q-methodology was used, where respondents were asked to sort a set of criteria while keeping the following prompt in mind: *Important for effective collaboration and integration between energy and spatial planning is….* To determine the respondents a comprehensive stakeholder analysis was conducted, which revealed the complex and dynamic aspects of the stakeholder landscape regarding this integration. It is a multi-level, multi-sector, and multi-actor issue, where acts are recently changed. Additionally, many programs are set up regarding this topic, resulting in an even more complex network by introducing additional conditions and involving an expanding array of stakeholders. Eventually, 35 respondents—14 in the spatial planning domain and 21 in the energy domain—participated in the research. They sorted 34 statements across five themes—*Governance Process*, *Governance Structure*, *Objective of Collaboration*, *Formal Roles & Responsibilities*, and *Participation & Communication*. These sorts show respondents' views regarding the importance they contribute to each criterion relative to the other ones and were analyzed to determine eventually the three perspectives.

The first perspective ("*Directive Design*") advocates for a proactive, top-down governance approach in which higher governmental bodies—national government and province—take a leading role in shaping and operationalizing strategic visions, particularly at the regional level. It emphasizes the importance of governance process and structure, and even though transparency in sharing information is essential, other criteria related to the objective of collaboration are highlighted as less important. The second perspective ("*Relational Pragmatism*") underscores the importance of informal collaboration between key actors—such as grid operators and spatial planners—in achieving effective integration. Criteria regarding the objective of collaboration—building trust, building relations, joint-fact finding—are key, emphasizing a pragmatic approach. In addition, a balance between short-term and long-term goals is essential. The national government should primarily act as a coordinator, even though formal roles and responsibilities are not viewed as essential in this perspective. The third perspective ("*Adaptive Alignment*") advocates for a

long-term, goal-oriented approach with a focus on stakeholder involvement—such as relevant stakeholders related to the specific issue. Effective communication, understanding, and trust is essential. In this perspective, the province and the grid operator are considered more influential.

Fundamental differences persist between these perspectives regarding the form, structure, and governance of this integration. The most pronounced divergences among respondents relate to governance structure, the objective of collaboration, and the distribution of roles and responsibilities. First, there is disagreement concerning stakeholder involvement. Some respondents view early and inclusive participation as essential for facilitating smoother decision-making later in the process, ensuring that diverse interests are considered upfront. Others, however, argue that broad stakeholder involvement slows down the process and complicates decision-making by introducing conflicting priorities. Second, divergence merges between short-term versus long-term approaches to integration. Some respondents highlight the urgency of addressing immediate challenges and advocate for pragmatic, short-term solutions. Others underscore that focusing on short-term fixes risks fragmentation and a lack of strategic direction, ultimately undermining long-term integration efforts. Third, there is tension over the governance approach—structured, formal governance versus informal, trust-based collaboration. Those favoring informality may feel constrained by rigid rules, while those supporting formal governance may see the informal approach as inefficient and lacking accountability. Finally, despite the consensus on the need for greater coordination, there remains significant disagreement on which level of government should take this role—the province or national government. This indicates that the respondents view the integration of energy and spatial planning differently. Those favoring national coordination, likely see the integration as a broad systemic challenge that requires uniformity, national regulation, and strategic oversight to ensure consistency across all regions. While those favoring provincial coordination believe that integration is highly context-dependent, requiring localized decision-making and flexibility to address regional differences

In addition, the research highlighted also the tension regarding the role of Grid Operators and Regional Energy Strategy (RES) Regions. Both are key stakeholders in the energy transition, with grid operators responsible for establishing future energy infrastructure and RES Regions tasked with determining the distribution of wind and solar energy within a region. However, both lack formal legislative power, making them reliant on other stakeholders while still carrying significant practical responsibilities. This governance gap adds another layer of complexity, as these stakeholders play an essential role in integration yet remain dependent on broader political and regulatory frameworks.

The perspectives also reveal some similarities: the need for a proactive approach, the importance of speaking and understanding each other language, no need for more decentralization in multiple decision-making clusters, and the importance of achieving a shared goal rather than institutional arrangements. These agreements align with how the respondents view the current situation and the accompanying challenges. A key challenge is that there is no established history or culture of collaboration between energy and spatial planning, making it difficult to transition towards intensive collaboration. Structural differences in approach, objectives, and even terminology further complicate efforts to align the two domains. Although various programs and collaborative initiatives have been launched, a lack of coordination results in more discussion than concrete action. Also, lack of responsibility exists at all levels, with stakeholders hesitant to take initiatives due to limited knowledge and capacity, unclear mandate, or lack of perceived urgency, contributing to further fragmentation.

The findings highlight the awareness of respondents to improve collaboration and integration, while they highlight the need for integration rather than specialization. They also emphasize that striving for consensus is not achievable at the moment and therefore not essential. This implies that there is an agreement that choices have to be made and things have to change and improve. And even though differences exist on how to improve it, the findings offer a structured way to facilitate discussions by highlighting areas of agreement and divergence. However, the findings of the research underscore that the integration of energy and spatial planning is highly dependent on political choices, political leadership, and political visions. These criteria determine the feasibility of integration. So, even though there is a broad agreement on the need for integration, the path forward remains uncertain due to governance disputes and political fragmentation. The research raises also the question of whether this issue is not only about improving the integration between energy and spatial planning but also about reconsidering our way of living. Maybe the current challenges require a fundamental rethinking of how our society functions and what is feasible within the spatial and energy constraints of a small country like the Netherlands.

The results of the research also determined some areas for further research. These recommendations consider expanding the scope of the research, analyzing a more in-depth cross-sector analysis including the interdependencies, and focusing more in-depth on what energy integrated into spatial planning may look like. Beyond the defined perspectives, the research confirms that the integration of energy in spatial planning is not solely a technical or procedural challenge, but a political issue, making the integration largely dictated by political considerations. Therefore, further research regarding political decision-making in energy and spatial planning would be interesting. Furthermore, further research may be interesting to determine the roles of key stakeholders without formal authorities, such as grid operators and RES regions, in a political issue. Finally, further research is interesting regarding the influence of professional background on the view of stakeholders.

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Abbreviation

ACM	Autoriteit Consument & Markt
GEA	Gelders Energieakkoord
GEIS	Gelderse Energie-Infrastructuur
GOVI	Gemeentelijke Omgevingsvisie
IPO	Interprovinciaal Overleg
LAN	Landelijk Actieprogramma Netcongestie
Ministerie KGG	Ministerie Klimaat en Groene Groei
Ministerie VRO	Ministerie Volkshuisvesting en Ruimtelijke Ordening
NOVEX	Nationale Omgevingsvisie Extra
NOVI	Nationale Omgevingsvisie
NPE	Nationaal Plan Energiesysteem
NPLW	Nationaal Programma Lokale Warmtetransitie
PBL	Planbureau voor de Leefomgeving
PEH	Programma Energiehoofdstructuur
planMER	Plannen en Programma's en de milieueffectrapportage
POVI	Provinciaal Omgevingsvisie
RES	Regionale Energie Strategie
SP IPE	Samenwerkingsprogramma Integraal Programmeren van het Energiesysteem
TVW	Transitievisie Warmte
UvW	Unie van Waterschappen
VLGG	Vitaal Landelijk Gebied Gelderland
VNG	Verenging van Nederlandse Gemeenten

Translation

Autoriteit Consument & Markt	Authority of Consumers & Markets
Gelders Energieakkoord	Gelderland Energy Agreement
Gelderse Energie-Infrastructuur	Gelderland Energy Infrastructure
Gemeentelijke Omgevingsvisie	Municipal Environmental Vision
Huis van Thorbecke	The Dutch system of decentralized government
Interprovinciaal Overleg	Interprovincial Consultation
Landelijk Actieprogramma Netcongestie	National Grid Congestion Action program
Ministerie Klimaat en Groene Groei	Ministry of Climate and Green Growth
Ministerie Volkshuisvesting en Ruimtelijke Ordening	Minsitry of Housing and Spatial Planning
Nationaal Plan Energiesysteem	National Energy System Plan
Nationaal Programma Lokale Warmtetransitie	National Local Heat Transition Program
Nationale Omgevingsvisie	National Environmental Vision
Nationale Omgevingsvisie Extra	National Environmental Vision Extra
Natuur en Milieu Gelderland	Nature and Environment Gelderland
Omgevingsvisie	Environmental Vision
Plannen en Programma's en de milieueffectrapportage	Plans and programs and the environmental impact statement
Planbureau voor de Leefomgeving	Environmental Planning Agency
Programma Energiehoofdstructuur	Energy Main Structure Program
Provinciaal Omgevingsvisie	Provincial Environmental Vision
Regioarrangementen	Regional Arrangements
Regionale Energie Strategie	Regional Energy Strategies
Ruimte voor de Rivieren	Room for the river
Samenwerkingsprogramma Integraal Programmeren van het Energiesysteem	Energy system Cooperation Program Integral Programs
Transitievisie Warmte	Transition vision Heat
Unie van Waterschappen	Union of Waterboards
Verenging van Nederlandse Gemeenten	Association of Dutch Municipalities
Vitaal Landelijk Gebied Gelderland	Vital Rural Area Gelderland
Water Bodem Sturend	Water and soil as guiding principles

1. Introduction

1.1 Context

In 2022, a temporary shutdown of the electricity grid occurred in North Brabant and Limburg because the grid had reached its maximum capacity (Volkskrant, 2023). Nowadays, the capacity map of NetbeheerNL is colored red, emphasizing that there is no available transportation capacity for new connection requests in nearly all regions of the Netherlands (Netbeheer Nederland, n.d.). In other words, the electricity grid had reached its maximum capacity, also called *Grid Congestion.* In addition to grid congestion, the energy transition is a relevant topic within the energy system. The energy system is transitioning from a traditionally centralized model to a hybrid system that incorporates both centralized and decentralized elements. This shift is accompanied by the development of a more diverse energy infrastructure, moving beyond the traditional reliance on pipelines and grids to include decentralized technologies such as solar panels, wind turbines, battery storage, and local heat networks (Ministerie van Algemene Zaken, 2024). The energy transition, driven by the goals of achieving a 50% reduction in CO2 emissions by 2030 according to the climate agreement, has become increasingly critical due to grid congestion. The current shutdowns underscore the urgency of accelerating the energy transition, to increase energy supply to meet the growing demand.

So, within the energy sector there are two issues at stake: accelerating the energy transition and combating grid congestion. First, due to the decentral aspect of the energy transition, it demands more physical space. Therefore, energy becomes also a sector with a spatial claim, highlighting the need to be integrated into spatial planning. Additionally, to combat grid congestion, energy needs to become a more essential criterion for making decisions regarding spatial planning. This therefore elevates the importance of integrating energy considerations into spatial planning processes (González & Connell, 2022). Accordingly, this research focuses on identifying stakeholders' perspectives on how to improve the integration between both sectors.

Traditionally, the energy and spatial planning sectors operate independently. Energy is typically installed after developments, such as new neighborhoods, were built. However, with the growing demands on the energy grid and the current grid congestion, this approach is no longer viable. First of all, the transition of the energy transition will ask for more space, and secondly, grid operators are due to the grid congestion not able to provide energy at all places. However, not only the energy system is asking for more space. Urgent social challenges such as the housing shortage, the quality of nature, and the transition of agriculture all have a major spatial impact (Rijksoverheid, 2020). However, space is scarce in the Netherlands. So as addressed by González & Connell (2022): "Competing land-use demands have prompted social and political challenges. Effectively addressing these issues and concerns is dependent on broad stakeholder agreement of the co-design and co-creation of assessment approaches to support participatory, accountable and transparent plan- and decision-making processes" (p. 2).

While grid operators are not effectively integrated into spatial planning yet, they have been urging the government for better energy planning, also known as *Spatial Energy Planning* (Energieplanologie) (NOS, 2022). This includes the call for greater integration between energy and spatial systems and an integral collaboration between diverse stakeholders.

As spatial and energy systems become increasingly interconnected due to grid congestion and the transition of the energy system, questions arise about how organizations should adapt to this rapidly changing environment. To date, energy availability follows the development of spatial planning. However, due to grid congestion energy considerations are becoming a determining factor in spatial planning decisions. A solution lies in adopting a more integrated approach, where stakeholders work together, understand each other's goals, and address external impacts. This stands in contrast to the current situation, where is a lack of effective collaboration and energy is treated as a sectoral issue rather than an integral part (Koelman, n.d.).

1.2 Complexity of Issue

To meet climate goals and achieve net-zero CO_2 emissions, a comprehensive transformation of the energy system—known as the energy transition—is essential. This transition requires an extensive deployment

of renewable energy sources, increased electrification, enhanced energy efficiency, and decentralized energy generation. It also calls for stronger integration across sectors, alongside new approaches in energy planning, policy-making, and infrastructure development (Dobravec et al., 2021). Beyond technological advancements, this shift emphasizes the integration of systems, such as spatial, water, and energy infrastructures, as their interdependencies are crucial for resource efficiency and sustainability (Camargo & Stoeglehner, 2018). The current grid congestion amplifies the need and the urgency for accelerating the energy transition, which in turn increases the pressure on the integration of various systems, while they depend on each other. Ensuring alignment among these interconnected elements is critical, as emphasized by Gürsan et al. (2024). However, achieving this alignment is a complex challenge, as will be further explained.

Complex issues demand collective action (Van Bueren et al., 2003), because of their multifaced causes spanning various policy areas and levels of government (Cejudo & Michel, 2017). In the context of multilevel governance, more actors are affected by the decisions concerning the design and selection of policy tools to address a problem (Howlett and Del Rio, 2015). Yet, public problems are often tackled through devolution, disaggregation, and specialization (Cejudo & Michel, 2017), which can fragment responsibility across agencies and levels, which often leads to only partial solutions to complex problems (Cejudo & Michel, 2017; Peters, 2015). Therefore, complex problems require intervention from different programs, stakeholders, and government levels—Integration.

Defining (Sectoral) Integration

(Sectorial) Integration is the move from mainly considering traditional sectors to integrating other emerging sectors (Ansong et al., 2017). It refers to the process of aligning policies, resources, and decision-making across multiple sectors to achieve a shared goal. This goal encompasses, but exceeds the programs and agencies' individual goals (Cejudo & Michel, 2017). Therefore, effective policy integration fosters collaboration by engaging a broad range of actors, establishing formal institutional arrangements, and committing adequate resources (Trein et al., 2023). Sectoral integration is critical for addressing complex, multidimensional challenges that require coordinated action across disciplines and administrative levels. Without integration, inconsistencies among policies may undermine their effectiveness, creating inefficiencies and conflicts (Broaddus, 2020). Several researches emphasize the need for integration to tackle complex challenges like environmental challenges, and policy coherence across all kinds of sectors for example the food system (Trein et al., 2023; Edwards et al., 2024). Indicating that integration is needed to tackle the complex issues within the energy and spatial domain regarding grid congestion, transition to a new energy system, and space scarcity.

Integration between Energy and Spatial Systems

The existing energy infrastructure needs to change from centralized to partly decentralized. This shift involves moving from large, centralized power plants to smaller, localized energy generation sources. While this increases energy resilience and local control, it also introduces spatial challenges. Decentralized systems require more land for technologies like wind, solar, and biomass energy, intensifying pressure on space and infrastructure (Sahoo et al., 2021). Additionally, energy installations can indirectly impact land use, such as safety zones around wind turbines.

Rising electricity demand and grid decentralization are increasing the interdependencies between energy and spatial planning, making coordinated, integrated planning essential (Dotson et al., 2022; NOS, 2023; Camargo & Stoeglehner, 2018; Hoicka et al., 2021; Liu & Dąbrowski, 2024; Stoeglehner et al., 2016). While energy infrastructure requires space, spatial planning determines where and how it can be realized. Moreover, changes in energy systems also impact economic, political, and social structures, influencing spatial organization (Liu & Dąbrowski, 2024).

Integrated planning optimizes land use, ensures resilient and sustainable systems, and balances competing demands (Stoeglehner et al., 2011; Camargo & Stoeglehner, 2018, Liu & Dabrowski, 2024; Ghodsvali et al., 2023). This approach ensures that energy policies account for spatial constraints and opportunities, while spatial policies incorporate renewable energy goals and infrastructure needs. However, suitable tools are needed to support such integration (Camargo & Stoeglehner, 2018; Ghodsvali et al., 2023).

Integration Spatial and Energy Planning in the Netherlands

The transition to a sustainable energy system in the Netherlands requires a fundamental rethinking of how spatial planning and energy planning are conceptualized and coordinated. Collaboration among

municipalities, provinces, grid operators, water boards, and the national government is essential but often hindered by competing priorities, organizational silos, and governance barriers.

Traditionally, spatial planning and energy have operated in silos, with energy considerations addressed only after new developments (e.g. housing or commercial buildings) have been planned or constructed (Van den Bragt et al., 2023; Personal Communication with an employee of Liander, [09-12-2024]). Grid operators tend to approach spatial planning from a technical standpoint, emphasizing reliability, safety, affordability, and accessibility of energy supply (VNG, n.d.). In contrast, spatial planners adopt a broader perspective, balancing energy with other societal and environmental considerations in a complex decision-making landscape (Gerritsen et al., 2023). These differences have caused coordination issues (RES, 2023a; NPRES, n.d., RES Noord-Veluwe, n.d.). For example, spatial planners' preference for solar energy, aimed at minimizing public resistance, overlooked system efficiency—exacerbating grid congestion and increasing costs (Gerritsen et al., 2023). Moreover, stakeholders often struggle with communication and misaligned expectations (Rosenbloom, 2020). Structural differences also create tension: spatial planning is decentralized and holistic, while energy is centralized and efficiency-driven (Stoeglehner, 2020).

The current reactive approach—where energy is consulted late—leads to inefficiencies and delays. Ideally, energy and spatial planning would be coordinated from the start to ensure system readiness and smooth project implementations. Grid operators seek a stronger planning role to prevent congestion, while spatial planners must balance land-use demands and energy needs. Bridging these gaps requires improving governance, knowledge-sharing, coordination, and collaboration (RES Noord-Veluwe, 2023; Dowling et al., 2023).

Some progress is being made, with grid operators and spatial planners collaborating in working groups, and initiatives like the Regional Energy Strategy (RES) promoting multi-level cooperation (Vega & van Twillert, 2023). Despite growing awareness, collaboration remains fragmented (Van den Bragt et al., 2023) and elusive. Stakeholders struggle to align goals, communicate effectively, and make joint decisions.

Challenges in Integration

Despite theoretical awareness, energy and spatial planning are rarely integrated in practice (De Pascali & Bagaini, 2018), due to siloed policy processes and risk aversion (Liu & Dąbrowski, 2024). Fragmentation persists due to cross-sectoral settings, diverse interests, distributed decision-making, and fragmented ownership and knowledge (Sonesson et al., 2021), resulting in siloed decision-making processes (Broaddus, 2020). Institutional barriers and different regulatory frameworks further hinder collaboration and policy coherence across sectors (Aubrechtová et al., 2020). Policies often address narrow issues without considering broader spatial and environmental implications.

Effective integration requires breaking down institutional barriers and fostering horizontal and vertical collaboration across sectors and government levels (Liu & Dąbrowski, 2024). Mechanisms for cooperation and stakeholder engagement are essential for adaptive and resilient policymaking (Sonesson et al., 2021; Nadin et al., 2020), though coordination across sectors and levels remains a significant challenge (Trein et al., 2023).

Integrating energy and spatial planning can be seen as a '*wicked problem*'' (Cajot et al., 2017), a complex, multifaced issue that is difficult to define and even harder to solve (Rittel and Webber, 1973). This complexity stems from the involvement of various sectors and actors across different scales, each with conflicting goals and priorities (Hofbauer et al., 2022). The evolving nature of the systems and the nature of the problem further complicates decision-making (Stoeglehner et al., 2016; Ghodsvali et al., 2023).

Sectoral Fragmentation

Sectors often operate independently, driven by different regulatory frameworks, objectives, and institutional logic. The result is a fragmented system with underdeveloped interconnections and barriers to integration (Zalloom, 2023; Cajot et al., 2017; Nowak et al., 2023; Van Bueren & Koppenjan, 2003). For example, barriers related to the spatial requirements as well as the environmental, social, and landscape impacts of renewable energy sources can hinder integration (Osorio-Aravena et al., 2020).

Diverse Stakeholders

Integration is a multi-actor process, involving a wide range of stakeholders, with varying interests, goals, and decision-making frameworks. All the different actors involved have their strategies to address a

problem, which are based on their perceptions of the problem, and its solutions therefore may differ from the views of others (Van Bueren & Koppenjan, 2003). This diversity often results in coordination challenges and institutional silos, where actors may overlook developments outside their domain (Gerritsen et al., 2023), having an impact on the integration of systems (Mooren et al., 2024).

Cross-Scale Complexity

The multi-scale nature of these systems, spanning local, regional, national, and global levels, further complicates governance (Loomans & Alkemade, 2024). Regional policymakers play a crucial role in bridging local initiatives with broader national energy goals, but regional governance structures may lack the capacity to handle this complexity (Camargo & Stoeglegner, 2018). Despite the importance of regional coordination, existing research often focuses on local or national levels, neglecting the governance challenges faced at the regional level (Hoicka et al., 2021).

Governance Structure

Governance involves coordinating multiple public and private stakeholders under formal and informal rules to balance interests and enable collaboration (Lockwood & Devenish, 2024; Endo et al., 2024; Roukounis & Tsihrintzis, 2024). Integrating systems like energy and spatial planning presents a complex governance challenge that demands effective structures (Giezen, 2018; Di Gregorio et al., 2019). These structures must accommodate the interests of these diverse stakeholders, scales, and sectors, align policy goals, and foster synergies across interconnected systems (Bodin, 2017; Mooren et al., 2024).

However, the diversity of these actors also poses governance challenges, as conflicting interests and sectoral priorities often hinder alignment (Nochta & Skelcher, 2020; Van Dijk et al., 2022). Governance models must be flexible, adapting to evolving contexts and regulatory shifts (Avoyan & Meijerink, 2020). Moving towards for example polycentric and adaptive governance models could break down structural barriers and facilitate smoother coordination, allowing for more integrated, sustainable solutions (Avoyan & Meijerink, 2020; Di Gregorio et al., 2019)

Improved Governance and Collaboration for Effective Integration

Thus, effective system integration requires strong collaboration and alignment across sectors and governance levels (Rosenbloom, 2020; Loomans & Alkemade, 2024). Cross-sector collaboration involves sharing resources, knowledge, and decision-making, resulting in outcomes beyond any single actor's preferences and enabling more adaptive, resilient policies (Zhu et al., 2019; Nadin et al., 2020). As Liu & Dąbrowski (2024) highlight both horizontal and vertical collaboration are vital to reduce fragmentation and foster coordinated, integrated policies.

Successful integration depends not just only on technical alignment, but also on governance frameworks (Hoicka et al., 2021). These frameworks provide legal mandates, institutional structures, and platforms for cooperation (Zhu et al., 2019). Improving sectoral integration calls for enhanced governance mechanisms—such as joint planning committees, shared policy frameworks, and stakeholder engagement—to align energy and spatial planning (Broaddus, 2020). Investing in collaboration could lead to better outcomes by uniting diverse actors and perspectives (Bui et al., 2023; Zhu et al., 2019).

1.3 Knowledge Gap

For a long time, the worlds of energy supply and spatial development operated independently. However, the situation has changed, necessitating the spatialization of the energy system and the alignment of spatial planning with energy logic. This brings several challenges that require integrated governance capable of managing diverse stakeholders, roles, and objectives (Lammers & Hinterleitner, 2022; Gürsan et al., 2024).

Despite recognition of the need for coordination, integration between energy and spatial planning remains underdeveloped. While existing studies highlight the importance of integrating urban planning with energy planning (Gürsan et al., 2024; Parthan et al., 2010), there remains a gap in understanding how spatial planning, which encompasses a broader perspective, can be aligned with energy planning. Moreover, research often overlooks the conditions necessary for coordinating and aligning these actors (Van Dijk et al., 2022). According to Cejudo & Michel (2017) integrating goes beyond compatibility, it requires a new mandate where actors align their decisions with overarching goals.

Governance structures play an important role in establishing integration and collaboration (Sinha et al., 2023; Bakhsh et al., 2024; Chatterjee, 2023, Van Dijk et al., 2022). However, governance approaches in energy and spatial planning remain fragmented, characterized by differing institutional structures and decision-making processes. Much of the literature focuses on technological aspects, neglecting governance issues, especially at the regional level where coordination is most complex (Mooren et al., 2024; Vazquez-Brust et al., 2020, Van Dijk et al., 2022; Sahoo et al., 2023) Additionally, current governance structures often lack the flexibility needed to address complex, long-term issues (Hölscher et al., 2022; Hoppe & Miedema, 2020; Sinha et al., 2023; Parthan et al., 2010). Silver (2023) emphasizes the importance of collaboration throughout all phases of the energy transition, not just in the initial stages, but also in implementation. However, current governance models tend to focus on early-stage collaboration, neglecting the need for sustained engagement. This highlights a critical need for further exploration and development of improved governance models.

Interdependencies between stakeholders also complicate integration and collaboration efforts. Van Bueren & Koppenjan (2003) highlight that fragmentation between sectors, scales, and stakeholders' decisions can only adequately be handled by enhancing and intensifying interactions between stakeholders. Integration relies on stakeholders' willingness to cooperate (Bodin, 2017), yet limited attention has been paid to how stakeholders can actively contribute in practice (Sonesson et al., 2021). Making expectations and assumptions explicit helps clarify collaboration boundaries and dependencies, as they become tangible, discussable, and negotiable (Radinger-Peer et al., 2022). However, institutional and cognitive barriers obstruct joint action, highlighting the need for deeper insight into actor dynamics, interests, and governance needs to support meaningful collaboration (Bodin, 2017; Levinson, 2016).

1.4 Research Objective and Relevance

The objective of this research will be to gain insight into stakeholder perspectives on the integration of energy and spatial planning, to identify essential criteria to improve collaboration, and ultimately facilitate integration. By examining several elements of governance and collaboration, including aspects such as processes, structures, responsibilities, division of roles, and knowledge, this research seeks to determine critical factors that either enable or hinder cooperation. The research will investigate whether there is common ground among stakeholders regarding their perspectives and vision, or whether conflicting ideas exist. This research is particularly relevant given that this integration is in its early stages and a clear understanding is still lacking by several stakeholders. Additionally, this research will provide a clearer understanding of the current situation of the issues, addressing the existing lack of comprehensive insight into ongoing developments and challenges.

In addition, this research also has a scientific relevance. The literature review reveals a gap in research on the governance and social dimensions of integration between energy and spatial planning. Recent studies have mostly focused on the technological aspects of energy systems and the energy transition. This research contributes to the academic literature discourse by analyzing the intersection of energy and spatial planning, identifying key criteria necessary to align these two fundamentally different domains.

This research addresses the complex, multi-actor challenges involved in integrating energy and spatial planning, aligning with the core focus of the MSc Engineering and Policy Analysis (EPA) on solving large-scale societal issues. The exploration of governance structures for integrating energy and spatial planning reflects the program's emphasis on designing policies in multi-disciplinary and complex environments. Through its focus on multi-actor collaboration, governance models, and decision-making processes, this research embodies the core principles of the EPA program.

1.5 Scope

This research focuses on the province of Gelderland, where energy and spatial challenges intersect in a complex stakeholder environment. Decision-making is complicated by the involvement of multiple governance levels with distinct interests and regulations. While a national-level scope would be too broad, Gelderland's urgency—highlighted by projected grid congestion impacting households by 2026 (IPO, 2025)—makes it a relevant case.

Gelderland faces significant challenges in its energy transition, such as shifting from natural gas to sustainable sources. Integrating diverse energy carriers—electricity, hydrogen, and heat—adds complexity due to varying infrastructure needs and stakeholder preferences. Energy-intensive sectors like brick manufacturing and greenhouse horticulture aim to adopt alternatives such as hydrogen and energy-harvesting systems. Conflicting views on wind and solar deployment further complicate planning, as some municipalities are reluctant to allocate space for these energy sources, despite the RES commitments. At the same time, rising grid congestion is accelerating the shift to district heating (NPLW, 2024), although electricity remains a more flexible option.

On the spatial side, pressures from housing development—especially in areas like Arnhem and Nijmegen—and environmental concerns such as nitrogen levels, create additional complexity. New housing projects need energy infrastructure, linking spatial planning and energy even more tightly.

These interlinked issues generate political tension and governance challenges, making Gelderland a relevant case for studying collaboration and integration of energy and spatial planning.

Current Situation

The energy grid in Gelderland, combined with Flevoland and Utrecht, is facing congestion challenges. Despite warnings from TenneT since 2021 (RES Noord-Veluwe, 2023), and new measures introduced in 2024 (TenneT, 2024), major grid expansions will not be complete until 2029 (Liander, n.d.).

Meanwhile, Gelderland faces a broader spatial puzzle: meeting goals for 100.000 new homes, achieving energy neutrality, restoring nature, and making agriculture more sustainable, all within limited spaces (Provincie Gelderland, n.d.). The GEA highlights that current goals are not being met and calls for stronger collaboration, bold initiatives, and alignment across spatial developments (Gelders Energieakkoord, 2024; Gelders Energieakkoord, 2023; FruitDelta Rivierenland, 2023).

1.6 Research Questions

What are the perspectives on how to improve the integration of spatial planning and energy in Gelderland in The Netherlands?

1. Which key stakeholders are involved in the integration of energy and spatial planning in the province of Gelderland in the Netherlands?
2. Which governance and collaboration criteria are considered most important for effective integration based on literature and experiences from other integrations?
3. What criteria for effective collaboration do stakeholders consider important in the context of spatial energy planning in the province of Gelderland in the Netherlands?
4. What is stakeholders' view on the current situation and does it influence their reasoning behind what they consider important at the moment?

1.7 Research Approach

Various analyses will be conducted to answer the sub-questions, ultimately providing a comprehensive response to the main research question. The main method conducted in this research is the Q-methodology. The Q-methodology aims to reveal the main perspectives that are favored by a particular group of participants (Watts & Stenner, 2012). The Q-methodology consists of a few steps which will be explained in more depth in Chapter 2. However, some additional research approaches will be conducted within the Q-methodology steps to answer the sub-questions (Figure 1).

First, a comprehensive stakeholder analysis will be conducted to define a carefully structured sample of respondents relevant to the issue and to answer sub-question one. Desk research will be used to identify stakeholders and their decision-making processes. Also, current programs and initiatives will be analyzed to get a better understanding of current collaborations and integration attempts.

Additionally, literature concerning governance and collaboration will be reviewed. For this literature review, several keywords are used, provided in Appendix A. These keywords were used in several databases such as Scopus, TU Delft Repository, and Google Scholar. To indicate the relevance of the literature,

inclusion criteria were applied: only publications written in English and published from 2020 and onwards were considered. When a title appears promising, the abstract is first reviewed to determine whether the full text is worth reading. Additionally, the snowballing technique was applied to identify further relevant literature. In this case, the inclusion criteria were not applied. Finally, experiences from other cross-sector integrations and evaluations of existing energy-spatial planning collaborations will be examined to answer sub-question two.

As part of the Q-methodology, structured interviews will be conducted in which respondents sort criteria based on their importance for improving integration and collaboration between energy and spatial planning. Statistical analyses will identify which criteria are generally considered important or unimportant, providing the answer to sub-question three.

To understand how respondent from both domains envision future collaboration, their perceptions of the current situation will be analyzed using interview transcripts, addressing sub-question four.

Additionally, a factor analysis will be conducted to explore whether different perspectives exist among respondents. These findings, combined with interview data, will support conclusions about these perspectives and contribute to answering the main research question.

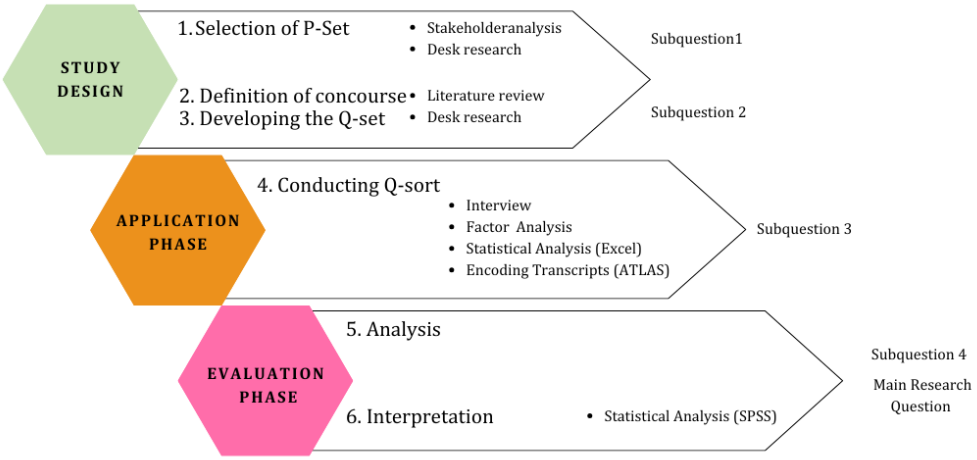

Figure 1 *Research Flow Diagram*

1.8 Structure Research

In this research, Q-methodology has been applied including several phases and steps, as illustrated in Figure 1. First, a more in-depth explanation of the methodology is provided, including both a theoretical explanation and a description tailored to this research. Chapter 3 provides the results of the comprehensive stakeholder analysis to define the key stakeholders relevant to this integration. Chapter 4 offers a literature review and desk research to define the statements underscoring important criteria for effective integration and collaboration. These results are used to perform the Q-study, which results in several factors. In Chapter 5, the final number of factors is determined. To enhance a better understanding of the situation before interpreting the factors, Chapter 6 describes the current situation based on interview insights. This context helps to clarify the reasoning of the respondents, supporting the analysis and interpretation of the identified factors in Chapter 7. These findings are then further discussed in Chapter 8, where conclusions are drawn and the main research question addressed. Finally, chapter 9 describes the research's limitations, recommendations for further research, and a reflection of the process.

2. Methodology

This chapter explains the theory of the Q-methodology, used in this research. First, it provides a general explanation of the methodology, followed by a more in-depth explanation of the steps. Besides a theoretical explanation of each step, an explanation of how this step has been applied in this research will be given.

2.1 General Context Q-methodology

Q-methodology aims to reveal the main perspectives held by a particular group of participants (Watts & Stenner, 2012). To determine these perspectives participants are asked to sort a set of statements—the Q-set—concerning the issue, resulting in Q-sorts. Here, the focus is less on the theoretical meaning of individual statements and more on how participants rank them, making the Q-sort itself the core of the analysis (Brown, 1980). The Q-sorts will be analyzed with a by-person factor analysis to identify patterns or clusters in how the statements are ranked. These clusters, supported by qualitative data from the interviews, are then interpreted and described as viewpoints, attitudes, opinions, or beliefs on the topic. Due to the combination of quantitative and qualitative method characteristics, Q methodology can be regarded as a mixed method (Dieteren et al., 2023).

Statistical Analysis

In Q methodology, the analysis focuses on identifying shared patterns of meaning among participants by using by-person correlation and factor analysis. Instead of analyzing individual statements separately, it compares the overall configurations of how participants ranked the full set of statements—their Q-sorts. These Q-sorts, are statistically compared to one another, resulting in a correlation matrix that shows the degree of similarity between each participant's sort. This matrix is then subjected to factor analysis, which to identify clusters of participants who created similar Q-sorts — in other words, participants who share a similar way of thinking about the topic. Each of these clusters is represented by a factor, which reflects a distinct viewpoint on the issue. The final step involves constructing a best-estimate Q-sort for each factor. This is an averaged Q-sort of statements based on the Q-sorts of all the participants who belong to that factor. This best-estimate Q-sort serves as a clear and interpretable representation of the particular perspective that the factor embodies.

History of Q-methodology

Q methodology invented in 1935 by William Stephenson was designed to systematically explore human subjectivity—people's viewpoints, attitudes, opinions, and beliefs on various topics (Brown 1980, McKeown & Thomas, 2013; Stephenson, 1993; Watts & Stenner, 2005, 2012). It provides a structured way to capture how different stakeholders think about a particular issue and to understand the diversity of perspectives within a group. The core tool of Q methodology is the Q-sort technique, which involves the rank-ordering of a set of statements from most agree to most disagree (Brown, 1996).

Originally used in psychology, Q-studies have also found applications in diverse disciplines, including policy research due to the ability to provide valuable insights that can inform policy-making processes (Alderson et al. 2018; Dieteren et al., 2023; Brown, 1980). The Q-methodology has been applied to several researches, such as research in environmental study (Webler et al., 2009), policy analysis (Minkman & Molenveld, 2020), the quality of participation processes (doody et al., 2009), project managers' perspectives towards collaboration in projects (Suprapto et al., 2015), transdisciplinary collaboration (Radinger-Peer et al., 2022) and has also been applied to analyzing environmental policy in the context of conflict and disagreement (Barry & Proops, 1999; Van Eeten, 2000). It is a valuable approach for exploring wicked policy problems, where multiple views coexist (Molenveld, 2020).

Why Q-Methodology

Integrating spatial planning and energy in the Netherlands reveals significant challenges rooted in diverse stakeholder perspectives, fragmented collaboration, and varying governance approaches. Q-methodology provides a compelling approach to address these complexities by systematically capturing and analyzing the different perspectives of stakeholders on governance structures, including decision-making processes and collaborative frameworks. By identifying areas of alignment and conflict, Q-methodology can offer actionable insights to refine governance strategies, enhance stakeholder collaboration, and promote a more

cohesive approach to spatial energy planning. These insights can also serve as a starting point for dialogue by making differences and similarities more visible.

Limitations
Several limitations regarding this approach must be acknowledged. First, the initial set of criteria (concourse) will be established without direct stakeholder input, which may restrict the diversity of perspectives captured. Additionally, the scope focuses on the provincial level, potentially overlooking governance dynamics at the national, local, or international levels. The research is further limited by a small sample size, inherent to Q-methodology, which might cause missing important viewpoints. This is particularly relevant given the uncertainty about whether different perspectives will be evenly distributed among participants. The study also narrows its focus to the integration of energy and spatial infrastructure, without considering other critical systems like water, transport, and construction, which could provide a more comprehensive understanding of the interdependencies. Finally, while the study does not evaluate the perspectives across a larger stakeholder sample, bias may enter through the subjective selection of statements for the Q-sort and during the factor analysis process, where methodological judgments influence the interpretation of stakeholder perspectives. This also results in limited reliability and the challenge in terms of generalizability (Thomas and Baas, 1992). So, a Q study reveals social perspectives on an issue, but cannot comment on how widely held these perspectives are in a population (Webler et al., 2009).

2.2 Steps of Q-Methodology

This research follows the basic steps as outlined by Van Exel & De Graaf (2005), with some adjustments. Notably, the P-set will be selected before defining the concourse and the Q-set, to allow for an early exploration of the stakeholder network. This helps clarify the current situation, collaborations, tensions, and ongoing initiatives. Furthermore, defining the P-set early in the process helps refine and concretize the criteria for the concourse and Q-set development. Additionally, the steps of analysis and interpretation are treated separately in this research. The interpretation phase combines Q-sort results with insights gathered from the interviews, offering a more complete understanding of stakeholder perspectives and interactions. The entire process is divided into three phases: Study design, Application phase, and Evaluation phase (Figure 2), which are further detailed in the next sections.

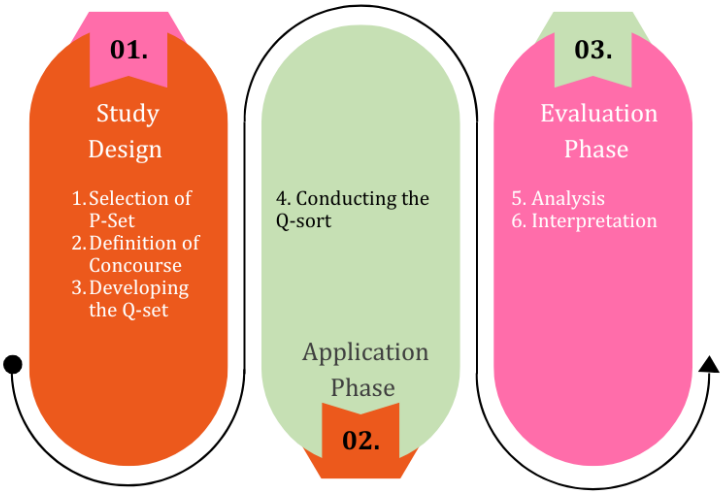

Figure 2 *Steps and Phases of Q-methodology*

2.2.1 Study Design

In the study design, the first three steps of the Q methodology will be executed—Selection of the P-set, Definition of Concourse, and Developing the Q-set.

Theory of P-Set
The P-set refers to the participants in the research, also known as the group of respondents. It is a structured sample of respondents who are theoretically relevant to the problem at hand (Brown, 1980),

potentially representing significant factors in the analysis (Brown, 1980; Webler et al., 2009.). The extensive literature review by Dieteren et al. (2023) expressed that in most cases the group of respondents is between 20 and 50.

Defining the P-set in this Research

To recruit the appropriate respondents for this research, a comprehensive stakeholder analysis is conducted, following the six-step approach from Enserink et al. (2022):1) Defining the problem and associated decision arena, 2) Identification of relevant actors, 3) Mapping the institutional landscape, 4) Identifying actor characteristics, 5) analyzing interdependencies, and 6) Evaluating the findings. Tools like Power-Interest Grid and Formal Chart supported this process.

The analysis was primarily based on desk research, which involved reviewing approximately 50 reports, articles, and policy documents. Initial insights were gathered through targeted Dutch-language search terms:"*Energieplanologie*" & "*Integratie Ruimte en Energie*". These searches led to sources from organizations such as Gebiedsontwikkeling.nu, RVO, VNG, TNO, and ROmagazine. Since this issue is a rapidly evolving issue, 20 active programs were analyzed (Appendix C), focusing on involved stakeholders, program descriptions, updates and evaluations.

Expert consultations with a spatial planner and a professional from *Integraal Programmeren* refined and validated the stakeholder selection, particularly for the province of Gelderland. This process revealed that most relevant stakeholders are currently active in the energy and spatial planning domains, possessing both high interest and influence. Given the early stage of integration and the wide range of perspectives already present within these two domains, the research focused specifically on them for feasibility and manageability.

Based on this identification of key stakeholders, the respondents were recruited. To recruit the appropriate respondents, a few connections within this field—grid operator, professional of *Integraal Programmeren*, and advisor of AEF concerning this topic—provided some suitable respondents. This resulted in a group of initially 24 potential stakeholders. In addition, all the municipalities, waterboards, the province, and RES regions in Gelderland were contacted via general contact emails. Snowball sampling was used during the interviews. In total, 35 respondents participated in the research—30 through direct outreach and 5 through the snowballing technique.

Respondent Overview & Characteristics

Table 1 provides an overview of the research's P-set. In total, 35 respondents participated in the Q-sort. The energy domain is slightly overrepresented, as shown in Figure 4. This overrepresentation, although, aligns with insights from personal communication (Personal communications with several experts, December 2024), which indicated that the energy sector feels the effects of the integration issue more than the spatial planning sector. Furthermore, the energy transition has been a priority for a longer period, meaning that many organizations and companies already have dedicated teams working on this topic. This naturally results in a larger pool of potential respondents from the energy domain. In addition, several municipalities, do not yet fully recognize the urgency of integrating energy in spatial planning, which partly explains the smaller representation from the spatial planning domain, while they were also not interested in participating.

The majority of the respondents are active in the public sector (Figure 5), aligning with the governance-heavy nature of spatial and energy planning processes.

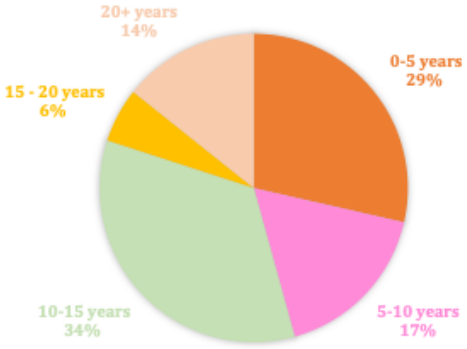

Figure 5 *Years of Work Experience in Energy and/or Spatial Planning Sector*

Figure 3 *Distribution of Domains*

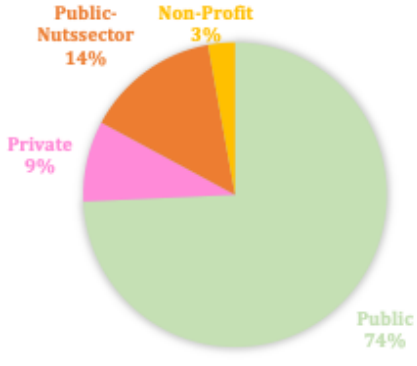

Figure *4 Distribution of Sector*

In terms of work experience, the P-set includes a wide range of professional backgrounds, including both relatively new professionals and highly experienced (Figure 3). Additionally, most respondents have project experience related to either spatial planning, energy projects, or the integration of both domains (Figure 6). This practical experience strengthens the validity of the research, as respondents will base their sorting choices also on experience, adding valuable practical insights to the research.

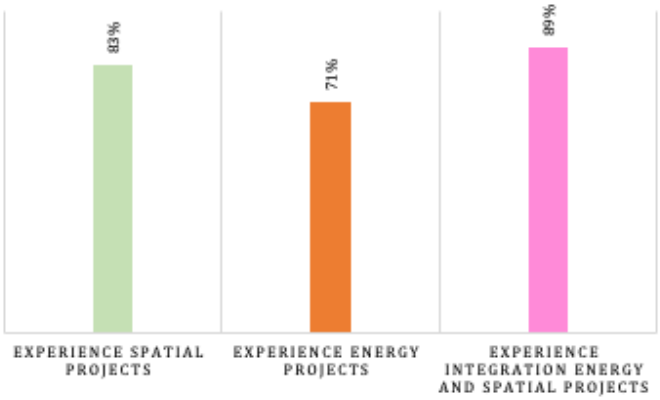

Figure 6 *Percentage of Project Experience*

The level at which respondents are active is relevant to mention. Many respondents are active across multiple levels, as shown in Figure 7. Some explanation is needed to interpret this figure: L stands for the Local level, R for the Regional level, P for the Provincial level, and N for the National level. The color of the circle indicates the number of levels a respondent is active on: Orange represents respondents active at one level, pink at two levels, green at three levels, and light orange at all four levels. The percentage reflects the proportion that operates at each of these combinations of levels of the total respondent group. This analysis confirms that all governance levels are represented in the P-set and that many respondents operate at multiple levels. This further highlights the multi-level nature of the integration challenge.

Furthermore, during the Q-sort interviews, it became clear that many respondents are active in programs. This reinforces the relevance and credibility of the P-set, as these respondents are deeply engaged in the issue at hand.

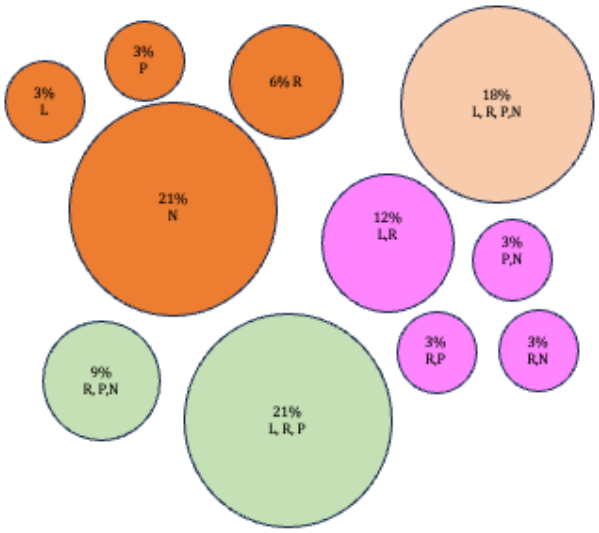

Figure 7 *Distribution of Operational Levels by Percentage*

Table 1 *Overview of Respondents*

Respondent	Domain	Sector	Level	Work Experience **	Experience Energy projects	Experience Spatial Planning projects	Experience Integrated Projects
1	Energy	Public	National	1	x		
2	Energy	Public	Local, Regional, Provincial	5	x	x	x
3	Energy	Privat	National, Provincial, Regional	1	x		x
4	Spatial	Public	National, Provincial, Regional	4		x	x
5	Energy	Non-Profit	Local, Regional, Provincial, National	3	x	x	x
6	Energy	Public	Regional	1		x	x
7	Spatial	Public	National	3	x	x	x
8	Spatial	Public	National	5	x		
9	Energy	Public	National	2	x	x	x
10	Energy	Public	Regional, Local	1	x	x	x
11	Energy	Public	Local, Regional	1			
12	Energy	Public	National, Provincial	1	x		x
13	Energy	Public Utility Sector	Local, Regional	2	x	x	x
14	Energy	Public Utility Sector	Provincial, Regional	2	x		x
15	Energy	Public	Provincial, Regional, National	2	x	x	x
16	Energy	Public Utility Sector	National	2	x		x
17*	Energy	Public	X	3	x	x	x
18	Spatial	Public	Provincial	3	x		x
19	Spatial	Public	National	1		x	x
20	Spatial	Public	Local	1	x	x	x
21	Spatial	Public	Regional, Provincial, Local	3		x	x
22	Spatial	Public	Regional, Local, Provincial	3	x	x	x
23	Spatial	Public	Local, Regional, Provincial	3	x		x
24	Energy	Public	Local, Regional	1	x	x	x
25	Energy	Public Utility Sector	Local, Regional, Provincial	3	x	x	x
26	Spatial	Private	National	3	x	x	x
27	Energy	Public	Local, Regional, Provincial, National	1	x	x	x
28	Energy	Public Utility Sector	Regional, Local, Provincial	3	x	x	x
29	Spatial	Public	Local, Regional, Provincial, National	5	x	x	x
30	Energy	Public	National, Provincial, Regional, Local	4	x	x	x
31	Energy	Public	Local, Regional, Provincial	3	x	x	x
32	Energy	Private	Local, Regional, Provincial, National	5	x	x	x
33	Spatial	Public	Local, Regional, Provincial, National	2	x	x	x
34	Spatial	Public	Regional	3			
35	Spatial	Public	Regional, National	5	x	x	x

*Due to privacy considerations, respondent 17 requested not to have their level documented

** Work Experience is coded as: 1) 0-5 years, 2) 5-10 years, 3) 10-15 years, 4) 15-20 years, 5) 20+ years.

Concourse

A concourse is a collection of all possible statements concerning a topic (Van Exel,2005). A concourse can be elicited from several sources by extensive reference to the academic literature, from both literature and public text, from formal interviews, informal discussions, and often via pilot studies.

Defining the Concourse in this Research

In this research, several sources are used to develop the concourse. First, literature on collaboration and governance—specifically Collaborative Governance, Adaptive Governance, and Polycentric Governance—was reviewed using search strings provided in Appendix A. In addition, evaluations and reports on ongoing initiatives and programs, such as the RES, PEH, and Energyboard were analyzed. In addition, other cross-sector collaboration programs in spatial planning—such as *Ruimte voor de Rivieren, Water Bodem Sturend,* and *Omgevingsvisie*—were included. These programs are examples of successful cross-sector collaboration, where waterboards became integrated with spatial planning, nature development, and other sectors such as agriculture and infrastructure.

Drawing from these sources, as well as informal interviews, observations, and desk research on Gelderland-specific issues, a concourse was developed, identifying criteria for effective integration of energy and spatial planning. The analysis resulted in 197 potential criteria. Table 2 categorizes the number of statements by source type: governance literature, current programs, other cross-sector programs, personal communication, and sources specific to Gelderland.

Table 2 *Division Number of Statements by Type of Source for Concourse*

Source Type	Count
Literature	
Collaborative governance	36
Adaptive Governance	9
Polycentric Governance	7
Current Programs & Collaborations	
RES Programs & Evaluations (RES 1.0)	33
PEH	4
Omgevingsvisies	12
Versnellingstafels	2
Energyboards	3
Regio Arrangementen	3
pMIEK	2
Handreiking Ruimtelijke Inpassing van Energie-Infra	4
Other cross-sector collaborations & Programs	
Water Bodem Sturend	24
Ruimte voor de Rivieren	28
Other	
Personal Communication	13
Gelderland Specific	17

Q-set

The defined concourse will be organized and analyzed to draw a subset of statements from it, known as the Q-set (Paige & Morin, 2014; Dieteren et al., 2023). The Q-set is a diverse collection of statements, each making a different claim about the subject matter, which participants will sort based on their personal views (Watts & Stenner, 2012). Unlike traditional surveys, statements in Q-methodology do not have fixed meanings; their value lies in how participants engage with them during the sorting process. As such, a Q-set is never really complete, it functions as a prompt for personal reflection and the expression of individual perspectives (Watts & Stenner, 2012).

Creating the Q-set from the concourse involves iterative cycles, using an inductive or deductive approach (Paige & Morin, 2014). An inductive approach draws statements from emerging themes when no guiding theory is available. A deductive approach is more structured, and based on theoretical frameworks or concepts. High-quality Q-statements, as described by Webler et al. (2009), are concise, clear, and capable of standing alone. They also contain 'excess meaning', allowing for different interpretations by different participants (Webler et al., 2009). Generally, the number of statements is between 30 and 50 statements according to the extensive literature review of Dieteren et al. (2023).

Defining the Q-set in this Research

The concourse of this research—including 197 statements—was too large, and thus had to be compromised to a manageable Q-sample. This selection process followed an inductive approach. First, the statements were sorted on similarity—duplicates were merged and grouped under broader themes using strategic sampling. Strategic sampling involves categorizing the concourse and organizing potential Q-statements within these categories (Webler et al., 2014). The themes were defined based on topics of the defined concourse. This grouping was done iteratively, with feedback incorporated throughout, ultimately resulting in a preliminary Q-set of 37 statements across five themes.

To refine this Q-set, it was evaluated by three individuals unfamiliar with the topic and one person experienced in Q methodology. They reviewed the clarity of each statement and checked for redundancy. Based on their feedback, the Q-set was revised and finalized with 34 statements. These statements were drawn from various sources described in Table 3. While some statements were extracted from multiple sources, because of the grouping process, the number of sources is higher than the number of statements.

Table 3 *Division Number of Statements by Source Type for Q-set*

Source Type	Count
Literature	
Collaborative governance	11
Adaptive Governance	2
Polycentric Governance	4
Current Programs & Collaborations	
RES Programs & Evaluations (RES 1.0)	14
PEH	3
Omgevingsvisies	7
Versnellingstafels	3
Energyboards	3
Regio Arrangementen	3
pMIEK	2
Handreiking Ruimtelijke Inpassing van Energie-Infra	3
Other cross-sector collaborations & Programs	
Water Bodem Sturend	10
Ruimte voor de Rivieren	15
Other	
Personal Communication	7
Gelderland Specific	6

2.2.2 Application

Theory

After the development of the Q-set and the P-set, the participants are asked to rank the items of the Q-set based on the condition of instruction, the Q-sorting (Yang, 2016; Brown, 1980). First, the participant performs the pre-sorting, where the participants read through all the statements to get a sense of all the statements. They place the statement into three columns: the statements they agree on, the statements they disagree on, and the statements they feel neutral or uncertain about. Afterward, the participants rank the statements ordered in a fixed quasi-normal distribution grid. Even though the shape of the distribution does not influence the results, a forced distribution delimits unnecessary work and is more convenient for respondents (Watts & Stenner, 2005).

The ranking of the items will be according to agreement, importance, or any other condition of instruction. In addition to the ranking, the respondent will explain their ranking. The resulting grid shows the value that the respondent attributes to each statement, relative to other statements.

Executing of the Q-sort in this Research

In this research, the Q-sort was conducted in the form of individual interviews, which were mostly held online via Zoom lasting around one hour. According to Van Exel (2005), interviews enable the researcher

to understand the results better and lead to more penetrating interpretations. During the interviews, the EQ Web Sort Tool was used. The project was hosted via Netlify, allowing respondents' data to be stored directly. The interview was divided into three phases. Before starting the sorting procedure, an instruction was given explaining the goal of the research and the prompt to keep in mind during the sorting (see Appendix B). While all the respondents were Dutch-speaking, the statements were translated into Dutch, to facilitate the sorting process for the respondents (see Appendix B).

Interview Method

The Q-sort was conducted in an interview form, providing the opportunity to gather additional empirical data. Interviews allow for the exploration of undocumented insights and nuances that may not be publicly available. Given the recency of the research topic, not all relevant information is accessible through literature or public sources, making interviews a key tool for data collection.

The primary aim of the interviews was to improve the understanding of the Q-sorts regarding the perceived importance of various criteria. Semi-structured interviews were conducted, incorporating open-ended questions to allow respondents to elaborate freely on their perspectives. This approach enabled a more in-depth exploration of participants' views, as recommended by Cresswell (2009) when mixing methods. In addition, respondents were encouraged to think aloud while sorting the Q-set—verbalizing their thoughts, and reasoning, sharing relevant examples of the current situation, and expressing their vision for the future.

Throughout the interviews, the researcher asked follow-up questions to clarify responses or request additional examples. These follow-up questions were not predetermined, but arose organically in response to participants'' narratives. At the end of each interview, all respondents were asked to explain their final sorting, with a particular focus on the statements they placed in the most extreme columns of the Q-grid. Additionally, as more interviews were conducted, a clearer picture emerged of the typical placement of statements across respondents. In the later interviews, this developing insight was used to deepen the interpretation process. When a respondent placed a statement significantly differently than what had been observed in earlier interviews—either on the opposite end of the scale or in stark contrast to commonly observed patterns—they were asked to elaborate on their reasoning. All interviews were recorded and transcribed with the informed consent of the respondents, enabling systemic analysis of the data, explained further in this section.

Interview Setup

1. Presorting

During the presort, respondents categorized each statement as *Agree*, *Neutral*, and *Disagree* based on its current importance for effective integration between energy and spatial planning. The respondents were asked to read every statement with the following prompt in their mind: *Important for effective collaboration and integration between energy and spatial planning is….* In addition, they were asked to consider the present phase of integration, not general importance. For example, a statement considered important in general but not relevant now was placed in the *Disagree* column. When the respondent was unsure about the statement, lacked knowledge of it, or did not want to express an opinion, the statement was placed in the *Neutral* column. There was no restriction on how many statements could be placed in each column, which was communicated clearly. Respondents provided background information, explained their reasoning, and could ask for clarification if needed.

2. Sorting

After the presorting, respondents were asked to sort the statements again in a fixed quasi-normal distribution grid (Figure 8), keeping the same prompt in mind. To support the respondents during this process, the statements were colored based on their preliminary sorting: green for *Agree,* red for *Disagree,* and gray for *Neutral.* This color-coding helped respondents by allowing them to first focus on sorting the *Agree* or *Disagree* statements, followed by the others, and finally the *Neutral* statements.

Since the grid was fixed, there was a limited number of statements that could be placed in each column. The respondents were instructed to sort the statements based on their importance in the current situation, with the most important statements placed in the +4 column and the least important in the -4 column. The vertical position of the statements within a column held no significance, and this was

communicated to the respondents. They could revise their placements throughout the process. The sorting process lasted about 20 minutes.

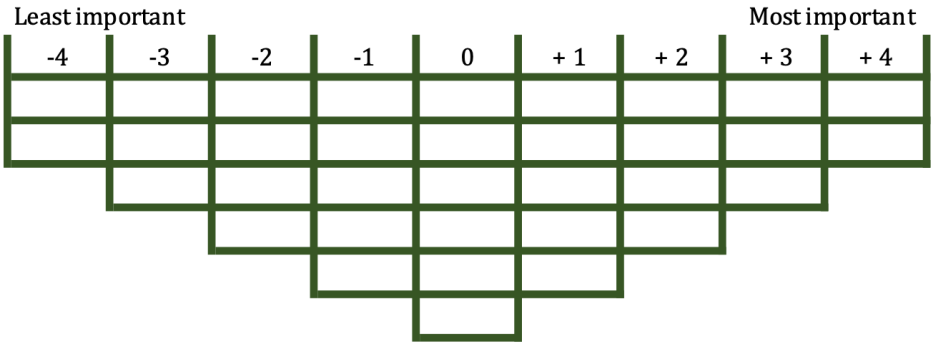

Figure 8 *Example of a Fixed Grid*

Once the respondents finalized their sorting, they were asked to explain their reasoning as explained earlier.

During the pre-sort process, stakeholders consistently placed only a few statements in the *Neutral* column and most in the *Agree* column. This suggests many criteria were seen as essential for improving collaboration and integration. Therefore, several respondents struggled with placing neutral or mildly positive criteria in the negative column but ultimately all expressed confidence in the placement of the statements in the end, especially those in the extreme columns of the Q-grid.

3. Questionnaire

Finally, the respondents were asked to complete a short questionnaire about their professional background (Appendix B). The purpose of this questionnaire was to collect data to explore how professional background characteristics might influence the perspectives identified through the Q-sort.

2.2.3 Evaluation

Theory

Data analysis in Q studies involves a series of statistical procedures (Yang, 2016). First, correlating participants' Q-sorts to reveal patterns of agreement and disagreement (Yang, 2016; Van Exel, 2005). These correlations form a matrix that is analyzed through Q-factor analysis, grouping participants based on similar sorting behavior. There are two common extraction models for the Q-factor analysis: Centroid Method and Principal Component Analysis (PCA). While the Centroid method allows for exploratory analysis and is theoretically preferred, PCA is mathematically more precise. Both tend to produce similar results (Brown, 1980). The factor analysis will result in Q-factors, representing shared viewpoints. Each Q-factor represents a particular arrangement of Q statements held by a group of participants who sorted statements in a similar way (Yang, 20160; Webler et al, 2009). If all respondents sort similarly, one dominant factor may emerge, if not, multiple or no factors may be found. Next, factor rotation, like Varimax or judgmental rotation, refines the factors for interpretability (Van Exel, 2005). The final number of factors depends on both statistical indicators and whether the factors make conceptual sense (Webler et al., 2009).

The final step, before describing and interpreting the factors, is the calculation of factor scores, or z-scores, which represent the average score of each statement by participants who define a particular factor (Van Exel, 2005). Positive z-scores indicate agreement with a statement, while negative scores reflect disagreement. These scores help identify three key outputs: extremely ranked statements (those most strongly agreed or disagreed with), distinguishing statements (which set one factor apart from others), and consensus statements (rated similarly across all factors) (Yang, 2016). Each participant is also assigned a factor loading, indicating how closely their Q-sorts align with a factor (Yang, 2016). The loading ranges from +1 and -1, indicating that the loading can be either positive or negative. This represents the respondent's sharing or rejection of the concepts of the underlying factor.

Finally, the explanations of the respondents during and after the Q-sort offer valuable context for interpreting the factors, helping to clarify the reasoning behind their ranking (Van Exel, 2005; Brown, 1980).

Evaluation Process in this Research

To analyze the Q-sorts, a factor analysis was conducted using the software KADE. PCA was chosen over the Centroid method for two key reasons: PCA is mathematically more precise, and the Centroid method showed some irregularities in the scree plot, as visible in Figure 10. There are some inexplicable drops in eigenvalues in the scree plot. For example, in the case of factor 3, the eigenvalue shows a sudden drop, and no respondents load onto this factor. However, for the following factors, the eigenvalue increases again, and respondents show significant loadings. In contrast, the scree plot produced by the PCA (see Figure 9) showed a more consistent and interpretable pattern. For these reasons, PCA was selected for this research. Although the Centroid factor analysis showed some unusual drops, there were still enough respondents loading on the other factors and there were still nuanced differences between factors, which was supported by the interview findings. Therefore, these anomalies did not affect the final results of this research.

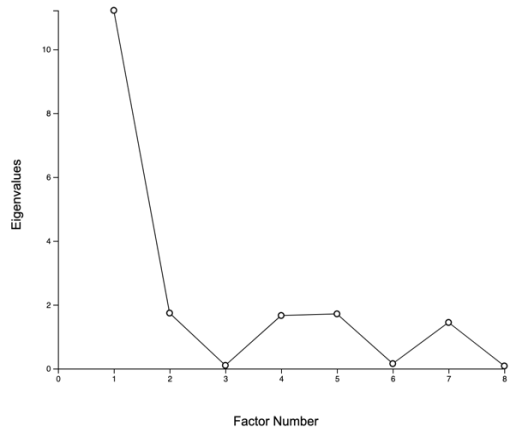

Figure 10 *Scree Plot Centroid Analysis*

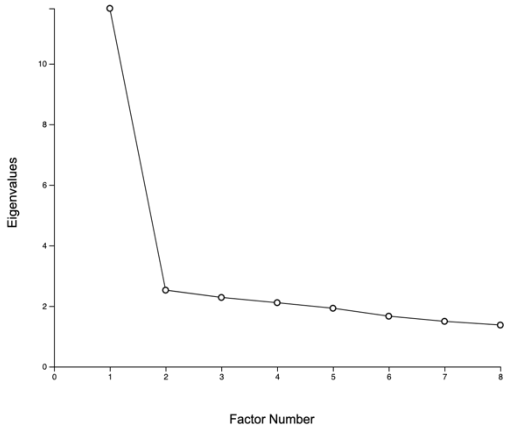

Figure 9 *Scree Plot PCA method*

After the PCA method, Varimax rotation was applied, because of its simplicity and reliability. As a widely used, automated method, Varimax maximizes variance explained by the fewest possible factors, making the analysis straightforward and transparent (Webler et al., 2009).

The number of factors was determined using quantitative and qualitative data, which will be described in more detail in Chapter 5. This resulted in three factors, which were further explored by examining distinguishing (at p 0.01), consensus, and the most extreme statements associated with each factor (both ends of the grid). This was supported by interview transcripts to enrich the interpretation and provide deeper insight into the meaning behind the factors.

In addition, some general analyses were conducted in Excel, to examine the overall distribution of statement rankings across Q-sorts. Lastly, SPSS was used for further statistical testing, including crosstab analysis and T-tests, to explore possible links between respondents' professional background characteristics and their perspectives.

Outliers

Based on the correlation matrix between the respondents, three outliers were identified (see Appendix E). A correlation was highlighted as it has a value of 40 or higher. These three respondents each showed fewer than three meaningful correlations with other respondents. In Appendix G a more detailed analysis of the findings after removing the outliers is provided. Eventually, while the structure of the factors, when keeping the outliers, was better and while two of the three outliers still had relatively high loadings on one of the factors, the decision was made to retain them in the data set.

Interview Transcripts

For the analysis, the interview transcripts obtained from Microsoft Teams were summarized, retaining key insights on the participants' views on the statements. These summaries were shared with the respondents for validation, and adjustments were made when requested to ensure accuracy and alignment with their intended meaning.

The summaries were subsequently analyzed using deductive coding in ATLAS.ti, a software tool designed to organize and code data (ATLAS.ti, n.d.). Deductive coding involves applying a predefined framework to the data to identify the presence of specific concepts or themes (ATLAS.ti, n.d.-a). In this case, the predefined statements served as the coding framework. When respondents' response addresses a particular statement, the corresponding code is applied in ATLAS.ti. Storing and organizing the data by statement in ATLAS.ti made it easier to retrieve and compare participants' responses and understand their views on statements, supporting a structured analysis to interpret the factors.

Additionally, to the statements, broader thematic codes were also used to interpret the interview data. These included codes such as "*Opinion Based on Final Sorting*," "*Current Situation*," and "*Examples*," which captured participants' reasoning, situational descriptions, and illustrative insights. The code "*Random Information*" was formalized, to capture insights that seemed interesting but questionable whether relevant for this research. These quotations were not directly linked to specific statements or sorting choices, but often related to respondents' background information or stakeholder context. The complete coding scheme, along with the frequency of each code's appearance across all interview transcripts, is presented in Appendix B.

3. Stakeholder Analysis: Selection of the P-set

For the stakeholder analysis, this research applied the steps of the Actor Analysis according to Enserink et al. (2022). These steps are also mentioned in the method chapter, Chapter 2. The results of these steps are described in this chapter. The goal of the stakeholder analysis is to define the P-set of the Q-methodology, indicating the stakeholders who are interesting in interviewing.

3.1 Recap Formulation of the Issue and Associated Decision Area

The research focuses on the integration of energy into spatial planning in the province of Gelderland. In Gelderland grid congestion is a big issue, and the demand for energy transport capacity expands faster than supply (*Kamerstuk || 2023/24, 29023, nr. 515, p. 3)*. In addition, Gelderland is falling behind in many sustainability projects and lacks the motivation to invest in renewable energy projects like wind farms (several interviews, January 2025). For example, some municipalities do not perceive the urgency of grid congestion and, therefore, do not prioritize the focus on integration (several interviews, January 2025). Also, in some municipalities' *Omgevingsvisies*, the energy transition is not mentioned, illustrating a persistent blind spot and a sectoral approach (several interviews, January 2025).

As described in the literature review, the integration of energy into spatial planning is a multi-actor issue. In Gelderland, various sectors beyond energy and spatial planning are involved in this integration due to their energy demands and the impact of the energy transition and spatial planning on their development plans. This makes the integration a more complex issue, including multiple objectives.

Furthermore, the development of an integrated decentral energy infrastructure makes the issue complex, due to the uncertainty of how the energy infrastructure of the future will look like. Different objectives exist on all the different types of energy sources, making the collaboration and integration even more challenging. In addition, the decision-making on this issue occurs at various levels—ranging from local to regional and national authorities—each with its priorities, regulations, and decision-making frameworks.

3.2 Stakeholder Identification

The identification of the stakeholders is based on Gelderland-specific issues described earlier, analysis of the current programs, and participation of stakeholders regarding energy transition, spatial planning, or integration.

Program Analysis

The analysis of current programs and visions related to spatial planning and/or energy infrastructure reveals a highly complex and fragmented landscape. Across national, provincial, regional, and local levels numerous programs are being developed and implemented. A comprehensive list of the analyzed programs and visions is provided in Appendix C.

The analysis reveals that stakeholders often participate in multiple programs simultaneously, frequently operating within overlapping networks. This can lead to an overburdening of responsibilities, and conflicting priorities, and reduces the capacity to align goals across programs. Figure 11 visualizes a program network, showing the interconnections between the analyzed programs and visions. The figure consists of programs focusing primarily on energy (orange), spatial planning (pink), and the combination of both domains (green). The programs are referred to by their abbreviations, as listed in the abbreviations list. The red connections indicate that the program NPLW has been discontinued. While the VLGG was part of the NPLW, but specific to Gelderland, it also faces issues due to a limited budget. The Energy Boards are not included in the network diagram due to a lack of available information, as they were only constituted in June 2024.

Ultimately, this program analysis underscores that the integration of energy and spatial planning relies on multi-level governance and cross-sectoral collaboration. Additionally, it confirms that it is not solely a technical or procedural challenge, but a multi-actor governance issue, requiring alignment between public authorities, grid operators, private parties, and local communities. The mapping reveals a multitude of programs addressing both spatial planning and energy, with (NP)RES and Integraal Programmeren playing a particularly prominent role in the network. Despite the growing number of programs aiming for

integration and collaboration, many remain loosely connected to others. Moreover, a cohesive, overarching strategy is still lacking. As a result, the growing number of programs may, paradoxically, complicate integration further by introducing additional conditions and involving an expanding array of stakeholders. This fragmented program landscape influences the position, interests, and relationships of stakeholders.

This mapping provides a first attempt to visually overview the program network. However, due to the sheer volume of programs and the informal nature of some collaborations, it is acknowledged that this network may not yet be fully complete. According to an interview with respondent 29 (January 2025), such a comprehensive overview is currently lacking within the governance landscape itself.

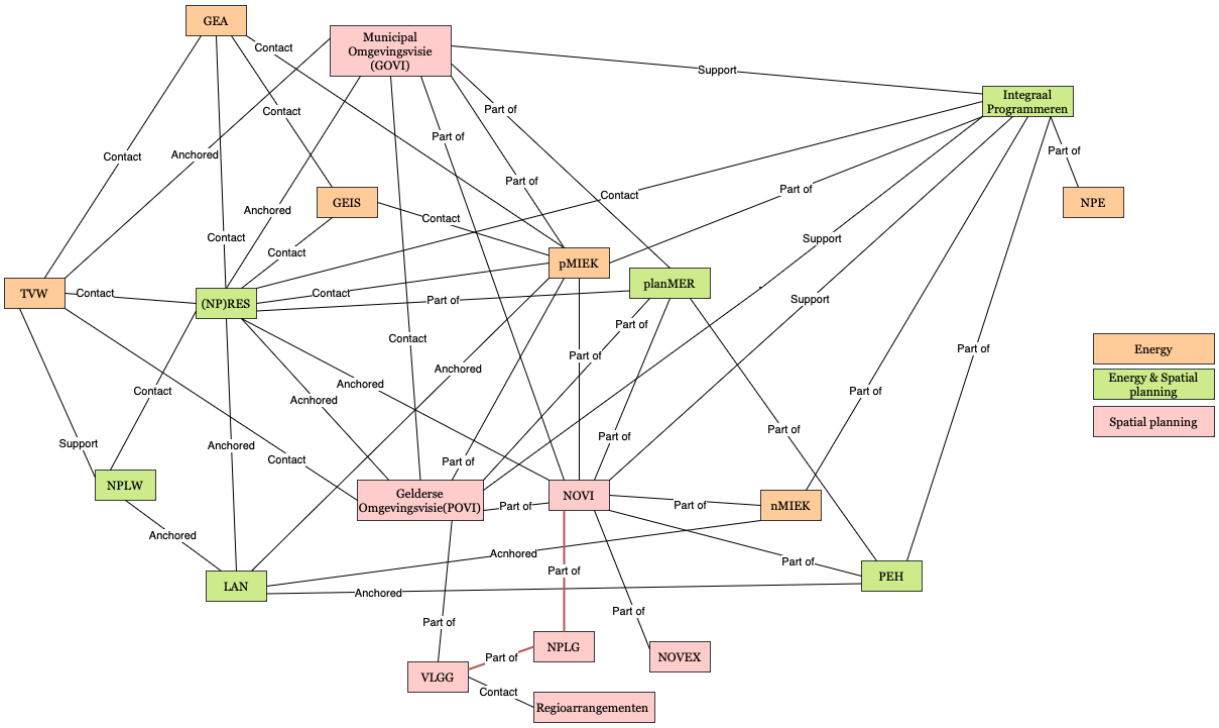

Figure 11 *Network of Programs*

Initial Stakeholder Selection

Based on the decision area and the program analysis, an initial group of stakeholders has been identified to include in the stakeholder analysis, which will be further described in this paragraph. Important to emphasize, that this is a first identification, serving as a starting point for the stakeholder analysis. The final selection of key stakeholders will be made at the end of this chapter, based on further refinement.

The initial selection of stakeholders reflects the multi-level nature of the issue, as highlighted in the program analyses. Stakeholders from national, provincial, regional, and local levels are included in this first stakeholder selection. In addition, while spatial planning inherently involves balancing diverse spatial claims of several domains, the stakeholder selection includes also stakeholders representing other sectors than energy and spatial planning. They might have competed or complementary spatial interests, so including them, ensures that the broader spatial context is considered in the stakeholder analysis. The initial selection of stakeholders is shown in Table 4.

Table 4 *Initial Stakeholder Selection*

Ministry of Climate and Green Growth (KGG)	*Association of Provincial Authorities (IPO)*	*Energy Cooperatives*
Ministry of Housing and Spatial Planning (VRO)	*Municipalities*	*Water Boards*
Netherlands Environmental Assessment Agency (PBL)	*Association of Netherlands Municipalities (VNG)*	*Association of Water Boards (UvW)*
Authority for Consumers & Markets (ACM)	*Energy Suppliers*	*Grid Operators*

Spatial Agencies	*Province of Gelderland*	*Renewable Energy Cooperatives*

In addition, three programs (Table 5) are included in the stakeholder analysis while their main focus is also on the integration of energy and spatial planning and they already bring multiple stakeholders together. Furthermore, *Integraal Programmeren* and the RES regions have a high connection rate according to the network provided (Figure 11). The NOVEX is interesting, while it is part of the *Omgevingsvisie*, but more concrete and action-focused. They therefore will play an important role in this integration issue and this research, while they might be able to provide valuable information concerning improving the collaboration and integration between energy and spatial planning.

Table 5 *Initial Program Selection*

Integraal Programmeren	*NOVEX*	*RES Regions*

3.3 Formal Positions, Rights, and Responsibilities

Enserink et al. (2022) mention the importance of mapping formal institutions, while they provide a good starting point for understanding stakeholders and their environments. Legislation and formal procedures shape the interaction and influence the behavior of parties. Therefore, in this section, the key laws and procedures will be explained to define the formal rights and duties of stakeholders. Based on the key acts and the rights and responsibilities of the stakeholders, described in Table C.2.1 in Appendix C, a formal chart (Figure 12) is designed.

Definition of Acts

In this situation there are four main acts crucial: *Klimaat Wet, Energie Wet, Wet gemeentelijke instrumenten warmtetransitie (Wgiw),* and *Omgevingswet.*

Klimaat Wet

The Dutch Climate goals are recorded in this act. Both the climate objectives and the policy framework of these climate objectives are recorded in this act (Ministerie van Infrastructuur en Waterstaat, 2024). For the implementation of this act the ministry KGG participates with governing bodies from provinces, waterboards, municipalities, and other relevant parties.

Energie Wet

This act will replace the current Electricity Act and Gas Act 1998. This act will be more focused on the energy infrastructure of the future, with more local renewable energy sources, storage, and flexibility. In addition, it will also provide more rights and protection to among others households, self-employed, and small businesses. Also, it will provide more possibilities to handle issues regarding the full electricity grid, for example by focusing on congestion management and cable pooling. Finally, it creates the possibility for people and companies to become active in the energy market by themself, for example via energy cooperation which will sell or deliver electricity generated by members (Ministerie van Economische Zaken en Klimaat, 2024).

This new act has been accepted by December 10, 2024, by the First Room. The implementation of the act will be by April 1, 2025. While this act will be implemented very soon the choice has been made to already replace the *Gas Act 1998* and *Electricity Act* with this act in the Formal chart.

Omgevingswet

This act focuses on the physical living environment. This has been implanted by January 1, 2024, and combines several old acts. The ministry VRO is responsible for this act (Ministerie van Infrastructuur en Waterstaat, 2025). This act arranges everything for the space we live and work in: the living environment. It aims to create a living environment that is healthy, safe, and pleasant. The rules provided by the act are about how we deal with nature, climate, construction, and living (IPLO n.d.-a).

Wet gemeentelijke instrumenten warmtetransitie (Wgiw)

This act gives the municipality the possibility to define local rules to transition from natural gas to sustainable sources of energy. This act implies that a municipality must set up a heating program every 5 years. With this program, they make clear which areas move away from natural gas and when and what the

possible alternatives are. This act gives the municipalities the ability to give clarity to grid operators, building owners, heat distributors, and other parties about the future heat provision of areas. Therefore, others can efficiently adjust their plans based on availability. This act will go into effect by January 1, 2026 (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2024). While it influences and changes the entire playing field and possibilities within the energy transition, this act has been included in the formal chart.

Formal Chart

According to the Dutch Constitution, *Huis van Thorbecke*, the Netherlands has three governance layers: the National Government, the provinces, and the municipalities. However, in reality, there are more, including waterboards (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020). The Netherlands is, therefore, a decentralized unitary state. This implies that the National Government has assigned several tasks to the governance layers below. However, the power of the lower governments is subordinate to the power of the National Government. In the formal chart, this governance layout has been used to define the formal position of the stakeholders.

Therefore, the relevant ministries, KGG and VRO, are positioned at the top. These ministries are responsible for defining policies, assigning tasks and responsibilities to other stakeholders, and ensuring compliance with legislation.

The Ministry KGG is responsible for the implementation and execution of energy and climate policies. It ensures that lower governments, such as provincial and municipal authorities, implement these policies correctly. Additionally, the ministry maintains formal relationships with energy-related stakeholders, including grid operators, energy suppliers, and the ACM. The KGG oversees whether grid operators and energy suppliers comply with national energy transition and climate strategy goals. Furthermore, it oversees ACM's role in accelerating the energy transition. However, the ACM functions as an independent regulatory body and is not directly affiliated with any specific ministry. ACM's responsibilities include tariff regulation for grid operators and the licensing and compliance oversight of energy suppliers, ensuring a competitive and regulated energy market (ACM, n.d.).

The ministry VRO is responsible for national spatial planning and has a formal relationship with lower government levels, such as municipalities and provinces, which are tasked with implementing its plans and policies. In addition to governmental bodies, the ministry collaborates with spatial agencies that provide research and advisory support on spatial planning policies and implementation strategies. Another significant stakeholder at the top of the formal chart is the Netherlands Environmental Assessment Agency, Planbureau Leefomgeving (PBL). The PBL operates independently from the ministries and provides impartial research and advice on environmental, spatial, and nature-related issues. The reports are utilized by the ministries to monitor and evaluate the effectiveness of policies, strategies, and outcomes (PBL, n.d.).

At the provincial level, a level lower, the province of Gelderland and the IPO play crucial roles in spatial planning and energy transition efforts. The province is responsible for tasks related to spatial planning, traffic and transport, regional economic development, and nature conservation (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020a). Under the *Omgevingswet*, the province determines whether cities and villages can expand and where industrial estates may be constructed. In addition, the province also plays a supervisory role over municipalities and water boards, ensuring compliance with spatial planning policies (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020a). Additionally, the province collaborates with stakeholders such as grid operators and the RES regions. The IPO, as an association representing all Dutch provinces, facilitates cooperation among the provinces and their engagement with stakeholders through programs such as *NOVEX* and *Integraal Programmeren,* which aim to improve coordination and collaboration on spatial planning and energy transition challenges.

A newly introduced governance layer between the province and municipalities is the RES Region. These regions develop strategic plans to achieve the Climate Goals for 2030, focusing on energy saving and renewable energy generation. Although the RES regions do not possess formal decision-making authority, their role is crucial in the energy transition process. The responsibility for decision-making remains with the national government, provinces, municipalities, and water boards (Webatleten, 2020). The RES framework is integrated into the *Omgevingswet,* reinforcing their strategic importance in linking energy and

spatial planning efforts (RES, n.d.) Despite their lack of decision-making authority, RES regions act as key facilitators in aligning the efforts of various governmental bodies.

At the lowest layer of the formal chart are the municipalities and waterboards. Municipalities are responsible for tasks that directly impact their residents. They have the authority to develop policies independently while also implementing national legislation (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020b). The municipalities also have an association for and by the municipalities, the VNG (*Vereniging van Nederlandse Gemeenten).* The municipalities must collaborate with various stakeholders, including waterboards and grid operators, as required by the *Omgevingswet* (*VNG,* n.d-b) Under the new *Wgiw Act*, municipalities are required to define heat transition programs that provide clear direction to other energy suppliers and grid operators regarding future heat supply in neighborhoods (*VNG,* 2024.) The relationship between municipalities and grid operators is characterized by formal collaboration, ensuring coordinated planning, and implementation. On the other hand, municipalities hold a hierarchical relationship with energy suppliers, as the municipalities set the regulatory framework for local heat planning within which energy suppliers must operate.

In the Dutch energy market, a distinction exists between energy suppliers and grid operators. Citizens enter into an energy contract with energy suppliers to receive electricity, while grid operators are responsible for ensuring the safe and continuous transport of electricity to end-users. Grid operators are also responsible for maintaining and expanding the grid infrastructure. According to the Energy Act, grid operators operate under ACM supervision and establish the technical and operational conditions that energy suppliers must comply with to gain access to the networks and provide services to end-users.

In addition to traditional energy suppliers, the new *Energy Act* has introduced (Renewable) Energy Cooperations, recognized as *Energiegemeenschappen* (*Energie Samen*, n.d.). These cooperatives are now able to produce, sell, and deliver electricity independently, positioning them as active participants in the electricity market. They collaborate with grid operators to distribute energy and can also partner with larger energy suppliers to complement their offerings. The municipality, under the framework of *Wgiw*, provides the necessary regulatory and infrastructural support for these cooperations to successfully execute local sustainable energy projects.

Several cooperative programs, such as *NOVEX* and *Integraal Programmeren*, serve as platforms for collaboration and integration between energy and spatial planning stakeholders, which has been promoted by the *Omgevingswet* (*Integraal Ofwel Samenhangend Werken*, n.d.).

Integraal Programmeren focuses on an integral approach across different levels—(inter)national, provincial, regional, and local—ensuring that strategic choices made at each level are harmonized. *NOVEX*, on the other hand, fosters collaboration on large-scale spatial planning challenges and incentivizes partnerships between government and private stakeholders (Volkshuisvesting en Ruimtelijke Ordening, 2022). While these programs do not have formal decision-making power, they provide a valuable opportunity for cross-sectoral cooperation and strategic alignment in the fields of energy and spatial planning.

At the bottom of the formal chart are social stakeholders, including local community organizations, interest groups, and non-governmental organizations. Although they do not have formal decision-making authority under the *Energie Wet* or the *Omgevingswet* participation is encouraged to ensure inclusive policy-making. By engaging with these stakeholders, governments, and private entities can develop well-informed and widely supported solutions that address the spatial and energy needs of communities.

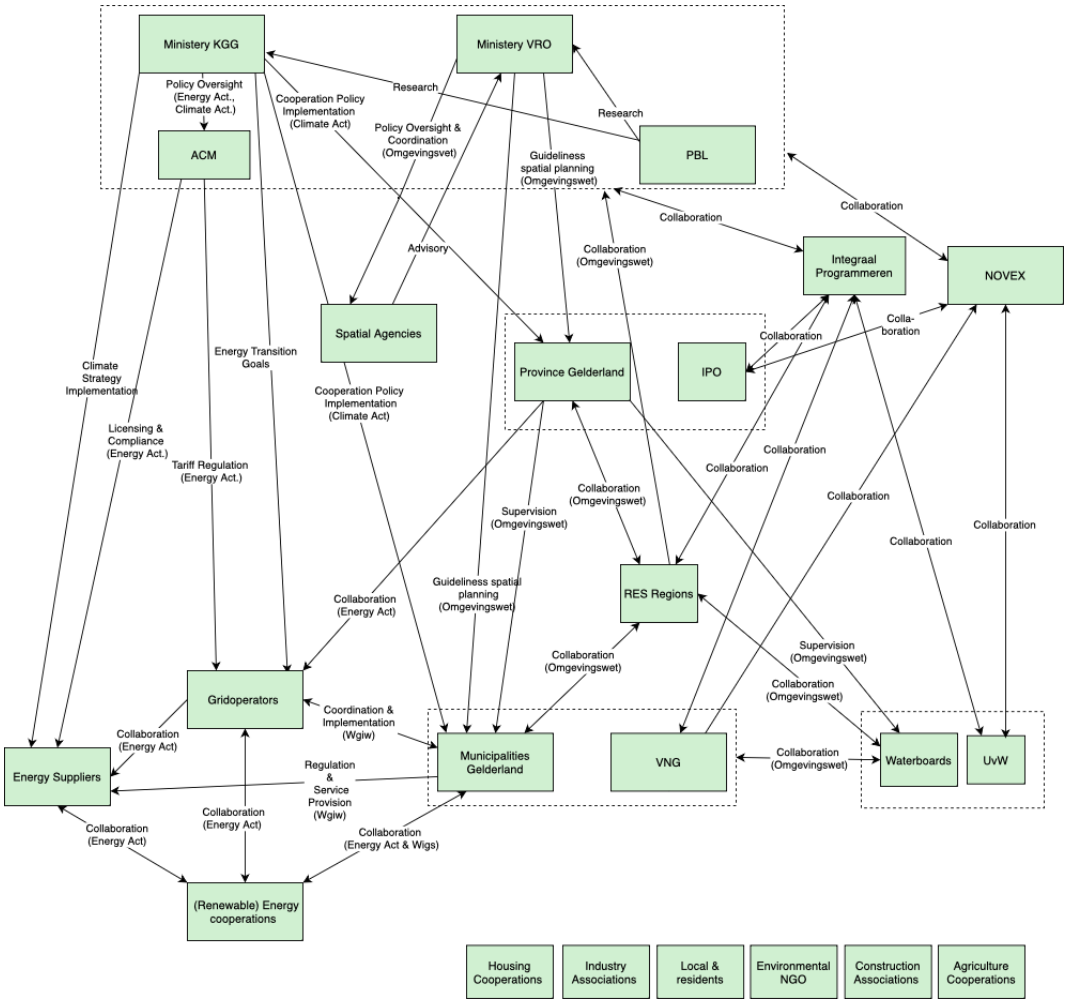

Figure 12 *Formal Diagram*

Single-sided arrows indicate a hierarchical relationship and two-sided arrows indicate formal representation relationships/membership. The dotted frames indicate clusters of actors who are all subject to a similar type of law or formal rule.

3.4 Define interest, Objective, and Perception on the Issue

Besides understanding the actor networks, also the key actor characteristics need to be analyzed. First, the interests and objectives of a stakeholder are analyzed. Interests are the issues that matter most to an actor. Interest is not directly linked to a concrete problem situation (Enserink et al., 2022). The objective indicates what actors wish to achieve in certain situations and which changes they would like to realize, or what they would like to maintain (Enserink et al., 2022). Second, the perception of the stakeholders is analyzed. Perception refers to the way a stakeholder understands, interprets, and frames a particular problem or situation.

Interest & Objective

Based on Table C.2.2 in Appendix C there are several overarching objectives and interests across the stakeholders. First, achieving climate neutrality by 2050 is a common goal across several stakeholders like ministries, provinces, municipalities, grid operators, energy suppliers, and other societal stakeholders. Second, aspects like reliability, affordability, and accessibility of the energy system are common objectives. However, within this objective, the perspectives do slightly differ, like technical versus social affordability. Third, it is widely recognized among the stakeholders that integrating energy into spatial planning is necessary. Both energy stakeholders and spatial planning stakeholders see this integration as essential, but the level of importance differs. The spatial planning stakeholders agree on the fact that it is important to balance all the different spatial claims. However, this objective is not recognized by the energy

stakeholders, who highlight the urgent position of energy in spatial planning. So, even though the objectives on the issue are in line with each other, there remain differences in the approach and the degree of integration.

Perception
Grid congestion is seen as a universally recognized cause. However, the underlying factors, such as spatial planning failures, lack of proactive policy, or insufficient collaboration differ per stakeholder. In addition, spatial misalignment is also a recurring cause across the stakeholders. The stakeholders highlight several aspects of governance structures that need to be improved, like the proactive approach, the lack of collaboration, and fragmented policies.

Based on Table C.2.3 in Appendix C, there is a difference in perceived solutions. Public stakeholders emphasize the need for governance reforms, collaborative planning, and improved integration. However, the stakeholders in the energy domain, like grid operators and energy suppliers, prefer faster, clearer, and more technically sound spatial planning processes. In addition, the social stakeholders emphasize that solutions need to be more transparent, and fair, and take into account environmental and social values.

So, there is a misalignment between more technical-economic players, like grid operators and energy suppliers, and the social/environmental players, like the NGOs and most social groups. Where technical-economic stakeholders view energy as an infrastructure and system optimization challenge, the social-environmental stakeholders view energy as a societal transformation challenge, one that touches on justice, democracy, and environmental ethics. This emphasizes a governance tension between efficiency and inclusiveness, while this influences their objective of the collaboration. One side is asking for speed and certainty, and the other side is asking for inclusion and carefulness.

So, there is an overlap in objectives and perceptions, however, it became clear that the integration of energy and spatial planning is not just a technical coordination challenge, but also a political and governance challenge. The technical challenges are intertwined with governance, spatial quality, and social objectives like environmental protection, making clear why the integration between energy and spatial planning is difficult in practice.

3.5 Power/Interest Grid

A Power/Interest grid (P/I Grid) helps to categorize stakeholders based on their ability to influence the integration of energy into spatial planning and their level of interest in the issue. Based on the formal chart and the definition of individual characteristics of the stakeholders (Objective, Interest, Perception), the stakeholders are placed in the grid (Figure 13). The x-axes describe the level of interest and the y-axes the level of power.

Stakeholders who are content-wise involved in the issue but also have decision-making power will be incorporated in the final stakeholder identification. Therefore, stakeholders placed in the upper right corner of the P/I grid will be included; this indicates that they have a high power and high interest regarding the issue. These stakeholders are involved in the discussion on the integration and collaboration and/or are directly involved in the collaboration. Therefore, their view on the integration is of added value.

There is an exception to this rule for the stakeholders in the bottom right corner of the grid. These stakeholders do not have a high power, according to the stakeholder analysis. However, these stakeholders are involved in many current collaborations or are mainly focused on the integration and collaboration of energy and spatial planning. They might provide valuable insights into the analysis and are therefore included in the final stakeholder identification.

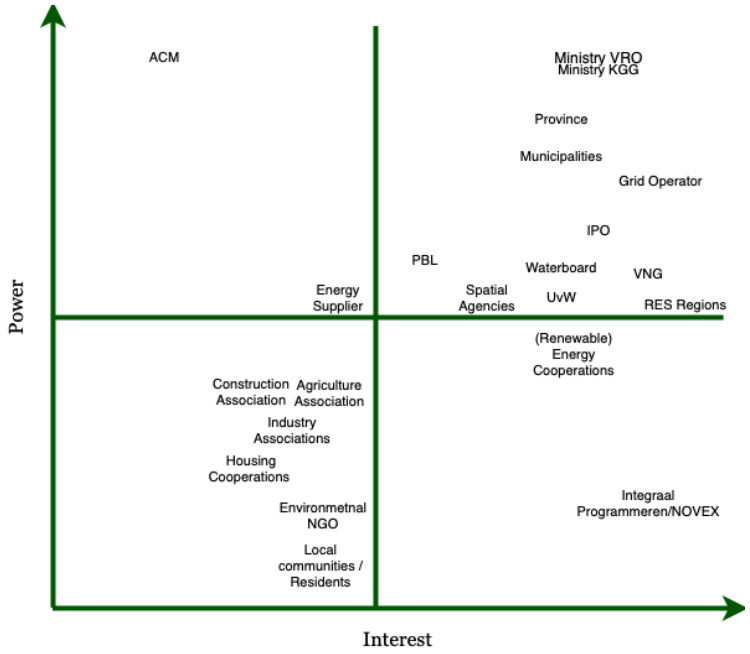

Figure 13 *Power/Interest Grid*

3.6 Conclusion Stakeholder Analysis

Based on the analyses above, the final selection of stakeholders is shown in Table 6. This selection serves as an initial indication of the stakeholders that are considered relevant for this research. It functions as a starting point to identify potential respondents for inclusion in the P-set, as the selection reflects the variety of perspectives that could contribute valuable insights. This selection is not a rigid framework, but rather an informed guide to ensure that the research captures a broad and balanced range of views across governance levels and domains.

Table 6 *Final Stakeholder Selection*

Ministry VRO	Municipalities in Gelderland	VNG
Ministry KGG	Grid Operator	PBL
Province Gelderland	IPO	Spatial Agencies
(Renewable) Energy Cooperations	Integraal Programmeren	NOVEX
UvW	Waterboard	RES Regions

4. From Theory to Statements: Developing the Q-set

As the literature review highlighted, effective integration relies on effective collaboration and governance structures. Therefore, the Q-set includes criteria that reflect these two aspects. To define these criteria, both literature reviews and desk research were conducted. This chapter begins with an overview of the literature on effective collaboration, followed by a review of several governance structures. Thereafter, the findings from desk research focused on current programs, existing collaboration between the energy and spatial planning domains, and cross-sector collaborations in other fields are provided. These reviews formed the development of the final Q-set, which is structured across several overarching themes, presented in the concluding section of this chapter.

4.1 Effective Collaboration

Definition of Collaboration

Collaboration can be broadly defined as a process where two or more actors work together to solve shared problems by combining resources, knowledge, and capacities (Bui et al., 2023). According to Ansell & Gash (2007), "Collaboration is a governing arrangement where one or more public agencies directly engage stakeholders in a collective decision-making process that is formal, consensus-oriented, and deliberative and that aims to make or implement public policy or management public programs or assets" (p. 2).

Collaboration is goal-oriented, meaning that parties enter the collaboration with the intent to jointly achieve outcomes they could not accomplish independently (Osei-Kojo et al., 2020). Also, collaboration is a multi-level, multi-sectoral, and multi-organizational context. In the case of this research, multiple sectors are involved, aligning with the definition of multi-sectoral collaboration—a process in which actors from the public, private, and non-profit sectors join forces to address a shared challenge (Osei-Kojo et al., 2020).

The Growing Role of Collaboration in Energy Planning and Policy

In recent years, there has been a growing interest in collaborative approaches such as co-creation and co-design in the context of strategic energy planning and energy policy design. These approaches aim to bring actors together in collective forums to engage in consensus-oriented decision-making (Sillak & Vasser, 2022). However, existing analyses of this shift towards collaboration in the energy sector have often conceptualized and assessed collaboration in broad terms, with a primary focus on the involvement of incumbent industry players, leaving the role of the third sector and local communities underexplored (Sillak & Vasser, 2022).

The Importance and Challenges of Effective Collaboration

Collaboration is an iterative process and a multi-dimensional concept (Osei-Kojo et al., 2020). Ansell and Gash (2007) suggest that a collaborative process entails among others building elements such as trust, commitment, shared understanding, and intermediate outcomes. Because of this multi-dimensional nature, understanding collaboration requires attention to a broad set of interrelated factors that influence its effectiveness. At the same time, collaboration is inherently challenging. Osei-Kojo et al. (2020) mentioned some constraints of collaboration, like evaluating and measuring outcomes of collaboration, the lack of consensus about the meaning of collaboration, and the accountability and power-sharing issues. In addition, when actors from different sectors focus on the same issue, they are likely to think about the issue differently, are motivated by different goals, and apply different approaches to solve the issue (Selsky & Parker, 2005). These sectoral differences further highlight the need for processes that foster mutual understanding, build shared visions, and create inclusive decision-making structures to align diverse interests and the integration of diverse sectors.

4.1.1 Framework Effective Collaboration

A wide array of elements influences the effectiveness of collaboration. O'Leary & Vij (2012) identify context, the purpose of the collaboration's mission, member selection and capacity building, motivation and commitment, structure, governance, power, accountability, communication, perceived legitimacy, trust, and information technology as essential elements influencing collaborative outcomes. Furthermore, Osei-Kojo et al. (2020) highlight the need for both formal and informal rules to guide the activities and behaviors of actors. Another key element of effective collaboration is joint action, which encompasses four

elements: procedural and institutional arrangements, leadership, resources, and knowledge (Osei-Kojo et al., 2020).

In addition, Bryson et al. (2006) built a framework with key factors influencing collaboration, shown in Table 7. This framework also emphasizes the formal and informal dimensions of collaboration.

Table 7 *Framework with Key Collaboration Elements by Bryson et al. (2006)*

Category	**Key Elements**
Formal and Informal Processes	Agreements, Leaderships, Legitimacy, Trust, Conflict Management, and Planning
Formal and Informal Structure	Membership, Structural Configuration, and Governance Structures
Contingencies and Constraints	Type of collaboration, power imbalances, competing institutional logics outcomes, and accountabilities

Conclusion Key Factors for Effective Collaboration
Based on the elements described above, the key factors to achieve effective collaboration according to the literature are balancing formal and informal mechanisms and participation.

Balancing Formal and Informal Mechanisms
One of the core insights from the frameworks is the need to balance formal and informal mechanisms. Formal structures, such as defined roles, rules, and governance frameworks, ensure clarity, legitimacy, and accountability, while informal processes, like trust building, open communication, and shared understanding, create relational strength and social cohesion. Effective collaboration thrives at the intersection of these two dimensions, with the flexibility to adapt governance as collaborations evolve (Eriksson et al., 2019).

Participation
In addition, member selection and inclusive processes are also critical (Rice & McCool, 2021). Selecting a diverse and representative group of actors, ensuring meaningful participation, and creating a safe and open environment for dialogue enhances both legitimacy and effectiveness (Rice & McCool, 2021).

These key factors guided the identification of overarching themes and criteria during the Q-set design, as shown in Table 12. They were complemented by additional criteria and themes derived from the literature review and desk research, outlined in the following section.

4.2 Governance Structures

Definition Governance
Governance involves complex public and/or private processes of coordination and regulation for social purposes, where powers are distributed across multiple actors under both formal and informal rules (Lockwood & Devenish, 2024). It is the process of ruling, cooperating, and controlling the relevant stakeholders and balancing diverse interests (Endo et al., 2024). Governance structures facilitate collaboration among diverse actors with varying goals and interests, which is critical for addressing the complex demand for integrated energy and spatial planning (Roukounis & Tsihrintzis, 2024).

There are multiple forms of governance when multiple stakeholders are involved. The governance structures analyzed in this research are Collaborative Governance, Adaptive Governance, and Polycentric Governance. Collaborative governance because of its multi-stakeholder aspect. Adaptive governance is a promising mechanism for promoting good governance, managing conflicts, and building capacities for adaptation and transformation. Therefore, Akamani (2016) argues that an adaptive governance approach could provide an effective guide for formulating policies aimed at enhancing the energy transition. Furthermore, Ostrom (2009) argued that a polycentric approach is the most efficient approach for communities to adapt and mitigate complex collective action issues such as climate change.

These governance structures will be elaborated on in more detail below.

4.2.1 Collaborative Governance

Collaborative governance involves the engagement of a cross-selection of stakeholders to address public problems through a collective and ongoing decision-making arrangement (McNaught, 2023). Emerson et al. (2011) define it as: "the processes and structure 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 to carry out a public purpose that could not otherwise be accomplished" (p. 2). Ansell and Gash (2007) add to their definition of collaboration that the decision-making process is collective, formal, consensus-oriented, and deliberative. Even though consensus is not always achievable, it can be seen as encouraging for more cooperation. Ansell and Gash (2007) see consensus-based decision-making as a cornerstone of collaborative governance because it fundamentally strengthens the legitimacy, effectiveness, and inclusivity of policy-making.

McNaught (2023) defines the following key components of collaborative governance arrangements based on the models of Ansell and Gash (2007) and Emerson et al. (2011): Starting Conditions, Institutional Design, Collaborative Process, Outcomes, and System Context. Table 8 presents a description of the importance of these components, based on McNaught (2023).

Table 8 *Key Components for Collaborative Governance by McNaught (2023)*

Key Component	Description
Starting conditions	These conditions set the initial playing field for collaboration. Understanding why stakeholders are involved and recognizing power asymmetries ensures that collaboration is equitable and productive from the start. It therefore includes the objectives for undertaking the collaboration, the power and resources identification and the formal authority, and the prehistory of participants.
Institutional Design	Governance structures and participation mechanisms influences the effectiveness of collaboration. It involves the identification of stakeholder's participation, defining leadership and meta governance, and establishing clear procedures for decision-making and responsibilities.
Collaborative Process	A structured collaborative process is needed to ensure an ongoing, cyclical process of collaboration. Therefore, key elements are trust-building and partnerships, developing shared goals and strategies, co-decision-making and co-implementation, implementation activities, and the evaluation of outcomes.
Outcomes	Effective collaboration does not only solve a single issue; a key element is multi-dimensional outcomes across problem domain, governance process, organization and individuals, and wide system context.
System Context	It is important that the collaboration align with broader governance systems and political realities.

The success of a collaborative governance regime depends according to Emerson et al. (2011) on three interactive components: Principled Engagement, Shared Motivation, and Capacity for Joint Action.

Principled Engagement

This implies the importance of how actors interact. Principled Engagement occurs over time through the iteration of four basic elements: Discovery, Definition, deliberation, and determination. These processes highlight the importance of identifying a shared interest and gathering information together, followed by creating a shared vision and terminology. Based on these processes, structured discussion, and conflict resolution can be established which results in making decisions and setting priorities.

Shared Motivation

Shared motivation is an important component to build trust and legitimacy. It highlights the interpersonal and relational elements of collaboration. Elements of shared motivation are mutual trust, mutual understanding, internal legitimacy, and shared commitment.

Capacity for Joint Action

Capacity for joint action is, according to Emerson et al. (2011,) "the collection of cross-functional elements that come together to create the potential for taking effective action and serve as the link between

strategy and performance" (p. 14). It consists of four elements: (formal and informal) procedural and institutional arrangements, leadership roles, knowledge-sharing mechanisms, and resource availability.

However, according to the research of Berthod et al. (2022), there are also some constraints on collaborative governance in energy transition issues. The practical examples in their research highlight that early in the process, broad participation and inclusive dialogue may be evident; however, as these processes mature, dominant incumbent interests and power imbalances tend to reassert control. This leads to a narrowing of stakeholder engagement and reinforcing traditional decision-making structures. In addition, it applauds governance frameworks that also allow space for productive conflict and contestation to break through institutional laziness and vested interests (Berthod et al., 2022).

Themes Based on Collaborative Governance

The literature review on collaborative governance highlights several key factors, including consensus, formal rules, starting conditions, institutional design (e.g., structure and leadership), and processes like trust building, shared goals, and partnership development. It also highlights the importance of outcomes, shared terminology, and information exchange. These key factors informed the development of themes such as conditions for collaboration, collaboration structure, communication, consensus, defined roles, joint-fact finding, mandated forms of collaboration, performance, relationships, responsibilities, stakeholder involvement, and transparency.

4.2.2 Adaptive Governance

Adaptive governance is a continuous, self-organized process of learning by doing, in which institutional arrangements and ecological knowledge are tested and revised over time (Munaretto et al., 2014). It addresses the broader social and institutional context of ecosystem-based resource management and aims for a holistic integration of social, economic, and ecological dimensions across multiple scales. By connecting diverse actors, adaptive governance supports ongoing learning and adaptation in response to uncertainty and change (Akamani, 2016).

Brunner (2010) outlined an ideal model of adaptive governance. This ideal type highlights decentralized decision-making, procedural rationality, and intensive science as its core principles, ensuring that governance structures remain flexible, inclusive, and grounded in real-world experience rather than rigid theoretical models.

A key criterion is the decentralized process of decision-making, which emphasizes a bottom-up approach where local knowledge and community experiences are being used. By organizing networks and scaling up successful local initiatives, adaptive governance fosters decision-making structures that remain dynamic and context-sensitive rather than rigidly centralized. Another essential criterion is procedural rationality in policy, where policies evolve through continuous evaluation and learning. Rather than rigidly adhering to pre-determined strategies. This iterative process ensures that governance remains responsive to changing conditions, balancing diverse interests, and promoting cooperation over unilateral decision-making. A strong foundation in intensive science and knowledge integration further supports adaptive governance. Inquiry is centered on real-world problem-solving, systematically analyzing the environmental, social, and economic factors at play. An integrative approach recognizes interactions across multiple governance levels, ensuring comprehensive and interdisciplinary solutions. Moreover, adaptive governance values local, traditional, and scientific knowledge, fostering mutual learning and adaptation. Table 9 summarizes the criteria of this ideal type of adaptive governance outlined by Brunner (2010).

Table 9 *Core Principles for Adaptive Governance*

Core principle	Explanation
Decentralized Decision-Making	- Bottom-up approach - Leveraging local community experiences and organizing them into networks enables the scaling out and scaling up of effective practices
Procedural Rationality Policy	- Policies evolve through continuous appraisal terminating failures and building on success - Balance diverse interests - Cooperative

Intensive Science	- Focused on centered inquired - Integrative - Comprehensive

Munaretto et al. (2014) also defined some key features of adaptive governance, listed in Table 10. Decentralized decision-making fosters polycentric institutions and collaborative networks, enabling shared power and conflict resolution. Continuous learning and experimentation support adaptive policies, allowing for flexibility, incremental adjustments, and diverse problem-solving approaches. The integration of scientific, local, and traditional knowledge strengthens social memory and collective deliberation, while resilience management ensures governance alignments with ecological and societal dynamics. Together, these features enable adaptive governance to self-organize, absorb change, and support long-term adaptation.

Table 10 *Key Features of Adaptive Governance by Munaretto et al. (2014)*

Key Feature	Description
Polycentric Institutions	Multiple, nested, and redundant centers of power.
Collaboration	Network and partnerships, sharing of power and responsibility, and mechanisms for conflict resolution.
Experimentation	Policy and management as experiments; learning by doing.
Flexibility, incrementality and reversibility	Allows for adjustments when new information becomes available.
Collective deliberation	Collective search for solutions to societal problems.
Participation	Including multiple stakeholders to bring in diversity of perspectives, preferences, interests, and values.
Variety	Development of multiple problem frames and solutions.
Integration of different kinds of knowledge	Local and traditional knowledge, scientific knowledge, and mechanisms for acquisition, integration, and sharing of knowledge.
Social memory	Mobilizing and making use of past experience with change.
Learning	Consists of three types of learning: single loop learning to improve routines and management practice, double loop learning to challenge assumptions, values and norms, and relational learning to build trust, appreciation and consideration.
Action at bioregional scale	Matching scales of ecosystems and governance.
Resilience management	Focus on system's capacity to absorbs change and self-organize.
Adaptive capacity development	Focus on enabling society to adapt.

A weakness of adaptive governance according to Munaretto et al. (2014) is that the approach is best for small-scale and well-defined resource systems and when dealing with moderate change.

Themes Based on Adaptive Governance

The literature on adaptive governance highlights decentralized, flexible, adaptive, and inclusive governance structures, highlighting bottom-up participation, continuous learning, and evaluating. It prioritizes conflict resolution, collective deliberation, and adaptive strategies over fixed ones. These insights informed themes such as mandated forms, process approaches, stakeholder involvement, monitoring & evaluating, and time frame.

4.2.3 Polycentric Governance

A polycentric approach involves multiple overlapping and nested decision-making centers (Ostrom, 2009), creating a decentralized, flexible, and adaptive governance system. Such a structure allows for competition, cooperation, and contestation among actors—characteristics of a polycentric system (Lofthouse & Herzberg, 2023).

The polycentric approach to governance is built on key criteria, according to the advantages of polycentric governance by Lofthouse and Herzberg (2023) listed in Table 11. The key criteria enhance flexibility, inclusivity, and adaptability in decision-making.

Table 11 *Key Criteria of Polycentric Governance by Lofthouse & Herzberg (2023)*

Advantages	Involved Criteria & Description
Competition among decision-makers	Competition among decision-makers fosters innovation and efficiency, preventing the monopolization of power and encouraging responsiveness.
Cooperation and Coordination	Cross-sector partnerships strengthen collaboration between governments, private actors, and civil society, ensuring policies are informed by diverse perspectives.
Legitimacy and Local Buy-in	Mutual learning, continuous monitoring, and evaluating enable governance systems to adapt based on real-world feedback, improving long-term effectiveness.
Experimentation and mutual learning	It emphasizes the effectiveness of testing diverse policy approaches to foster a system of trial-and-error learning. This will increase adaptive capacity.
Institutional Resilience and robustness	Decentralization distributes authority across multiple levels, reducing systemic risks and increasing institutional resilience.
Emergent outcomes	A bottom-up approach ensures that governance structures remain context-sensitive, allowing solutions to emerge organically based on local conditions and needs.

However, a key limitation of polycentric governance is the inability to adequately address persistent power imbalance and the challenge of ensuring meaningful participation.

Themes Based on Polycentric Governance

The literature on polycentric governance highlights characteristics such as multiple decision-making centers, flexibility, adaptivity, collaboration conditions, cross-sector parentships, monitoring and evaluating, mutual learning, and a bottom-up approach. These characteristics informed themes such as collaboration conditions, approaches, competition, and responsibilities.

4.3 Evaluation of Current Initiatives & Programs

Despite the progress demonstrated by the initiatives in Table C.1 in Appendix C, several persistent challenges remain. First, grid operators are often involved too late in spatial planning processes, resulting in misaligned infrastructure plans that fail to integrate seamlessly with urban development (Generation.Energy, 2024). Early involvement, therefore, remains a critical point of improvement. Second, insufficient uniformity in data standards and planning agendas hinders cohesive long-term decision-making (IPLO, n.d.). Third, collaboration between spatial planning and energy stakeholders is still hampered by varying approaches and priorities (Veenstra et al., 2019). Urban planners and energy experts often "speak different languages," leading to misunderstandings (RES, 2023), and in many municipalities, energy and spatial planning still operate in isolated silos (RES, n.d. -a). This fragmentation often leads to a lack of oversight, missed opportunities for synergy, and unaddressed bottlenecks. Additionally, municipalities and grid operators are often unaware of each other's insights, hindering coordinated action (VNG, n.d.-a). Finally, many processes remain focused on addressing immediate issues, such as grid congestion, rather than incorporating a broader long-term vision (Werkgroep Integraal Programmeren, 2022).

Specific challenges have been identified within initiatives like the RES, including decision-making hurdles caused by divergent interests and limited capacities. The RES is still too complex and asks for more concreteness (RES Noord-Veluwe, 2021). It requires knowledge development and innovative ideas to translate into improved planning and decision-making practices. Also, energy issues need to be more closely integrated with other current and future challenges. Finally, there is a wish for more structured participation.

Similar barriers are noted in the *pMIEK* process, where early and active involvement of municipalities is crucial to harness their spatial knowledge and align local plans. National coordination and clearer

mandates for stakeholders are also deemed essential. The *Handreiking Ruimtelijke Inpassing van Energie-Infrastructuur* emphasizes the need for improved trust and predictability between municipalities and grid operators, calling for structured agreements to synchronize efforts. Similarly, *POVI* underlines the difficulty of integrated working, as stakeholders often operate within siloed disciplines.

Themes Based on Current Programs & Initiatives

Desk research on current programs, initiatives, and collaborations, revealed the need to improve early involvement, transparency, communication, long-term focus, aligned processes and structures, and structured participation. In combination with criteria identified as essential in evaluations of other cross-sector collaborations, these areas for improvement informed themes such as approaches, structure, collaboration conditions, consensus, coordination, relationships, joint-fact finding, leadership, mandated forms, monitoring and evaluation, outcome, responsibilities, stakeholder involvement, transparency, communication, defined roles, policy coherence and integration, task-centered decision-making, and time frame.

4.4 Themes

As explained in Chapter 2, to define the Q-set, the concourse has been grouped into themes with an iterative process. Based on every criterion several themes were defined as described earlier, which eventually was reduced to five themes by an iterative process. First similar criteria across all sources were clustered, identifying recurring elements such as trust building, information exchange, and defined roles. These were then grouped into provisional categories like communication or structure. Through multiple iterations, overlapping or closely related categories were merged. For example, consensus-building and joint-fact finding were both consolidated under the broader theme Objective of Collaboration. The choice was made to define approximately five overarching themes. Too many themes would have made it more difficult to interpret the Q-sort factors, and to identify potential patterns or conflicts across them. On the other hand, too few themes risk oversimplifying the data and losing important nuances. Defining five themes strikes a balance: it allows for sufficient depth within each theme, preserves the nuances found in the literature and empirical data, and maintains a manageable structure for analysis and interpretation. The final themes are the *Objective of Collaboration*, *Governance Process*, *Governance Structure*, *Participation & Communication*, and *Formal Roles & Responsibilities* (Figure 14).

As the review defined themes drawn from each review, Table 12 shows which criteria of which source informed which of the final five themes.

Table 12 *Overview of Source-Based Criteria Mapped to the Five Themes*

Final Theme	Source	Criteria
Objective of Collaboration	Collaborative Governance	Consensus, Joint-fact finding, project realization, Relationship, trust building, and shared goals
	Adaptive Governance	Joint-fact finding
	Polycentric Governance	Cross-sector partnership and joint-fact finding
	Effective Collaboration	Goal-oriented, consensus, trust, and joint-fact finding
	Desk Research	Consensus, joint-fact finding, project realization, relationship, and task-centered decision-making
Governance Process	Collaborative Governance	Monitoring and evaluating
	Adaptive Governance	Adaptivity, Proactive, local focused processes, decentralization, and conflict resolution
	Polycentric Governance	Local focused processes, decentralization, flexibility, adaptivity, and monitoring and evaluation
	Effective Collaboration	x
	Desk Research	Adaptivity, Proactive, standardization, mandated forms like conflict mechanisms, monitoring and evaluating,

		local focused processes, and decentralization
Governance Structure	Collaborative Governance	Defining roles and responsibilities, policy coherence, starting conditions, and institutional arrangements
	Adaptive Governance	Institutional arrangements, and time frame
	Polycentric Governance	x
	Effective Collaboration	Formal and informal rules
	Desk Research	Coordination mechanisms, independent chair, regional level, defined roles and responsibilities, specialization, policy coherence, time frame, and external influence
Formal Roles & Responsibilities	Collaborative Governance	Role of National government
	Adaptive Governance	x
	Polycentric Governance	Role of residents
	Effective Collaboration	Power distribution and leadership
	Desk Research	Role of the Province, grid operator, municipality, residents, and national government
Participation & Communication	Collaborative Governance	Transparency, participation by relevant stakeholders, and communication
	Adaptive Governance	Participation by local communities
	Polycentric Governance	Competition and bottom-up approach
	Effective Collaboration	Member selection, communication
	Desk Research	Transparency, participation by area-users, local communities, relevant stakeholders, and communication

Objective of Collaboration

Objective of Collaboration covers the preferred goals and outcomes of the collaboration. It highlights critical elements and goals for cross-sector collaboration to succeed in a complex policy field like the energy transition. Previously described themes, such as consensus, joint-fact finding, relationships, performance, and task-centered decision-making could all be grouped under this overarching theme.

Governance Process

Governance Process unfolds the methods, procedures, and decision-making styles that guide how stakeholders work together and make collective choices during collaboration. This is relevant for this research while the integration of energy and spatial planning is still emerging, meaning that the entire process of working together across these domains needs to be actively developed and institutionalized. Previously described themes such as processes, approaches, monitoring and evaluation, and mandate forms could all be grouped under this overarching theme.

Governance Structure

Governance Structure refers to the formal and informal institutional arrangements that shape how collaboration is organized and sustained over time. Governance Structures are important elements to analyze in the integration of energy and spatial planning, while they provide the support for a joint governance framework for sectors that have not collaborated intensively before. Previously described themes such as collaborative structure, time frame, external influence, policy coherence and integration, and defined roles could all be grouped under this overarching theme.

Participation & Communication

Participation & Communication is another key theme. As became clear, communication is a key challenge at the moment, emphasizing the importance of improving communication. In addition, the issue involves many stakeholders and objectives, highlighting the need for defined participation—who must be involved, how, and when. Previously described themes such as transparency, communication, collaboration conditions, and stakeholder involvement could all be grouped under this overarching theme.

Formal Roles & Responsibilities

Formal Roles & Responsibilities are essential to provide clarity on who does what, ensuring that leadership roles, facilitation, and accountabilities are explicitly addressed. Previously described themes such as collaboration conditions and responsibilities could all be grouped under this overarching theme.

Figure 14 *Defined Themes*

4.5 Final Q-set

Based on the literature and desk research described above the final Q-set is defined with the iterative process explained in the methodology chapter, Chapter 2. The Q-set is provided in Table 13.

Table 13 *Final Q-set*

Nr.	Statement
	Governance Process
1	Collaboration between spatial planning and energy must take an adaptive form to adjust to new information
2	A more proactive approach in spatial planning, and consequently in the integration of energy, is essential
3	Standardized procedures are essential to effectively integrate energy considerations into spatial planning
4	Conflict resolution mechanisms must be part of the decision-making process to ensure that the process can continue even when stakeholders disagree
5	Monitoring and evaluating is essential to ensure effective decision-making process in the collaboration between spatial planning and energy
6	The process of integrating energy into spatial planning must be tailored to address local challenges
7	Decision-making on the energy vision, including the integration in spatial planning, needs to be decentralized in multiple decision-making centers/clusters
	Governance Structure
8	For effective collaboration, coordination mechanisms must be clear and formally established, including working groups, platforms, and scheduled periodic meetings
9	Assigning an independent chair or program manager improves coordination and decision-making
10	Regional steering groups are the heart of the cooperation; they create the space where the objectives, goals, and considerations are discussed
11	Defined roles and responsibilities must be clearly assigned, recorded, and made transparent
12	Effective collaboration relies more on strong institutional arrangements, such as roles, responsibilities, and processes than on achieving shared goals

13	Specialization within sectors, rather than integration, ensures better decision-making
14	Governance structures of the collaboration are most effective when energy vision and spatial planning are jointly developed
15	The current grid limitations should not be an excuse to avoid investing in long-term electrification pathways
25	The sustainability of the greenhouse horticulture sector must be coordinated regionally
	Objective of Collaboration
16	Striving for consensus is essential, even if it requires more time and compromises on individual interests
17	Joint-fact finding is essential for effective decision-making and the integration of energy in spatial planning
18	The focus must be on direct project realization rather than on strategy and policy development
19	It is important to invest in building both personal and cross-sectoral relationships to improve collaboration
23	Building trust between stakeholders is the most important criteria for effective collaboration
20	The identity and possibilities of the area should guide decision-making
21	A clear task and clear goal must be defined together, as a shared framework, before starting with the decision-making process
	Formal Roles & Responsibilities
24	The province must take on a more coordination role
26	Given the major impact on the electricity system, the grid operator must be able to say no to electricity demand from the brick factories
27	Municipalities must take the lead in coordinating the spatial integration of energy infrastructure
28	Residents determine whether a heating network will be installed in their neighborhood
29	It is desirable that the national government is responsible for setting boundaries, preconditions, and preventing unwanted situations that could hinder collaboration
	Participation & Communication
30	Total transparency in information sharing is a must for any effective collaboration
31	Area users such as Brick Valley/Greenhouse Horticulture sector must be given an active voice in decision-making
32	Collaboration is most effective when local communities are engaged from the start
33	Involving all relevant stakeholders from the start is crucial for successful collaboration, even if it slows down decision-making processes or complicates finding timely solutions
34	Successful collaboration relies on stakeholders speaking and understanding each other's language
22	(Healthy) competition is needed to develop creative, adaptive solutions that effectively integrate energy considerations into spatial plans

5. Determining the Number of Factors

The Q-sort interviews resulted in 35 Q-sorts (Appendix D), where every respondent determined what criteria they found the most important and least important. These Q-sorts were used in the factor analysis to determine the number of factors. The process of determining the number of factors is described in this chapter. The chapter concludes with the final number of factors, that will be analyzed and interpreted in more depth.

To determine the number of factors suitable for this research, several factor rotations were analyzed on two- to eight-factor solutions (Appendix F). Several rules were applied, described below. In Table 14, the results of the applied rules are shown. The table only shows a value for a factor if the rule has been applied. So, for example, when a rule before did not apply to that factor the other rules were not relevant anymore on that factor.

1. Minimum of eigenvalue of 1 (Kaiser's Criterium)

First, Kaiser's criterium was applied, which stated that only factors with an eigenvalue of 1 or higher are retained (Watts & Stenner, 2012; Brown, 1980). In this case, all the eight factors meet this requirement.

2. Minimum of 3 Q-sorts loading on a factor

In Q methodology, the rule of at least three loaded respondents per factor often applies. This loading will be calculated with the formula $2{,}58 / \sqrt{N}$, where N is the number of statements (Brown, 1980). This is important because a factor in Q methodology represents a shared way of thinking, and you need enough respondents to interpret a pattern reliably. The loading must be 0.442 or higher ($2{,}58 / \sqrt{N}$, with N = 34). In this case, this rule did not apply to factors six to eight. Therefore, these factors were excluded as possible factor solutions.

3. Number of defining sorts with a minimum difference of 0.1 with other factors

The number of defining sorts is the sum of all the q-sorts that have a loading of 0.442 or higher and a difference of around 0.1 with the loading on other factors. As Van Exel and De Graaf (2005) argue that a high number of Q-sorts is desired, choosing 2 factors would be the last option according to this rule.

4. Determining whether a q-sort is significant enough to belong to a factor: $f^2 > h^2/2$

In a factor solution, each Q-sort (or respondent) has a loading on every factor. To determine whether a Q-sort significantly contributes to a factor, the highest factor loading for that Q-sort is identified and then squared (f^2). This value is then compared to half of the common variance ($h^2/2$), which is calculated by squaring each of the Q-sort's factor loadings, summing them, and dividing the total by two. For a factor to be considered valid, it must have at least two defining Q-sorts—meaning at least two Q-sorts where f^2 is greater than $h^2/2$. If a factor has no defining Q-sorts or only one, it is deemed unacceptable.

In this research, the highest number meeting this criterion will be used to determine the final factor solution. In this case, that will be for three or four factors. Having four factors shows that there are four q-sorts, who did not comply with this rule. However, these Q-sorts are evenly spread across the different factors and there are still at least three defining Q-sorts that comply with the rule per factor. Therefore, having four factors will also be analyzed by the final rule.

5. Cumulative % explained variance, nuance difference, and Correlation

The focus of interest in this research lies not only on the quantitative distribution among the population but also on the identification of different views. Therefore, in this research, the focus is not only on the internal structure of the evaluation but also on considering the statements that were ranked differently in the factors and can, therefore, distinguish them (Duenckamnn, 2010). Therefore, to determine the number of factors also the nuanced differences between the factors will be analyzed. To determine these nuanced differences, the correlation between the factors (see correlation tables in Appendix F) and the statements defining the factors—distinguishing statements and most extreme statements—were analyzed.

Although the cumulative percentage of explained variance is higher for the four-factor solution, the increased correlation between the factors reduces the distinction between them, making the nuanced differences less pronounced. Therefore, this research focuses on a three-factor solution, as it maintains clearer

distinctions between factors and a more balanced distribution of respondents while still capturing meaningful nuances in perspectives.

Table 14 *Factor Determination Characteristics*

Factor	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Eigenvalues	11.8275	2.5252	2.2839	2.1117	1.928	1.66653	1.4958	1.3726
Cumulative % Explained Variance			48%	54%				
Defining sorts	-	29	32	34	34	-	-	-
Number of sorts meeting $f^2 > h^2/2$			34	31	23			

Verification Factor Structure

The three-factor structure identified with the Q-methodology factor analysis is also supported by a hierarchical cluster analysis (see Appendix K). The clustering results show a strong alignment with the Q-factors, providing additional validation for the chosen factor solution.

Distribution of Respondents on the Factors

To define the number of respondents on factors, the factors' loadings are analyzed. These loadings indicate the relation between each respondent and a factor. A participant is flagged when the loading is higher than 0.442 (2,58 /$\sqrt{N}$with N = 34). The respondents with their loading are shown in Appendix F. For the final distribution, when a respondent has a high loading on multiple factors, the respondent has only been flagged when the difference was around 0.1 or higher. Therefore, three respondents were not flagged, while it could have led to a higher correlation between the factors, making it harder to differentiate the distinct viewpoints. Two respondents did not have a loading of 0.442 or higher. For these respondents, ultimately, the factor has been chosen that has the highest loading. This resulted in 10 respondents loading on factor 1, 15 on factor 2, and 7 on factor 3.

6. Description of the Current Situation

While a clear understanding of the current situation was hard to find in all the articles, reports, and evaluations, a description of the current station is defined in this chapter. This description helps to better understand the reasoning behind the choices of the respondents and also to interpret the perspectives. Based on the interviews, a vision of the current situation has been sketched. This might not describe the entire situation fully in detail, while this description of the current situation is based on statements and, therefore, a little detail of the current situation. However, it gives an idea about how the respondents see the current situation and what informs their choices during the Q-sort. The respondents are referred to by their respondents' number and professional domain—E for energy and S for spatial planning.

General Description of the Current Situation

The integration of energy and spatial planning remains a significant challenge, as energy has not yet become a standard component of spatial planning processes (Respondents 14E & 34S). Although connections between these two domains are increasingly recognized, a structured approach that positions energy as a guiding factor in spatial planning is still lacking (Respondent 28E). Consequently, provinces and regions continue to designate locations without ensuring the availability of energy (Respondent 24E). However, there is a real need for action and change.

"By actively steering now and integrating energy as a fixed component of spatial planning, it can be prevented that as soon as the current network problems are solved, new bottlenecks will immediately arise. This requires foresight and solid management to ensure structural and sustainable solutions" (Respondent 13E).

Collaboration between municipalities, provinces, and grid operators is intensifying but remains unevenly developed. While some regions demonstrate effective coordination, others struggle due to a lack of awareness and insufficient knowledge exchange. Workshops and informal meetings are used to improve alignment between energy and spatial planning, but this process is still in its early stages (Respondent 14E). Meanwhile, the RES regions have played a crucial role in raising awareness and involving various stakeholders in the energy transition. However, they have also contributed to the fragmentation of sustainable energy generation rather than efficient distribution:

"The distribution of sustainable generation at the regional level causes a lot of fragmentation, while some choices should be made at a higher scale level. The principle of clustering and efficient use of space sometimes clashes with the idea that each region should contribute something. This does not necessarily lead to the most effective or logical spatial distribution of energy infrastructure. Supply and demand must come together at the network level, and that does not always happen at the RES level. For example, offshore wind is not used locally, but switched via TenneT's high-voltage grid to industrial clusters such as Tata Steel." (Respondent 14E).

A major barrier to cooperation is the absence of a shared vision and common language. Different stakeholders apply their interpretations and priorities, leading to miscommunication and conflicts (Respondent 15E). Additionally, structural differences between the energy and spatial sectors pose challenges. The privatization of the energy sector has resulted in companies like TenneT focusing also on cost control and profit maximization, which does not always align with spatial and societal objectives. Grid operators possess technical expertise but are constrained by regulations and funding, limiting their ability to respond flexibly to spatial developments. Conversely, governmental and public institutions primarily focus on policy and administrative processes while lacking in-depth expertise on energy infrastructure (Respondent 26S).

Beyond these institutional challenges, historical and cultural patterns of collaboration play a role (Respondent 18S). While some RES regions have a strong tradition of cooperation, others lack such a history, making collaboration more difficult (personal communication with an expert, [December 2024]). Energy issues only become a priority for spatial planning when they impose direct constraints on development (Respondent 17E). Due to this traditional approach, there is less experience in the collaboration between energy and spatial planning, resulting in being in a building phase (Respondent 23S). Which results in clashes and challenges in the integration and collaboration: *"Clashes are inevitable, especially since many parties involved are not yet accustomed to the impact of energy on spatial processes."* (Respondent 13E),

and *"At the moment, potential conflicts arise mainly during the practical implementation, such as the placement of cables and pipes. This is the result of not discussion thoroughly in advance." (*Respondent 3E)

Description of Current Situation by Theme

Governance Process

The governance process of the integration of energy into spatial planning faces significant challenges. Decision-making is slow and sectoral, often resulting in energy considerations being introduced too late in the planning process (Respondents 28E, 19S & 35S). Actions are typically taken reactively rather than proactively (Respondent 27E). The lack of a forward-thinking approach (Respondent 24E) can be attributed to the novelty of the issue, a shortage of specialized experts (Respondent 4S), and an overall hesitancy to make decisive choices: *"The proactive approach often fails now because it is a completely new domain/issue that we are talking about. There are already various experts (environmental, traffic), but not so many energy system thinkers. As a result, the decisions are not taken" (Respondent 4S)*

In addition, as a result of a reactive approach, the lack of resources and issues like grid congestion occurs (Respondent 27E), highlighting the need for a proactive approach: *"Without a progressive strategy, we will continue to lag behind the facts and the energy transition will become increasingly difficult to achieve" (Respondent 27E).*

Even though there are spatial planning procedures, these are often, according to Respondent 2E, wrongly approached and lack tailoring to local challenges, such as the possibilities and identity of an area. For example, when an under station will be realized in a world heritage area, it requires an approach from the other way around. First, it should be questioned whether this is the right place or not. Up until now, grid operators have provided advice on the location based on system calculations without considering broader spatial and societal implications (Respondent 2E).

"The focus is strongly on energy generation and infrastructure, such as cables and transformer stations, without making broader spatial considerations. Reasoning is mainly in terms of power generation and technical solutions, while insufficient attention is paid to the spatial impact and the broader functions of an area" (Respondent 29S).

Meanwhile, municipalities and provinces focus on achieving national energy targets without always conducting a reality check (Respondent 29S).

These different focuses also result in frustration: *"Local challenges play an important role, especially because they determine what is possible in an area or not. When the municipalities indicate that an area is not suitable, the grid operator sees it more as the municipality not wanting something, instead of adhering to many other rules and interests" (Respondent 2E).*

In addition, there is a difference between municipalities' commitments, making the division of wind turbine assignment unfair and insufficiently managed: *"The distribution of the wind turbine task is unfair and insufficiently managed. Some municipalities take responsibility out of idealism and actively look for a location for wind turbines despite their limited space and high natural values. On the other hand, some municipalities deliberately wait and do not make concrete plans, with the result that they are now out of the picture. This is not corrected by the province or the government, which means that some municipalities are disproportionately burdened while other municipalities do not take responsibility. They mainly look at their interests, and there are currently no strict rules that oblige municipalities to look beyond their interests to the broader regional or national task" (Respondent 27E).*

Furthermore, monitoring and evaluation are insufficient. Evaluations are limited and conducted on an individual rather than a collective basis, with no structured mechanisms for feedback (Respondent 28E). As a result, bottlenecks are not systematically identified, and there is little opportunity for learning and improvement. Additionally, many stakeholders withhold information for political or strategic reasons, further hindering honest reflection (Respondent 9E).

Finally, standardized policy procedures also create obstacles. The energy transition requires an integrated approach, yet tensions arise between existing administrative processes and the need for flexibility. This is evident in projects such as the pMIEK in Gelderland, where participatory procedures are prescribed, but

the complexity of the energy transition demands a more adaptive and collaborative approach (Respondent 18S). However, adaptive governance is still in its infancy (Respondent 18S).

Governance Structure

Respondent 2E highlights that managers search reflexively for structures and responsibilities. However, these structures are in practice often not effective. For example, the energy boards, where regions and alderman represent sustainability but do not have a mandate from their municipal councils. This results in more transmission structure than effective decision-making.

The governance structures in spatial planning have changed significantly in recent years. The repeal of the '*Wet op de Ruimtelijke Ordening*', which previously provided clear central and decentralized frameworks, has resulted in more flexibility under the '*Omgevingswet*', granting municipalities and provinces increased responsibilities (Respondent 4S). However, this shift has also led to uncertainty and a lack of clear guidelines (Respondent 35S).

At the national level, there is an abundance of programs and initiatives, yet they often lack coordination (Respondent 29S).

"At the national level, there is an abundance of programs and initiatives, which are not always well coordinated. There are at least 26 national programs, of which at least three (NPRES, NPLW, and NPLG) are strongly intertwined. Only in the past one or two years has there been more cooperation. At the local level, the same problem occurs: municipalities are being hounded to realize their share of the 35-terawatt hours of generation on paper, without properly looking at the spatial and social consequences. Indicating that national objectives are blindly adopted without a reality check." (Respondent 29S)

The RES regions, designed to foster regional cooperation, have yielded mixed results. In regions where collaboration is traditionally strong and where municipalities recognize the economic benefits of joint decision-making, alignment is more effective. In other areas, however, municipalities continue to operate autonomously, hindering collective efforts (Respondent 25E). After nearly five years, discussions about how to structure cooperation persist rather than producing concrete results (Respondent 6E).

In addition, long-term planning is poorly integrated. Energy visions are sometimes established without alignment with broader environmental policies, leading to sectoral approaches that fail to account for spatial impacts (Respondent 14E). Municipalities were encouraged to develop regional energy strategies before formulating heat strategies, resulting in poorly considered decisions (Respondent 29S). The implementation of RES strategies also faces challenges. Even in regions where extensive research has been conducted to identify feasible energy solutions, projects encounter political and social resistance (Respondent 20S). Additionally, the energy transition remains heavily influenced by a centralized model dominated by large energy companies and grid operators (Respondent 31E).

Objective of Collaboration

Collaboration of energy and spatial planning is mostly hindered by the absence of a shared goal and unified vision (Respondents 1E & 11E). *"Having the same basis helps for a discussion, but at the moment this is not always the case" (Respondent 11E).* While governance structures for water and soil are well established, energy infrastructure has yet to become an integral part of planning processes: "*In the current working method, many parties still operate on a sectoral basis, which hinders coherence" (Respondent 35S).* Stakeholders often prioritize their interests (Respondent 1E), leading to stagnating decision-making. Grid operators focus on infrastructure and short-term solutions, whereas municipalities and provinces emphasize broader spatial considerations and long-term goals (Respondent 16E).

Despite the lack of a common foundation (Respondent 11E), joint-fact finding is increasingly applied, though it often results in more discussions rather than concrete actions. Scenarios of grid congestion are repeatedly questioned rather than decisions being based on these reliable forecasts (Respondent 1E). This leads to stagnation, where much discussion occurs, but little is executed (Respondent 27E). Additionally, joint fact-finding sometimes causes stakeholders to encroach on each other's roles, complicating cooperation (Respondent 28E).

In addition, collaboration remains highly dependent on personal relationships and trust (Respondent 10E). However, building these relationships is not yet a smooth or natural process (Respondent 4S). The

absence of a culture of mutual trust and clear role definitions further fragments cooperation, leading to inconsistent effectiveness (Respondent 15E).

Formal Roles & Responsibilities

The formal roles and responsibilities in the energy transition and spatial planning are not clearly defined, leading to fragmentation and indecisiveness. *"At the moment defining roles and responsibilities is sometimes left undone, which ultimately leads to too much talking" (Respondent 1E).*

Provinces struggle with a lack of knowledge and experience, making it difficult to effectively take on a coordinating role (Respondent 13E). Furthermore, provinces do not always fully recognize the urgency of grid congestion and often prioritize other issues (Respondent 11E): *"Provinces mostly do not acknowledge what it means when there is for example five years no new connection possibilities" (Respondent 11E).*

"Provinces often have different priorities and this coordinating role is experienced as complex and challenging. It requires aligning municipalities, which inevitably disappoints some parties. Furthermore, provinces must collaborate with grid operators and the government, which further increases the complexity. This makes it a difficult task that is not always actively addressed" (Respondent 11E).

Municipalities are responsible for spatial planning decisions but face uncertainty and a lack of organizational capacity, delaying key decisions such as wind turbine placement (Respondents 10E & 27E). Their primary focus is on concrete projects, while energy planning remains abstract and is not always perceived as urgent (Respondent 10E). *"At the moment municipalities only take action when the need becomes concretely felt"* (Respondent 10E). Respondent 6E highlights that the municipalities themselves also struggle, on the one hand, they want to keep their say to keep their residents happy, however on the other hand they acknowledge that the province should make decisions so that steps can be taken.

"At the moment municipalities are sometimes reluctant, indicating the need of the upper layers to make the choices to make sure things will happen." (Respondent 9E).

Grid operators find themselves in a complex position between providing advice and shaping policy. While they participate in strategic discussions, they remain formally in a reactive role ("you request, we deliver"), without the mandate to set priorities (Respondents 25E & 14E). Consequently, their recommendations are not always integrated into policy processes (Respondents 15E & 16E).

The national government has taken a less active and important role in the situation at the moment. For example, regarding the decisions of the RES regions on the placement of wind turbines: "*Through the RES regions, it must be examined per region where wind turbines can be placed. The regions themselves must decide how they are going to achieve the energy goals. However, some provinces are not suitable for this approach. Spatial planners indicate that for wind energy, we must work towards large wind clusters, preferably integrated with solar and where there is also high energy demand. The advantage of this approach is that the impact on the landscape is less, the energy transition becomes cheaper and you can therefore spare vulnerable areas. However, at the moment, wind turbines are placed in places where the landowner has a personal interest. While the impact of wind turbines on the landscape is so great on our living environment, the government should play a much more compelling role in this— which is also permitted by law—than by making it a decision of the landowners."* (Respondent 5E).

The national government has recently taken a less active role in energy planning but appears to be shifting toward greater central coordination (Respondent 19E). Respondent 15E underscores the need that the national government must coordinate more on the efficient development of the energy system: *"The focus on "you ask, we carry", costs too much, takes too much time, and is bad for the landscape. We need to determine which social functions should be prioritized and managed".*

Respondent 29S describes the current competencies as follows: "*Powers have been decentralized to municipalities, which on the one hand was intended to reduce sluggishness, but on the other hand led to fragmentation and uncoordinated spatial development, such as the uncontrolled growth of distribution centers and solar parks. This problem is exacerbated by the fact that provinces no longer have to assess zoning plans, which means that there is no direction at the provincial level."*

Participation & Communication

Collaboration between energy and spatial planning sectors is hampered by differences in terminology and interpretation (Respondent 14E): *"Miscommunication often arises because the same terms have different meanings in different fields, underscoring the importance of mutual understanding and coordination" (Respondent 14E).* Words such as "dimensioning" hold distinct meanings for spatial planners and grid operators, leading to misunderstandings and delays (Respondent 13E). Local governments and grid operators often struggle to communicate effectively, as municipalities do not fully grasp grid operators' needs, while grid operators lack insight into municipal spatial planning priorities (Respondent 3E).

Although various initiatives have been introduced to improve mutual understanding—such as workshops, training programs, and visual tools (Respondents 16E &15E)—cooperation between grid operators and local governments remains complex. Grid operators, like TenneT, have historically focused on working with large industrial consumers and are less accustomed to engaging at the local level. Grid Operators like Liander, on the other hand, play a more bridging role between municipalities and businesses. However, there remains a level of distrust from grid operators toward other stakeholders, as they sometimes assume that only they possess the correct insights based on energy data and system profiles (Respondent 20S). Even though, these insights of the grid operators are not shared with for example the municipality (Respondent 23S). The other way around is the same (Respondent 29S): *"At the moment, there is often a lack of insight into each other's plans, which means that municipalities do not always know which expansions grid operators are planning and grid operators are insufficiently informed about spatial developments such as new industrial estates or residential areas" (Respondent 3E).*

Additionally, current participation processes are not always effective. Entrepreneurs and housing associations are frequently involved too late, despite their crucial role in the sustainability of the built environment (Respondents 20S & 7S). *"Spatial use is the core of the discussion and the Netherlands can only be divided once. At present, there is still too much sectoral focus or decision-making per project, which is inefficient. There is a demand for a strategic framework in which the interests of different sectors, such as housing corporations, agriculture, and nature, are weighed up in advance. This prevents the same discussions from arising every time, for example about the loss of agricultural land for solar fields" (Respondent 19S).*

Furthermore, the lack of structure in participatory processes sometimes leads to stagnation. For instance, participation in the National Energy System Plan (NPE) has been limited to online consultations and conferences, which does not facilitate broad, inclusive decision-making (Respondent 29S). Besides, rather than fostering collective solutions in the participation process, discussions are often repeatedly reopened, making participation more of a tool for opposition than a constructive mechanism (Respondent 5E).

"At the moment, local politicians are given every opportunity to get out of something, which only makes the conflict worse" (Respondent 5E).

Political Aspect

While there is widespread recognition of the importance of joint decision-making and integrated planning across the respondents, practice proves unruly. As Respondent 29S argues, facts are often undercut by political discussions and disagreements. The integration of energy and spatial planning is influenced by political dynamics across different scales. Political fragmentation results in municipalities operating independently without sufficient coordination, while national direction is lacking (Respondent 29S). In addition, local politics is at the moment guided by opposition rather than long-term considerations. As Respondent 5E notes, local politics often avoid making difficult decisions, which only increases the conflict and leads to suboptimal outcomes, such as the placement of wind turbines in less suitable locations. Respondent 10E highlights that municipalities tend to act when urgency is tangibly felt, as in housing deals or political pressure from the city council. At the regional level, progress is also hampered by political headwinds, with municipal politics prioritizing its agendas over collective goals (Respondent 25E). Respondent 25E observes that while collaboration works better in regions with inherent cooperative traditions and economic incentives for joint-decision making, a lack of alignment in other areas causes stagnation. Thus, political differences directly influence the effectiveness of collaboration and overall progress.

The political desire for public support often clashes with the need to give direction, set priorities, and make unpopular choices. Making choices at scarcity is one of the biggest challenges. The question of where grid capacity should be expended first—at a business park, a freight loading dock, or a school—is both objectively and politically sensitive (Respondent 30E). Respondent 14E underscores that the administrators

must take on the role of having to start making those difficult and painful choices, as in the end, everyone benefits more from that than ambiguity. With the introduction of the Wgiw, decision-making authority over heat networks is shifting to municipal councils, though public support remains a key factor in implementation. Respondent 4S notes that residents may increasingly need to accept heat networks even if they oppose them, as they may be the most socially beneficial solution. This requires not only a focus on implementation but also a long-term perspective on policy development.

At the moment politically driven ambitions—such as one million charging stations or one million electricity heating pumps—are treated as fixed goals. However, Respondent 2E advocates for more realistic planning based on the actual capacity of the grid. In addition, they call for a greater focus on prioritizing societal functions. Respondent 2E further stresses the importance of considering broader spatial and ecological contexts, such as nature and nitrogen issues, when implementing solutions. This reinforces that energy questions cannot be addressed in isolation, but must be integrated with domains like housing, labor, and social infrastructure (Respondent 7S). This intersection is evident in sectors like glass horticulture, where sustainability decisions intersect with employment, export, and spatial policy, requiring strategic coordination at the national level (Respondents 33S, 13E, 12E & 22S).

Moreover, technical and strategic decisions, such as the construction of heat networks or network reinforcement, are increasingly politically charged, while it asks for broader social and economic considerations (Respondent 14E). According to Respondent 19S, grid operators can no longer operate in isolated sectoral silos, as political and administrative choices increasingly influence grid capacity and prioritization. Yet, the energy transition faces resistance from political and economic interests. Respondent 31E mentions that both grid operators and the national government have interests in maintaining centralizing energy flows, partly due to tax structures and market control. As a result, fundamentally different ways of organizing are not seriously considered.

Finally, the evolving political landscape further complicates matters. The removal of the initial spatial planning ministry VROM, which once provided integrated planning for housing, industry, nature, climate adaptation, and the energy transition, is now seen as a missed opportunity (Respondents 2E & 5E).

These political sensitivities and strategic considerations often lead to choices being postponed or avoided, thereby hindering the progress of the energy transition. Even as awareness and motivation grow, progress can still be hindered by certain stakeholders and systemic challenges embedded in the political and institutional context.

7. Making Sense of the Q-Sorts and Factor Arrays

In this chapter, the results of the Q-study will be analyzed. First, respondents' Q-sorts are analyzed, by providing an overall evaluation of the statements. While there was an extremely high eigenvalue of factor 1, this analysis evaluates whether there are different views on the statements. In addition, the consensus statements will be analyzed. Furthermore, the factor arrays will be analyzed and interpreted into perspectives. The chapter concludes with how the view on the current situation by respondents, described in Chapter 6, influences their view and therefore the perspectives.

7.1 Statement Evaluation

Factor 1 has a notably high eigenvalue, as seen in Table 14, indicating that the first factor explains a large proportion of the total variance in the dataset. Additionally, the relatively high correlation among factors (see Appendix F, Table F.4) suggests a high level of consensus, which is uncommon in Q-methodology, where diverse viewpoints are typically expected. This unique finding will be further explored in the discussion, where a potential reason for this consensus will be examined. The high eigenvalue of factor 1 indicates that there must be consensus on several statements. Therefore, before analyzing the factors in more detail, the statistics of the statements and the consensus statements will be analyzed first. The conclusion in this section is reinforced with examples given during the interviews.

Statistical Analysis of Statements

Diverse analyses are performed on the statements provided in Appendix H. The results of these statistical analyses indicate that, despite the high eigenvalue suggesting a high level of consensus, respondents' rankings of the statements in the Q-grid still differ significantly. According to these analyses, most consensus statements fall under the theme of *Governance Structure*, suggesting that there is mostly consensus on the importance of criteria of governance structure for effective integration and collaboration. The findings also indicate that these statements are mostly neutrally viewed. So, the respondents have a neutral opinion about how the governance structure might support effective collaboration and integration. The theme of *Formal Roles & Collaboration* has the strongest tendency toward negative remarks. Overall, based on the standard deviation, there is a high distribution and clear divide among the respondents regarding how they view the statements, mostly on the themes of *Governance Structure*, *Objective of Collaboration*, *Formal Roles & Responsibilities*, and *Participation & Communication*.

Based on these findings—even though the relatively high correlation and high eigenvalue of factor 1—there seems to be a difference across the statements, indicating that there is a distinct view on important criteria for effective integration and collaboration between spatial planning and energy.

Consensus Statements

The consensus statements show where there exists agreement across the different factors (Newman & Ramlo, 2010). A statement is defined as a consensus statement when its Z-score does not significantly differ across any of the factors. The consensus statements in this research according to the factor analysis are:

1. *Collaboration between spatial planning and energy must take an adaptive form to adjust to new information (1)*
2. *Standardized procedures are essential to effectively integrate energy considerations into spatial planning (3)*
3. *The process of integrating into spatial planning must be tailored to address local challenges (6)*
4. *Specialization within sectors, rather than integration, ensures better decision-making (13)*
5. *Striving for consensus is essential, even if it requires more time and compromises on individual interests (16)*
6. *Municipalities must take the lead in coordinating the spatial integration of energy infrastructure (27)*

Notably, is that three of the six statements belong to the theme *Governance Process*. The other three consensus statements belong to the themes of *Governance Structure, Objective of Collaboration*, and *Formal Roles & Responsibilities.*

Conclusion Statement Analysis

The findings reveal agreement on criteria related to the governance process of integration. This is evidenced by the high number of consensus statements within this theme, a relatively low standard deviation score compared to other themes, and the absence of particularly distinctive results in the statistical analysis. Respondents generally agree on the need for a more adaptive approach, allowing for adjustments based on new developments in the energy transition, emerging challenges such as grid congestion, and the increasing competition for space in spatial planning. Given the dynamic nature of these challenges, adaptability is seen as essential for effective integration. Additionally, there is a shared recognition of the importance of tailoring the integration process to local challenges. Currently, broader spatial and social implications are not considered in the energy transition, resulting in assigned areas that are not suitable for those energy sources. This has resulted in frustration among stakeholders, highlighting the need to better incorporate local conditions into decision-making. Moreover, the findings indicate that a standardized, rigid process is generally viewed as unhelpful, as it creates obstacles in a context that demands flexibility. The analysis also revealed that there is consensus around a neutral view on governance structure-related criteria and the need for integration over specialization. The theme of Formal Roles & Collaboration has the strongest tendency toward negative remarks, for example, that municipalities should not take on the primary coordinating role. Furthermore, striving for consensus is not considered essential, suggesting that respondents prioritize decisive action and higher-level coordination over prolonged negotiations.

Overall, these results indicate widespread recognition of the need for change, decisive action, and stronger integration. However, they also showed diverging views on how this integration should be achieved. These varying views will be further explored in the following section.

7.2 Perspectives

7.2.1 Summary: Evaluation of the Perspectives

In the final step of the Q-methodology, the identified factors are analyzed and interpreted as perspectives. From this point onward, the focus shifts from factors to perspectives. The perspectives represent different viewpoints on the integration of energy and spatial planning. Each perspective emphasizes specific criteria as either important or unimportant in the current integration process. These perspectives are based on the Q-sorts resulting from the factor analysis (Appendix I). Table 15 provides an overview of the position of each statement in these Q-sorts, ranging from 4+ to 4-. To determine the perspectives, the distinguishing statements will be analyzed. In addition, the highest-ranked (+4, +3) and the lowest-ranked (-4, -3) statements will be analyzed for each factor. For the interpretation of the factors, qualitative data from the interviews are used.

Table 15 *Factors with Corresponding Rankings*

Statement Number	Factor 1	Factor 2	Factor 3
1. Collaboration must take an adaptive form	+2	+2	+1
2. A more proactive approach is essential	+4	+3	+2
3. Standardized procedures are essential	-2	-1	-1
4. Conflict resolution mechanisms must be part of decision-making	-1	+1	0
5. Monitoring and evaluation are essential	0	0	+1
6. The process of integrating must be tailored to address local challenges	0	+1	+1
7. Decision-making must be decentralized	-1	-3	-2
8. Coordination mechanisms must be clear and formally established	0	-1	0
9. Assigning an independent chair/program manager improves coordination	+1	0	-2
10. Regional steering groups are the heart of the cooperation	+2	0	0

11. Defined roles and responsibilities must be clearly assigned	+1	+2	-1
12. Effective collaboration relies more on strong institutional arrangements	-2	-3	-4
13. Specialization ensures better decision-making	-3	-4	-3
14. Jointly developing the energy vision and spatial planning	+4	0	-2
15. Current grid limitations should not be an excuse to avoid investing in long-term projects	+2	0	+3
16. Striving for consensus is essential	-1	-1	-2
17. Joint-fact finding is essential	+1	+3	0
18. Focus must be on direct project realization	-3	+1	-4
19. Important in investing building relationships	+1	+3	-1
20. Identity and possibilities of the area should guide decision-making	0	+2	+2
21. A clear task and goals must be defined together	+1	+2	+3
22. (Healthy) competition is needed	-1	-2	0
23. Building trust is the most important criteria	-1	+4	+4
24. The province must take on a more coordination role	+3	-2	+3
25. Sustainability of the greenhouse horticulture sector must be coordinated regionally	-2	-2	-3
26. The grid operator must be able to say no to electricity demands of industries	-4	-3	+2
27. Municipalities must take the lead in coordinating	-2	-1	-3
28. Residents determine whether a heating network will be installed	-3	-4	0
29. It is desirable that the national government take on a more coordinating role	+3	+1	-1
30. Total transparency in information sharing is a must	+3	+1	+1
31. Area users must be given an active voice in decision-making	-4	-2	-1
32. Collaboration is most effective when local communities are engaged from the start	0	-1	+1
33. Involving all relevant stakeholder form the start is crucial	0	0	+2
34. Successful collaboration relies on speaking and understanding each other's language	+2	+4	+4

Table 16 provides a summary of the three perspectives. It describes how each perspective approaches the key themes. This summary is further supported by the spider web diagrams, which visualize the distinguishing statements (see Appendix J). Table 16 and the visualizations make clear that there are both similarities and differences across the perspectives.

Perspective one emphasizes the need for a more proactive approach and increased collaboration, whereas perspective two advocates the need for a more central approach with defined roles and responsibilities. In contrast, perspective three does not consider these themes—structure and process—essential for integration. The objective of the collaboration is not essential for integration, according to perspective one, while the focus on long-term vision is key. However, the objective of collaboration is, according to perspective two, a key theme, highlighting that several informal elements improve integration and collaboration. Perspective three also considers the need for defined clear tasks and goals and trust-building. Regarding the formal roles and responsibilities, perspectives three and two both acknowledge the need for a more coordinated role of the province, but according to perspective one, this is in collaboration with the national

government and perspective three with the grid operators. Roles and responsibilities, however, are not seen as essential in perspective two. Finally, all three perspectives highlight criteria of participation and communication as essential, but their emphasis differs. Perspective one underscores the must for transparency, while perspective two emphasizes the importance of speaking and understanding each other language. Perspective three agrees on the need to speak and understand each other's language but also highlights stakeholder involvement.

A more detailed description of each perspective, including references to the interviews, will be provided further in this chapter.

Table 16 *Summarized Description of the Three Perspectives*

	Perspective 1 **Directive Design** *A Top Down, Collaborative, and Proactive integration*	Perspective 2 **Relational Pragmatism** *Pragmatic and Informal Collaboration*	Perspective 3 **Adaptive Alignment** *Goal-Oriented and Adaptive Integration*
Governance Process	A change in the approach is essential, especially a more proactive approach.	Decision-making must not be decentralized any further in clusters/centers. A more central approach is essential.	A more proactive approach is desirable; however, the process criteria are not the most essential element for integration.
Governance Structure	A structure fostering a collaborative approach regarding the energy vision and spatial planning is essential.	Defining roles and responsibilities must be clearly assigned before starting with the process.	The focus lies more on achieving shared goals than on strong institutional arrangements, structure.
Objective of Collaboration	The objective of the collaboration is not very important, only the focus on primarily the long-term vision.	Many informal elements concerning the objective of collaboration are important, such as trust-building trust, joint-fact, and building personal relationships.	A clear task and goals must be defined firstly, additionally trust is very essential.
Formal Roles & Responsibilities	Both the province as the national government should take on a more coordination role.	Criteria concerning formal roles & responsibilities are not essential for establishing integration.	The province must take on a more coordination role. In addition, the gird operators should also become more prominent to establish effective integration.
Participation & Communication	Total transparency of information-sharing is a must.	Speaking and understanding each other language is essential for effective integration.	Mutual understanding and speaking the same language are essential, however stakeholder involvement is also essential.

Figure 15 provides a visualization of the differences and similarities across the three perspectives, including most of the statements which will be described in more detail in the following section.

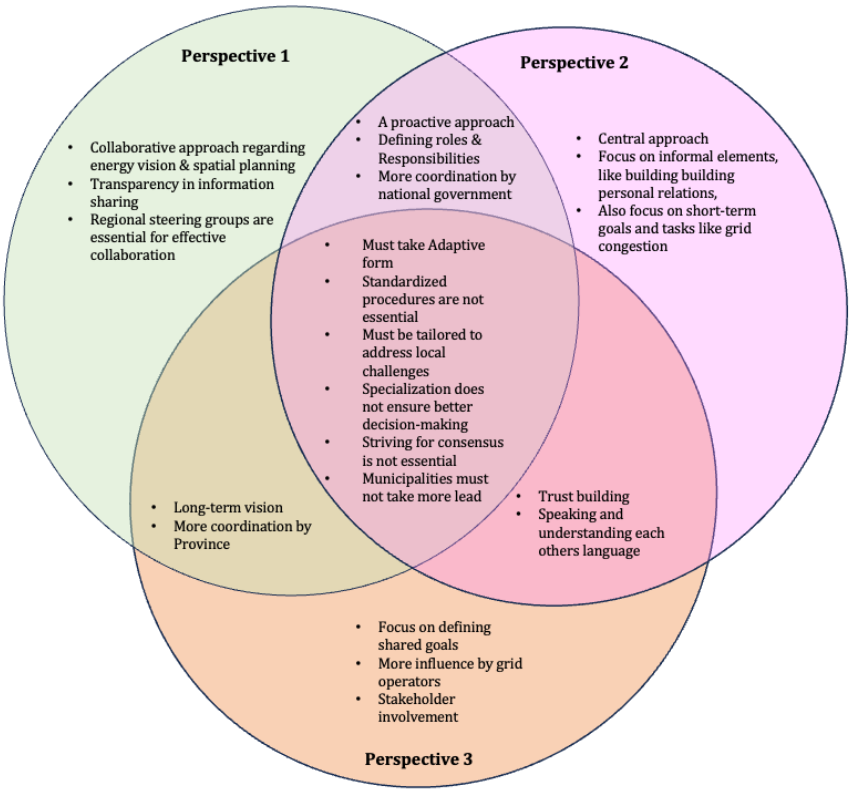

Figure 15 *Venndiagram of the Perspectives*

7.2.2 From Factor to Perspective

This section provides a detailed description of every perspective. The statements related to the perspective—most extreme and distinguishing—are highlighted with quotes and information from the interviews. The respondents are referred to by their respondent number, as noted in Table 1, and their professional domain—E for energy and S for spatial planning. The statements are also referred to with their statement number followed by their position in the perspectives' Q-sort, which are provided in Appendix I. As the current situation highlights the significant influence of political dynamics on effective collaboration and integration, this section provides a brief political reflection on the specific political challenges associated with each perspective. These reflections are based on the description described in Chapter 6 and the input of respondents.

Factor 1 Directive Design
A Top-down, Collaborative, and Proactive Integration

The emphasis in this perspective lies on formulating long-term policy and strategic vision, collaboratively developed and steered by the national government and the province. The regional level, in turn, ensures that this overarching vision is effectively translated into municipal policies and local implementation strategies. Highlighting the need for a proactive approach and transparency in information-sharing.

This perspective emphasizes the importance of the themes of *Governance Process* and *Governance Structure* for effective collaboration and integration of energy in spatial planning. This perspective underscores the necessity of collaboratively developing the energy vision in conjunction with spatial planning frameworks, such as the *Omgevingsvisie (14,+4)*. These documents require an integral approach to all the different spatial claims, like new residential areas, industrial estates, nature and landscape, climate adaptation, and the energy transition (Respondent 5E).

*"At the moment, the energy vision is established without a direct connection with the Omgevingsvisie, making it very sectoral" (*Respondent 14E). Respondent (14E) emphasizes the need for collision tests—critical testing of the performance and effects—with spatial planning to realize a more integrated and coherent

approach. This will also decrease the chance that tension, conflict, and resistance will arise (Respondent 18S).

As respondents (8S & 20S) highlight the need to take energy into account from the beginning ("*At the front"*), a proactive approach is therefore deemed essential in this perspective (2, +4). Without a proactive approach, we will continue to lag behind the facts, and the energy transition will become increasingly difficult to achieve. *"By actively steering now and integrating energy as a fixed component of spatial planning, it can be prevented that as soon as the current network problems are solved, new bottlenecks will immediately arise. This requires foresight and solid management to ensure structural and sustainable solutions." (Respondent 13E).*

Therefore, according to this perspective, both the province and the national government are expected to assume a coordinating role, ensuring a structured and coherent decision-making process. They are primarily responsible for establishing the overarching framework, within which lower levels of government and relevant stakeholders operate (29, 3+;24, 3+). Respondent 1E sees a clear top-down structure: "*First the national government must provide clear choices and afterwards the province will look at how you can set up your logistic clusters."*

So, according to this perspective, decision-making authority must be concentrated at the provincial and national levels, while stakeholders such as residents, area users, and grid operators have a more limited role in this perspective. Area users must not be given an active voice in decision-making (31, -4), residents should not determine whether a heating network will be installed (28, -3), and the grid operator must not be able to refuse the electrification of industries like brick factories (26, -4).

Several respondents (3E, 6E, 22S & 14E) indicate that area users must be heard, but are not authorized to have an active voice in the decision-making. *"Involving them can work against you. Sometimes a choice simply has to be made from above and there is no longer any say in that choice". (Respondent 22S)*

Regarding the input of the residents, although the participation of residents is considered important, *"acceptance is sometimes the highest achievable" (Respondent 13E).* Respondent 13E gives a reason that residents are often reluctant to make changes behind their front door, especially if these entail costs. In addition, residents often lack the technical and substantive knowledge to be able to properly assess the broader impact of such decisions. Therefore, choices should be made at a higher administrative level, with room for participation and consultation, but not as a decisive factor. Resident 8S adds that when residents are given this responsibility, this could result in heating networks never getting off the ground: *"Although it is important to take residents' objections into account, the realization of heating networks is necessary, especially given the current international uncertainties surrounding energy."*

Finally, the gird operators should remain in a neutral role and cannot determine for themselves whether a particular development is justified or not regarding this perspective: "*Rejection of projects can only be based on national or local policy choices, not by the grid operator itself." (Respondent 3E)*

However, while a decentralized approach is often viewed critically from other perspectives, this perspective adopts a less negative stance (7; -1), recognizing the regional level as a crucial intermediary between municipalities and higher governmental bodies (10, +2). This perspective emphasizes that regional steering groups are the heart of the cooperation and are essential for integration.

Respondent 16E underscores that the province must play a clear but not excessive role in the coordination of energy issues, and the regions can contribute to that: "*Effective regions can independently take on many substantive tasks, and the province must focus on supra-regional decision-making instead of duplicating work."* However, too many consultation tables lead to inefficiency, both in decision-making and in the involvement of grid operators, who then have to repeatedly tell the same story at different levels: *"Good coordination between the regional and provincial scale is crucial to prevent overlap and* fragmentation*" (Respondent 16E).*

This intermediary function of the region level is also considered essential for bridging the gap between local implementation and overarching strategic objectives. However, good collaboration between the regional level and the provincial level is therefore required. While regions have a better view of the local identity and context but do not have the formal competent authority, respondent 14E sees a collaboration

between these two levels: *"The province as the coordinating level and the regions as the parties that contribute local knowledge and interests."*

The regional level is described by respondents as: *"a place to share knowledge" (Respondent 2E) , "an important connecting link" (Respondent 33S), "the link between national policy and how it can be applied at a local level" (Respondent 21S).* Respondent 15E adds that the region level is clear and has a network with short lines: "*The regional level is a level where you can still reach each other by bike."*

However, the region level operates within the frameworks established by the province (Respondent 13E). So, in this integration, a distinction must be made between decision-making based on the *Huis van Thorbecke* (The Dutch system of decentralized government) and cooperation at a regional level, where municipalities and stakeholders exchange knowledge and cooperate on an equal basis (Respondent 15E). Therefore, this perspective aims for a more top-down approach, including the province and national government, who coordinate specifically at the regional level to execute the strategies, collaboration, and projects.

Unlike other perspectives, this perspective acknowledges the potential added value of an independent chair, which can enhance coordination and neutrality in decision-making processes (9, 1+). However, the efficiency of this independent chair depends on the person assigned (Respondents 12E & 11E).

Notably, collaboration objectives are not considered a primary concern in this perspective compared to the other perspectives. Indicating that investing in personal and cross-sectoral relationships is not as important (19, +1) and successful collaboration does not rely that much on speaking and understanding each other's language (34, -2). The perspective highlights the essential focus on long-term vision (18, -3). Therefore, the current grid limitations should not be an excuse to invest in long-term electrification plans (15, +2). A clearly defined task and goal are also not deemed prerequisites for initiating the integration process recording to this perspective (21, 1+). *"The energy transition is such a big, impactful transition that there is no single goal, but many goals" (Respondent 31E).* Therefore, Respondent 31E emphasizes that in complex issues within the energy transition, decision-making should not be postponed by endless discussions about interpretations. In this field, there are many different perspectives and expectations about what someone means. Instead of first talking and analyzing extensively before a process starts, respondent 31E advocates making these discussions part of the decision-making process right away. This forces parties to actively take a position and jointly solve while ideas, goals, and needs are exchanged and formed along the way. This results in a learning process in which decision-making and cooperation develop "*along the way*" instead of everything having to be fully thought out in advance.

Furthermore, building trust is not perceived as the most critical criterion for effective collaboration (23, -1), distinguishing this perspective from others that prioritize interpersonal or institutional trust as a fundamental component of governance processes. Instead, the primary focus in this perspective lies on the governance process and the institutional structure, with an emphasis that defined roles and responsibilities must be assigned clearly (11, +1): "*This ensures that collaboration takes place at a set pace and that concrete decisions are made at predetermined times. By properly recording these structures, it can be agreed on how and when collaboration takes place, which prevents processes from getting bogged down. (Respondent 8S)"*

Finally, total transparency in information-sharing is a must in this perspective (30, 3+), as it is perceived as a mechanism that indirectly fosters trust among stakeholders (Respondents 13E & 8S). Respondent 23S emphasizes also the consequences of withholding information: *"Sharing information is important. When there is a feeling that things are being withheld, the cooperation will be more difficult".*

According to this perspective transparency and governance processes outweigh the importance of trust.

"*Having trust is important, but it doesn't have to be the most important thing. Suppose there is no trust, but there is a binding agreement that no one can get out of, then that's fine too."* (Respondent 8S) and "*Although trust helps to make cooperation run smoothly, it is not always decisive for decision-making. Sometimes, managers have to make choices that are not supported by all parties, but that are clear and substantiated. In such cases, transparency and clarity in decision-making can still lead to trust in the long term, even if the outcome is not immediately desired by all stakeholders*." (Respondent 14E)

Political Implication of the Perspective

This perspective highlights the need for a top-down approach to achieve more effective integration and collaboration. However, as discussed in Chapter 6, differing political visions across various government levels often hinder decision-making and can lead to process stagnation. Political interests and preferences significantly influence how stakeholders behave and engage. While the regional level is seen as a crucial intermediary between the local and national levels, it is composed of multiple municipalities, each with its own political agenda and vision. This internal diversity can complicate coordination and alignment. Although this perspective values a long-term strategic vision, political realities often favor short-term goals, as these are more tangible, time-bound, and politically advantageous. Furthermore, transparency in information-sharing is identified as essential. Yet, the willingness to share information is frequently influenced by political or strategical considerations (Respondent 9E), and in some cases, information is deemed politically sensitive, making transparency even more difficult (Respondent 25E).

Factor 2 Relational Pragmatism

Pragmatic and Informal Collaboration

Rather than focusing primarily on institutional agreements—such as formally defined roles and responsibilities—this perspective underscores the importance of informal elements in cooperation. Achieving a shared goal requires genuine human interaction or *mensenwerk*. The quality of collaboration itself is the key to success, rather than rigid structures or hierarchical arrangements.

"It really is human work, so building trust is very important" (Respondent 21S)

This perspective highlights the critical role of informal collaboration between stakeholders. Building trust, fostering mutual understanding, and developing a shared language are essential for effective cooperation. Joint fact-finding, proactive engagement, and strong personal and cross-sectoral relationships serve as the foundation for successful collaboration. The effectiveness of the collaboration depends on the administrative culture (trust, the way of working together, and traditions): *"When this culture of trust and mutual consent is not there, the cooperation also proceeds less well. It is really about trust, mutual consent, and speaking and understanding the same language, these are the success factors of cooperation" (Respondent 15E).*

According to this perspective, building trust is the most important criterion for effective collaboration (23, +4): *"If there is no basis of trust, then you see that a collaboration will never be effective" (Respondent 25E), "If you trust each other, you have come a long way" (Respondent 30E), "Trust is the basis of many processes" (Respondent 13E), "Building trust is crucial for effective cooperations. It forms the basis on which joint decisions are made" (Respondent 18S), "Trust is the foundation of the collaboration, especially because of the different layers." (Respondent 24E)*

Respondent 21S indicates that the importance of building trust should not be underestimated. When there is good trust, arrangements, and clarity are less important (Respondent 15E). Also, speaking each other's language is important to build trust (Respondent 2E). Successful collaboration requires investing in each other's understanding and language (34, +4). It helps to reduce miscommunication and better align all objectives (Respondent 21S), especially between domains that originally had little cooperation (Respondent 14).

Additionally, according to this perspective, joint-fact finding is essential for effective decision-making (17, +3). It helps to reduce misconceptions and myths (Respondent 9E), and makes sure that choices are made based on the same information (Respondents 3E& 33S).

"Join-fact finding is useful, to have the same basis to enter into discussions with each other. Sectors retain their expertise and that is good, but that basis of and common knowledge is of added value." (Respondent 19S)

This joint process helps to bridge different levels of knowledge and prevents misinterpretations of facts from hindering cooperation. It ensures that parties are on the same page and use the same facts as a starting point, even if they do not fully agree in the end. This creates more understanding of each other's perspectives and keeps the discussion constructive (Respondent 18S). This aligns with the strong emphasis on this perspective on integration instead of specialization within sectors (13, -4).

Finally, it is important to invest in personal and cross-sectoral relations according to this perspective (19, +3). It helps to build trust and understand each other: *"Trust will be built by building personal relations" (Respondent 6E)* and *"It is important that we can understand each other and therefore invest and build relationships" (Respondent 1E), "The different worlds and parties need to understand each other better and investing in relations can contribute to that" (Respondent 3E)* and *"You always have to know the sectors, to be able to collaborate" (Respondent 34S).*

In addition, defined roles and responsibilities must be made clear and transparent at the front in this perspective (11, 2+). Clarity about the roles and responsibilities is essential to prevent misunderstanding and conflict (Respondent 18S). It results in transparency about everyone's expectations and where we stand. Respondent 25E thinks it is a "*No Brainer*" whether roles and responsibilities should be defined.

Assigning roles and responsibilities is essential for structured cooperation between energy and spatial planning and must be done proactively, while this perspective underscores the importance of a proactive approach (2, +3). But success does not only depend on formal agreements; it is also about understanding and awareness within organizations. Therefore, this perspective underscores that effective collaboration does not rely more on institutional arrangements (12, -3). While formal agreements and structures are necessary to give people the time and mandate to make decisions, Respondent 14E underscores the value of a more pragmatic approach where cooperation develops organically. This balance between structured organization and informal cooperation is seen as essential in this perspective:

These defined roles help with creating awareness, but in the long term, it should become a given. Energy should no longer be something 'specific' that requires separate agreements but an integral part of how we make spatial choices. This, therefore, requires not only frameworks but also a cultural shift and knowledge sharing within and between organizations. *"At some point, energy must become more status quo" (Respondent 14E).* Respondent 35S underscores that trust will be a stimulating factor for this process and collaboration, highlighting the need for informal elements.

A distinguishing aspect of this perspective is its pragmatic approach to current challenges, particularly concerning grid limitations. Compared to other viewpoints, this perspective acknowledges that existing constraints in the energy grid present immediate concerns. Indicating that the current grid limitations should sometimes be an excuse for long-term projects (15, 0).

"The current grid congestion problem makes us realize that not everything is feasible and that there is a limit to what the electricity grid can handle. This realization should lead us to sometimes ask whether investments in electrification should not be better spread or adjusted. Sometimes postponement is necessary and it is important to think about the right route in the long term. This does not mean that electrification should be stopped, but that the speed and priorities must be in line with what is feasible at that time." (Respondent 2E)

"*The scarcity and suboptimal choices must be taken into account. The goals of 2050 cannot be reached by purely wishful thinking or taking cost efficiency as the only guideline but by accepting that there are limitations and difficult choices. This means that some electrification projects or locations will not be feasible in the long term, or even never. This is a fundamental principle of Spatial Energy planning: planning and phasing energy development based on realistic limitations and not just on ambitions."* (Respondent 7S)

So, in this perspective, there is a greater emphasis on direct project implementation rather than solely focusing on long-term electrification strategies (18, +1). Addressing grid congestion is considered a priority to enable further progress. At the moment, there is much focus on vision and policy making, while some things need to happen now (Respondent 6E). *"At the moment, there is too much talking and too little action. As a result, the focus should shift slightly more towards direct project realization instead"* (Respondent 9E). The perspective emphasizes the need for parallel working on the long-term vision and short-term investment plans.

"There must be a focus on both project realization and vision and policy. Despite this, indeed, attention must increasingly go to realization because the time that we have to realize is getting shorter. But you will still need strategy and policy for that and even more crucial, and that is also Spatial Energy Planning, creating a funnel for decision-making, in which choices are gradually structured and refined." (Respondent 7S)

Furthermore, this perspective does not advocate for an increased coordination role for the provincial government (24, -2). Even though it suggests that the national government should take on a bit more prominent role in setting boundaries and defining preconditions (29, 1+), formal roles and responsibilities are not a key theme within this perspective. The national government must set clear frameworks and rules, while trust between parties is still the most essential criterion to enable cooperation (Respondent 34S). Respondent 20S highlights: *"Currently the province is taking on too large a role, and therefore sees more potential in national management with executive responsibility delegated to the regional level instead of provincial".*

This perspective is more focused on a central approach than on decentralized in multiple clusters and centers (7, -3). Therefore, the involvement of other stakeholders should be minimal. Residents should not determine whether a heating network will be installed (28, -4), and the grid operator should not be able to have input on which industries will be provided with electricity due to the scarcity of electricity (26, -3). Additionally, area users should not be given an active voice in decision-making (31, -2).

Political Implication of the Perspective

This perspective highlights the importance of informal characteristics of collaboration, such as building relationships and trust between stakeholders. However, these informal dynamics are sensitive to political changes. Shifts in political leadership and electoral cycles can easily disrupt established relationships. Regarding joint-fact finding, the current situation shows that this often gets overshadowed by political discussions and disagreements. In addition, the focus on short-term planning and ambitions can result in political pitfalls particularly when broad systems and long-term issues are overlooked. Finally, because this perspective places less emphasis on formal roles and responsibilities, it can lead to situations where no single actor feels ownership or urgency to act. This lack of formal accountability creates political challenges, as stakeholders may avoid making decisions or delay action when issues become politically sensitive.

Factor 3 Adaptive Alignment

Goal-Oriented and Adaptive Integration

The third perspective advocates for a long-term, goal-oriented approach with a focus on stakeholder involvement. Highlighting the need for improved communication, mutual understanding, and trust-building. The process should be adaptive and coordinated primarily by the province in collaboration with the grid operators.

This perspective asserts that effective collaboration and integration rely on mutual understanding, the ability of stakeholders to communicate in a shared language, and trust-building (23, +4; 34, +4). However, this perspective differs in the importance of establishing a clear and collectively defined goal. This must be done before initiating the decision-making process (21, 3+). *"Agreeing on shared goals are the words, and the responsibilities and processes that follow are the actions"* (respondent 19S).

Having a clear task and goal makes the collaboration more efficient and prevents moments of misunderstanding. It helps to make everything more concrete and preventing that there will be just endless talking (Respondent 3E). However, not only the goals and tasks should be formulated, but the underlying reasons and assumptions should also be made explicit (Respondent 29S).

> *"It is important to give direction and clarity in a diffuse field of energy solutions. It helps to create a better understanding of why certain choices are hard and why certain solutions are or are not feasible"* (Respondent 9E).

Without a clear shared framework, decision-making can stagnate, while clear agreements result in more focus and improvability (Respondent 11E). It is not necessary for all parties involved to fully agree on the content, while the project description or start note must be clear to everyone. This creates a shared understanding of the process, regardless of the final substantive outcomes (Respondent 12E).

The primary focus according to this perspective should be on long-term electrification projects, ensuring that grid congestion is not used as a justification for delaying necessary investments and strategic planning (15, 3+): "*Grid congestion should not be an excuse to stand still. Thinking about electrification and smart energy solutions needs to happen now, despite limitations"* (Respondent 33S). The limitations are also

a chance to think more strategically about the future: *"Congestion has sharpened the discussion about the spatial and energy planning of the Netherlands and forces more conscious choices. Instead of simply expanding according to old methods, the current scarcity offers the opportunity to fundamentally reconsider how the energy system should be set up in the long term"* (Respondent 14E).

In this perspective, the provincial government is expected to assume a more prominent coordinating role, facilitating integration efforts (24, +3). The province should make decisions, while much of the energy infrastructure will be built on the provincial scale (Respondent 12E). Therefore, the sustainability of greenhouse horticulture should not be coordinated regionally (25, -3). However, expanding the national government's authority to set boundaries and preconditions for integration is deemed undesirable in this perspective (29, -2). The national government lacks knowledge of local characteristics and dynamics within specific regions, which is essential for effective collaboration and tailor-made solutions (Respondent 12E). Also, the municipalities should not take the lead in coordinating (27, -3).

Unlike other viewpoints, this perspective posits that formally defining roles and responsibilities is not a prerequisite for successful cooperation (11, 0). While the process of integration is very much in development, roles and responsibilities can change quickly, which requires flexibility (Respondent 11E). In this perspective, the focus lies on establishing goals and tasks and keeping the division of roles flexible. Effective collaboration relies on achieving a shared goal instead of strong institutional arrangements according to this perspective (12, -4): "*It is about what is delivered, not necessarily who does what within an organization"* (Respondent 23S). The efficiency of the integration relies more on dynamic and collaborative decision-making than on a rigid assignment of responsibilities (Respondent 31E). Therefore, the focus must be on strategy and policy development instead of direct project realization (18, -4).

Moreover, this perspective suggests that investing in personal and cross-sectoral relationships is not very important (19, -1). When there is too much focus on building relationships, the project implementation will not be completed (Respondent 6E). As Respondent 29S highlights: *"It is sometimes necessary to 'call a spade a spade' rather than just stick to generalities."* Instead, the success of the collaboration in this perspective is primarily contingent upon mutual trust and the ability to communicate effectively. Building trust and speaking and understanding each other's language are key criteria within this perspective (34, +4; 23, +4).

A distinguishing feature of this perspective is its approach to stakeholder engagement. While it acknowledges the importance of involving stakeholders from the start (33, 2+).

> *"Involving all relevant stakeholders from the start is crucial for successful collaboration, even if this slows down the decision-making process. Involving stakeholders early on often creates a greater understanding of the final choices, even if they do not fully agree with them. This increases acceptance and makes it easier to explain and justify decisions." (*Respondent 12E)

Decisions regarding stakeholder involvement should be context-specific, taking into account the particular circumstances and issues at hand. Therefore, there must be clarity about what is thought of participation and what is done with it at the front of the process. Choices will have to be made about who is involved, when, and how (Respondent 11E): "*It is important to first have a clear understanding of your goals and determine the framework for participation before involving other parties*" (Respondent 21S). Involving respondents regarding the installation of heating networks should be considered during the process (28, 0). In this perspective, there is also more emphasis on the role of the grid operator in the collaboration: *"The grid operators provide the knowledge that municipalities and provinces use to make choices."* (Respondent 1E) Therefore, this perspective underscores that grid operators must be given a significant role in discussions regarding the electrification of industries in the Netherlands (26, +2). While ultimate decision-making authority rests with formally established governing bodies, grid operators possess valuable expertise that should inform the decision-making process. The grid operators have insight and knowledge about what is still possible and what is not, based on time and costs. "*It is desirable that the grid operator provides advice, for example in the form of an energy test."* (Respondent 15E)

One proposed mechanism for incorporating their input is the *Energietoets (Energy Test)*. This test can help to identify areas where energy demand and infrastructure coordinate. This would mean that there would be a kind of energy budget per area in which the impact of new developments is included in the decision-

making. An Energy Test should, therefore, primarily help to set boundaries and prioritize developments without compromising the safety and reliability of the grid as highlighted by respondent 14E.
As this perspective emphasizes the need for stakeholder involvement and a goal-oriented process, it underscores the importance of integration rather than specialization for better decision-making (13, -3). According to this perspective, assigning an independent chair/project manager will not improve coordination and decision-making (9, -2). While there is good collaboration, an independent chair is not needed (Respondent 28E): *"An independent chair is not crucial, the efficiency of the integration relies more on the collaboration of the involved parties."* (Respondent 9E).

Political Implication of the Perspective
Politically driven ambitions or shifting policy priorities can undermine or destabilize long-term goal-setting, which this perspective relies on. While flexibility and stakeholder engagement are seen as essential, political interests may lead to selective forms of participation or give attention to the opposition voices, especially when decisions are politically sensitive. In addition, this perspective highlights the important role of the grid operators in achieving integration goals. However, this becomes complex in a political context, as grid operators lack formal decision-making authority. Respondent 14E warns against situations where political parties or governmental bodies can shift too easily with the priorities of grid operators.

7.3 Foundations of Perspective: Analyzing the Reasoning of Stakeholders

As the descriptions of the perspectives above highlight, there are quite some differences between the three perspectives. There are however also some similarities, as made clear by Figure 16. First, the need for a proactive approach. Second, the importance of speaking and understanding each other language. Third, the fact that all three perspectives highlight the importance of more coordination, however on which level, remains fragmented. Fourth, institutional arrangements are not seen as more important than achieving shared goals, while all perspectives see defining a clear goal and task as something positively contributing to the integration. These agreements across the perspectives align with how respondents view the current situation and where there is room for improvement. The respondents underscore the challenge of no established history or culture of collaboration between energy and spatial planning, making it difficult to transition towards intensive collaboration. Structural differences in approach, objectives, and even terminology further complicate efforts to align the two domains. Although various programs and collaborative initiatives have been launched, a lack of coordination results in more discussion than concrete action. The similarities between the perspectives, address these challenges.

Respondents emphasized that actions are currently taken reactively, as traditionally, energy has been considered an afterthought in spatial planning. However, due to grid congestion, the increased spatial demands of transitioning to a decentralized energy system, and time pressures, a reactive approach is no longer viable. Moreover, communication and mutual understanding are essential, particularly according to perspectives two and three. This aligns with respondents' concerns about the challenge of not understanding each other, often speaking a different language which results in inefficient collaboration. Additionally, respondents highlighted the current fragmentation of responsibilities, as a result of greater coordination being assigned to the local level. This is paired with a lack of responsibility at all levels, with stakeholders hesitant to take initiatives due to limited knowledge, unclear mandate, or lack of perceived urgency, contributing to further fragmentation. This acknowledged challenge aligns with a more centralized shift in coordination across all three perspectives. However, there remains a difference in opinion on who should take on this coordination role—the national government (perspective one) or the province (perspective one and three). Furthermore, respondents highlighted the absence of shared goals and a unified vision, leading to stagnating collaboration. The lack of clear objectives makes it hard to achieve effective integration. This is also reflected in the perspectives, where defining clear goals is seen as more important than strong institutional arrangements.

Notably, even though trust-building emerged as a key criterion only in perspectives two and three, respondents also mentioned that building trust is essential for effective collaboration, with existing evidence showing that trust results in better and more efficient integration efforts.

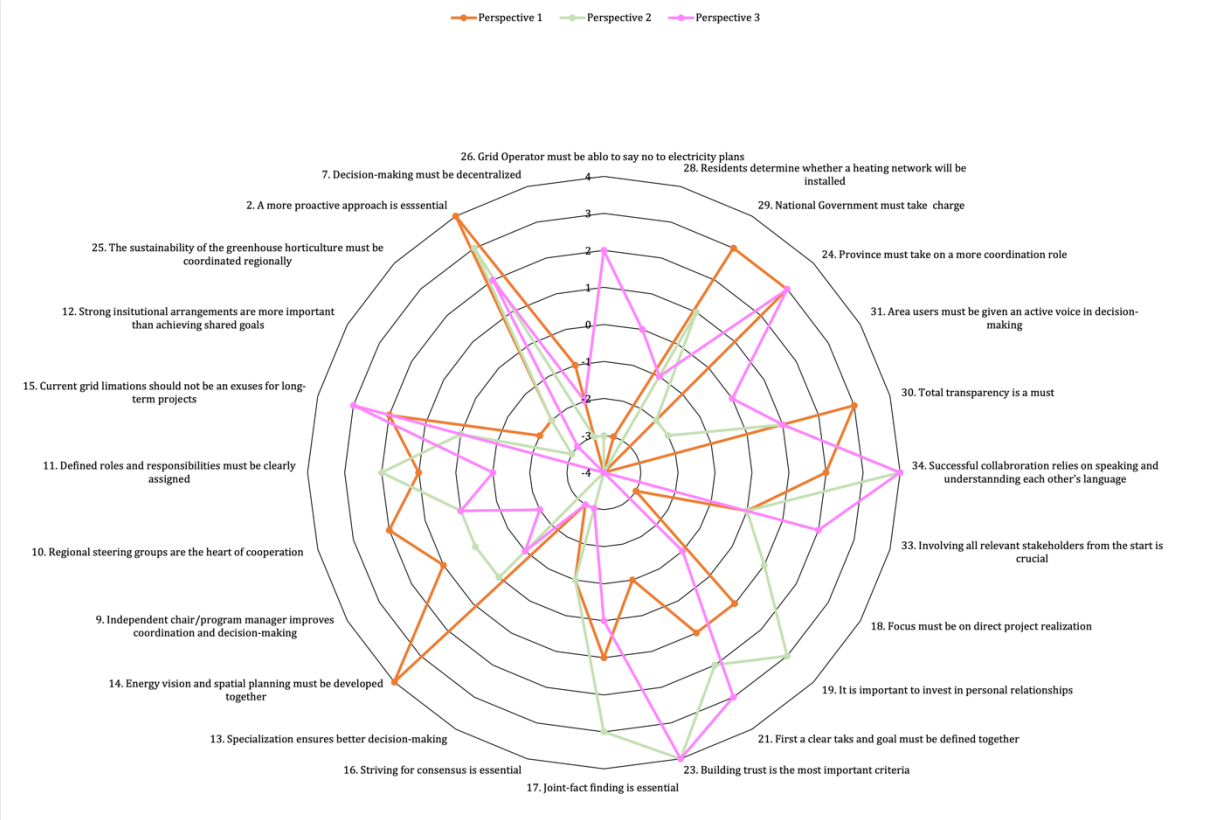

Figure 16 *Overview of the Perspectives' Scores on Representative Statements*

Professional Background Influences

Several analyses were conducted to explore whether differences in viewpoints can be explained by respondents' professional backgrounds. The analyses focus on the influences of domain affiliation, sector type, and project experience. More detailed statistical results and analyses can be found in Appendix K.

Highest Loading per Respondent

Based on the statistical analysis of how domains are distributed across perspectives (Appendix K, Table K.1), the energy domain appears to be evenly distributed across the three perspectives. This suggests that respondents within this domain relate to all three perspectives in a balanced way when considering collaboration and integration of energy and spatial planning.

In contrast, respondents from the spatial planning domain show a preference for perspective two, with 64% of them loading highest on this perspective. This indicates that they value informal elements and a pragmatic approach in collaboration and integration between energy and spatial planning. Notably, only one respondent from the spatial planning domain loaded highest on perspective three, suggesting that goal-oriented, adaptive, and inclusive collaboration is seen as less important among spatial planners. Interestingly, while there are differences between domains, the analysis also reveals variability within each domain in how collaboration and integration are perceived. Especially in the Energy domain, since respondents are distributed evenly across all three perspectives, indicating no single dominant viewpoint.

Moreover, the average factor loadings across perspectives and domains are quite similar (Appendix K, Table K.1). This implies that, although respondents may differ in which perspective they align with most strongly, each perspective contributes similarly to the understanding of integration and collaboration within each domain.

Lowest Loading per Respondent

Each respondent was also analyzed based on the perspective they aligned with the least (Appendix K, Table K.2). The results showed that most respondents of the energy domain scored lowest on perspective three, suggesting a lower perceived relevance of adaptive, inclusive, and goal-oriented integration and collaboration strategies. In the spatial planning domain, the lowest loadings were more evenly distributed across all perspectives.

What is particularly interesting is that perspectives are both the highest and lowest-scoring perspectives within the same domain**,** depending on the respondent. This suggests a level of intra-domain diversity, with professionals holding differing or even opposing views about the same perspective, and therefore also on the integration of energy into spatial planning.

In addition, the average loading for the energy domain on perspective one is negative, indicating that these respondents tend to respond in an opposite pattern to what perspective one represents. Perspective one highlights the importance of long-term and collaborative planning collaborating, transparent data sharing, and a more top-down, coordinated approach. However, these principles may be at odds with the realities of the energy domain. Energy professionals often operate within tight timelines, focusing on short- to medium-term deliverables, making long-term strategic collaboration less relevant. Moreover, the call for transparency in data sharing may conflict with sector-specific limitations such as data privacy regulations. These constraints may lead to professionals in the energy field to perceive the principles of perspective one as impractical or misaligned with their operations constraints, potentially explaining the observed negative factor loadings.

Influence of Experience and Sector

Additionally, statistical tests were performed in SPSS to analyze whether certain other background variables might explain differences in perspective alignment (Appendix K).

The comparative analysis of all three project experience types — energy projects, spatial planning projects, and integrated projects — suggests that professional project experience is associated with a relative shift in perspective. Across all three project experience types, Perspective two consistently emerges as the most dominant, especially among respondents with spatial planning project experience or those working in the spatial planning domain**.** This perspective emphasizes pragmatism, informality, and adaptive coordination, suggesting that both professional background and practical integration experience may foster appreciation for this mode of collaboration. This suggests that practical experience influences how professionals assess this perspective, potentially making their view more critical or nuanced over time. There could be several explanations for this shift. Spatial planning professionals often operate within structured regulatory frameworks and are accustomed to formalized, long-term planning processes. As such, they may favor formal mechanisms for collaboration and integration, drawing on positive experiences within this structure. Alternatively, it is also possible that previous experiences with informal or ad hoc collaboration were perceived as ineffective or frustrating, which may lead them to devalue Perspective two in favor of more structured approaches.

Specific to the energy domain, experience tends to lead to a more balanced distribution across all three perspectives. One remarkable insight, is that experience in spatial planning project shifts to actually more preference to perspective three, indicating that these projects showed the efficiency of more inclusive and goal-oriented collaboration.

In addition, an analysis has been performed on the influence of the sector on the respondents' views. Respondents from the public and private sector mostly aligned with perspective two, while perspective three was primarily associated with the public utility sectors.

However, all these analyses need more in-depth research, with for example bigger sample groups, to analyze whether there is a significant difference in view across different professional backgrounds, as many of the results were just not significant.

Comparison with Existing Literature

The findings of this research are compared with existing literature on similarities and differences.

Barriers to Integration

Several barriers identified in this research align with those found in earlier research. Miscommunication and misalignment emerged as key challenges to integration and collaboration, consistent with Rosenbloom (2020). Fragmentation, caused by cross-sectoral structures, diverse interests, distributed decision-making, and fragmented ownership and knowledge, is similarly discussed in the literature (Sonesson et al., 2021). These elements were reflected in both the stakeholder analysis and the current situation described by respondents. Siloed decision-making processes, as emphasized by Broaddus (2020), were also confirmed in this research.

Institutional barriers and conflicting regulatory frameworks, noted by Aubrechtová et al. (2020), were another shared concern. Respondents explained how policies often address narrow issues without considering broader spatial and environmental implications, such as in the placement of wind turbines, where local challenges are frequently overlooked. These findings also support McNaught's (2023) emphasis on the influence of system context and political realities. This study illustrates how broader governance structures, political visions, and systemic choices shape collaboration and integration efforts in practice.

Osei-Kojo et al. (2020) argue that a lack of consensus on the meaning of collaboration is a core challenge in cross-sectoral efforts. This study builds on that insight by identifying three distinct stakeholder perspectives. These perspectives show that stakeholders may focus on the same issue but interpret it differently, are motivated by different goals, and pursue different approaches, which aligns with the literature of Selsky & Parker (2005). Notably, in this research such variation was found not only between sectors but also within them.

A key difference is that this research offers a more detailed and practice-oriented analysis of integration and collaboration in the specific Dutch context of Gelderland. While much of the academic literature remains theoretical and often emphasizes technical dimensions, this study highlights governance dynamics and their practical implications for policy and collaboration.

Comparison of Key Criteria

Due to a lack of literature specifically addressing governance and collaboration structures for the integration and collaboration of energy and spatial planning in the Netherlands, this research compares its findings with broader governance and collaboration literature. This research identifies concrete themes and entry points for developing governance structure at the regional level, addressing gaps noted by Vazquez-Brust et al. (2020), Van Dijk et al. (2022), and Sahoo et al. (2023).

Previous research has promoted adaptive and polycentric governance models as promising to foster better integration (Avoyan & Meijerink, 2020; Di Gregorio et al., 2019). The findings of this research support that notion to some extent, indicating that collaborative governance elements also enhance integration. The findings suggest that no single governance model is inherently superior for the integration of energy and spatial planning in Gelderland, as the three identified perspectives all draw from multiple governance types.

Although polycentric and adaptive models are often linked to decentralization and bottom-up approaches, this research reveals that such approaches are not widely seen as essential for integration in the Gelderland context. Instead, flexibility and adaptivity were emphasized by respondents, aligning with adaptive and polycentric governance literature.

Stakeholder strategies were found to be shaped by varying perceptions of the problem, confirming insights from Van Bueren & Koppenjan (2023). The role of regional policymakers, highlighted by Camargo & Stoeglehner (2018), was echoed in two of the three perspectives. However, provinces often lack the capacity, knowledge, and experience needed to fully take on this role—an issue confirmed by this study.

Shared goals were widely regarded as crucial for successful integration. One perspective placed particular emphasis on this point, while the others also stressed the need for shared goals prior to the development of institutional arrangements (Statement 12, P1–2, P2–3, P3-4). This supports Cejudo & Michel's (2017) argument that integration requires more than compatibility—it involves aligning decisions with overarching mandates and goals.

While several authors (Sillak & Vasser, 2022; Ansell & Gash, 2007) stress the value of consensus in collaborative processes, many respondents in this study considered consensus unrealistic and overly time-consuming in this context. Lastly, all three perspectives—though to varying degrees—emphasized the importance of a shared language. This aligns with Emerson et al. (2021), who underline the need for common terminology to enable effective cross-sector collaboration.

8. Conclusion

Currently, energy and spatial planning operate independently in The Netherlands, resulting in challenging collaboration and integration. However, with grid congestion and the ongoing energy transition, energy and spatial planning become increasingly interdependent. This underscores the need for greater collaboration and integration between the two domains. This research aimed to gain insight into stakeholder perspectives on the integration of energy and spatial planning, to determine critical factors to improve collaboration and ultimately facilitate integration. This was achieved using Q Methodology in combination with desk research and interviews. This aim has been translated into the main research question: *What are the perspectives on how to improve the integration of spatial planning and energy in Gelderland in The Netherlands?* To provide an answer to the main research question, sub-questions were answered first in chapters 3, 4, and 6. This chapter addresses the main research question and outcomes of this research.

Short Summary of the Three Perspectives

Three perspectives were identified through the Q-methodology, providing an answer to the main research question. Each perspective consists of criteria supported by various sources, including literature, program rapports, articles, and informal interviews. Perspective one advocates for a proactive, top-down governance approach, in which higher governmental bodies take a leading role in shaping and operationalizing strategic visions, particularly at the regional level. It emphasizes the importance of governance processes and structures. Objectives of the collaboration—such as building trust, joint-fact finding, and clear goals—are seen as less essential, while transparency in information-sharing is viewed as critical. In contrast, perspective two underscores the importance of informal collaboration. It stresses the value of mutual understanding, personal relationships, and speaking a shared language, emphasizing a pragmatic approach. This perspective calls for clear roles and responsibilities and a balanced focus on long-term and short-term planning. Perspective three advocates for a long-term, goal-oriented approach focusing on stakeholder involvement. Effective communication, mutual understanding, and trust are essential, though building personal relationships is not necessary. The process should be flexible, with roles and responsibilities remaining fluid to adapt based on the overarching goals. Selective stakeholder involvement is encouraged, and the province and grid operators are considered more influential than the national government.

Reflection on Tensions

While Chapter 7 shows agreement on criteria for improving collaboration and integration between energy and spatial planning, fundamental differences persist regarding the form, structure, and governance of integration. The three perspectives reveal persistent tensions—short-term versus long-term, formal versus informal, level of participation, and decentral versus central.

A key area of disagreement concerns the importance of stakeholder involvement in the integration process. It underscores a divide between those who view collaboration as a means of efficiency and those who fear it may lead to bureaucratic stagnation. This reflects a broader tension between the urgency to act and the need to include diverse voices. How do you act fast enough to meet for example climate goals and the increasing electricity demands, while also taking the time to make inclusive, legitimate decisions that reflect the complexity of the real world? In this light, the energy transition is not simply a technical or logistical challenge, like installing more wind turbines, building energy infrastructure, and just planning coordination or policy alignment. It involves negotiating values by balancing the act between decisiveness and deliberation. This tension also emerges between short-term pragmatism and long-term strategic coherence. These competing time horizons reveal a fundamental challenge in transition governance: the difficulty of aligning fast, tangible interventions with the slower pace of systemic, multi-level integration.

Similarly, the tension between centralization and decentralization is not just about institutional design, but about competing views. Should integration be steered through national consistency, or does it require regionally tailored solutions that respect local contexts? This tension suggests that governance in the energy transition is not just about organizing responsibilities, but about negotiating the very nature of authority and control in a changing policy landscape. It touches on more fundamental shifts in how authority is exercised, distributed, and legitimized in a rapidly changing policy environment. Traditional roles may no longer fit the scale or complexity of the challenges and old hierarchies may clash with new needs.

Also, stakeholders such as grid operators and RES regions gain influence but lack formal power. Despite being central to implementation, they often lack the institutional authority to shape decisions. This

highlights that integration is not only a coordination challenge, but also a matter of power, legitimacy, and recognition. It raises a critical question: what type of authority is needed to steer complex, cross-sectoral change? Should it be legal authority through formal laws and mandates, expertise-based authority by grid operators and planners, democratic legitimacy by local participation, or pragmatic authority by those who can get things done?

The tension between formal and informal governance reflects different understandings of what makes governance legitimate. Formal approaches derive legitimacy from legal authority, clear mandates, and institutional accountability—validating decisions based on rules and procedures. Informal governance, by contrast, builds legitimacy through mutual trust, relationships, and the perceived fairness and responsiveness of the process. Here, authority is less about legal mandate and more about social acceptance and practical effectiveness. These differing views matter because they influence not only how decisions are made, but how they are received and sustained in practice. In the context of the energy transition—where complexity, uncertainty, and urgency collide—governance systems must reconcile these two logics. The challenge lies not in choosing one over the other but in integrating structure with flexibility and accountability with adaptability.

Taken together, these tensions suggest that integration is not hindered by a lack of insight or willingness, but by clashing logic. These are not just technical disagreements, but reflections of competing values, different interpretations, and clashing institutional logic. In other words, they reflect the complexity of systemic change. These disagreements are not just disagreements to be solved, but tensions to be navigated. In this light, collaboration is not a neutral or managerial task, but a politically charged process where competing visions, interests, and rationalities intersect.

The Role of Political Tension

This research highlights a paradox: while there is broad agreement on the need for integration, the path forward remains uncertain due to governance disputes and political fragmentation.

As the stakeholder analysis illustrates, all levels of government—national, provincial, regional, and local—play a role in shaping spatial energy planning. However, each operates from its own objectives, decision-making processes, and policy frameworks. These differences reflect diverging political visions that directly influence how integration is conceptualized, negotiated, and implemented. This fragmentation influences stakeholders' perspectives on integration and determines the feasibility of implementing a coordinated governance structure. While technical solutions for integration exist or are close to being developed, their implementation is dictated by political choices on when, where, and how they will be applied.

The dynamic nature of the policy landscape further complicates the situation. Recent legislative amendments and shifting institutional roles reflect ongoing uncertainty around governance responsibilities. For example, in recent years, responsibilities have shifted more towards municipalities. In addition, while the Ministry of Spatial Planning was reinstated this year, it had previously existed but was dissolved a few years ago. These governance shifts, driven by changing political priorities, contribute to a governance environment marked by complexity, fragmentation, and inertia. Rather than enabling coordination action, these shifts often generate uncertainty about who is responsible for what, undermining long-term strategy and sustained collaboration.

Moving forward, it must be acknowledged that political choices—more than technical limitations—will shape the success of integration. Decisive governance is needed to ensure integration becomes more than a shared ambition. Political commitment is not just a bottleneck, but also a key enabler of effective collaboration. More broadly, collaboration and integration are not merely organizational challenges—they raise deeper normative and political questions. Is the current governance framework adequate to manage the shift from centralized to decentralized energy systems? Who decides which energy sources to prioritize, how trade-offs between sustainability, emissions, and timelines are negotiated, and which industries receive priority access to electricity? Additionally, how should the burdens and benefits—such as between heating and electricity—be fairly distributed?

These questions highlight the deeply political nature of the integration of energy in spatial planning. Energy is not a standalone sector, it intersects with housing, mobility, industry, climate policy, and social equity. As such, meaningful progress requires looking beyond technical coordination and recognizing the broader societal, and political choices at stake. Integration is not merely about aligning systems, but about

negotiating the values, priorities, and visions that will shape the spatial and energy landscapes of the future.

The Role of Broad Systemic Choices

For a long time, society operated under the assumption that resources were abundant and infrastructure could expand endlessly to accommodate growing demands. This is no longer the case. We now live in an era of scarcity, where energy is deeply intertwined with every aspect of daily life. Perhaps the issue is not only about improving integration between energy and spatial planning but also about reconsidering our way of living. Have we, as a society, become accustomed to unlimited growth, demanding more than our country can realistically provide?

Warnings from (some) grid operators are increasing, signaling that we are approaching the limits of our current system. In the past, every surge in demand was met with infrastructure expansion, but this time, expansion alone may not be the solution, or even possible. Instead, it may require a fundamental rethinking of how our society functions and what is feasible within the spatial and energy constraints and current infrastructures. Ultimately, these are broad systemic choices that extend beyond energy and spatial planning. The urgency for action is not merely about governance reform—it involves shaping a sustainable, resilient future.

Contribution to Academic Literature

This research addresses notable knowledge gaps in the academic literature on the integration of energy and spatial planning—particularly in the emerging field of Spatial Energy Planning (*Energieplanologie)*. Given that Spatial Energy Planning is still an emerging term with little academic grounding, this research contributes significantly to its definition, scope, and substance**.** It shows that Spatial Energy Planning is not just about integration or technical coordination—it involves systemic questions around prioritization, institutional learning, and stakeholder dynamics.

One key contribution of this research lies in the stakeholder analysis, offering deeper insights into actors' interdependencies, perceptions, motives, and objectives. Where much of the literature remains general, this study places a strong emphasis on the personal views and experiences of relevant stakeholders. This approach allowed for a more nuanced understanding of why integration gets stuck and how perspectives shape strategies, collaboration boundaries, and governance expectations. The description of the current situation provides a concrete case. Although the research focuses on Gelderland, the findings are also relevant to other Dutch provinces. The description of the current situation also reflects broader national dynamics. Gelderland-specific examples as well as issues common across the Netherlands contribute to the analysis.

While Q-methodology limits statistical generalization, the depth of the identified perspectives provides strong interpretive generalizability. Many of the respondents, such as ministries, grid operators, and planning consultants, operate beyond Gelderland and drew on national experiences. Though some Q-statements were tailored to Gelderland, the underlying tensions and governance challenges are widely applicable, especially as other provinces also deal with high electricity demand, spatial scarcity, and sectoral friction. The in-depth interviews enriched the analysis by adding context and revealing the reasoning behind stakeholder views. This approach strengthens the validity and relevance of the findings and shows that Q-methodology, when combined with rich qualitative data, can offer valuable, broadly, applicable insights.

Furthermore, this research addresses a gap in the literature on the governance and social dimensions of integrating energy into spatial planning by developing an initial governance framework. While this framework represents an initial conceptualization, it offers a structured foundation for analyzing Spatial Energy Planning. Respondents confirmed the framework's usefulness in organizing key criteria, and its effectiveness was evident in two ways: it helped identify three distinct stakeholder perspectives and was recognized as a relevant and comprehensive tool. This suggests practical value for guiding governance discussions and improving integration efforts. While literature emphasizes the need for governance structures to facilitate this integration, this research shows that bottlenecks also stem from practical constraints, systemic choices, and political tensions.

9. Discussion

Limitations regarding the research are described in this chapter, followed by suggestions for further research. While the topic is a relevant social issue, there are some practical recommendations provided in this chapter. The chapter will conclude with a reflection on the learning journey of the past six months.

High Eigenvalue

The factor analysis showed that factor 1 had a significantly high eigenvalue, while the eigenvalues of the subsequent factors were considerably lower. This high eigenvalue suggests a strong underlying consensus, indicating that a single dominant factor explains a substantial portion of the variance in the data. Research findings indicate broad consensus on the importance of integration and collaboration, with differences emerging in more nuanced details. These subtle differences became clearer through the qualitative insights shared during the interviews. The richness of this data enabled a deeper interpretation of the Q-sorts, revealing the reasoning behind individual responses and clarifying the nuanced differences.

Limitations

Time Sensitivity of the Research

Since this integration is highly relevant and still in its early phases, the situation is continuously evolving. As described in the stakeholder analysis, new acts have been introduced and will take effect in the coming months. Additionally, insights from interviews indicate that some grid operators and provinces are seeking collaboration to better understand each other's objectives and responsibilities. Meetings are being organized to discuss alignment and potential conflicts between stakeholders. Furthermore, energy policies are beginning to be incorporated into municipal *Omgevingsvisies* signaling a shift towards greater awareness. Also, current programs are working to enhance awareness and coordination on this topic by exploring opportunities for collaboration, organizing congresses, and developing a course regarding *Energieplanologie*. However, the situation has also become more urgent and complex. Several new challenges have emerged, including increased pressure on the energy grid, which could start affecting households as early as 2026. In addition, the scarcity of space and electricity has become more apparent across multiple sectors. These developments may influence the view of stakeholders, underscoring that small details of the views captured in this research may differ when the research is performed again half a year later—described in more detail below.

Statements

Several limitations relate to the design of the statements and the final Q-set. As the integration between energy and spatial planning is still emerging, themes were not based on well-established frameworks. However, no key propositions appear to have been overlooked in retrospect. Additionally, the rapidly evolving landscape—marked by increasing collaboration, changing laws, and ongoing policy shifts—suggests that some details within the perspective and short-term priorities may become outdated over time. For example, if legislation redefines roles and responsibilities, perspectives on who should take the lead in coordination may shift. Similarly, changes in spatial planning policies and grid congestion regulations could make some arguments less relevant, particularly if new frameworks offer clearer solutions to existing challenges. In addition, as collaboration expands and stakeholders gain more experience working together, initial concerns—such as whether early stakeholder involvement slows decision-making—may dimmish.

However, the underlying patterns and governance tensions identified in this study—such as top-down versus bottom-up approaches, formal versus informal collaboration, the degree of participation, and short-term versus long-term strategies—are deeply embedded in governance debates and will persist across different contexts. These foundational dilemmas will continue to shape collaboration, with the most effective approach varying by context, topic, and type of partnership.

The perspectives identified in this research capture these core tensions, rather than just temporary conditions. Moving forward, periodic reassessment of stakeholder perspectives will be essential to monitor how shifts in policy and practice influence integration efforts. However, the fundamental governance conflicts and trade-offs will likely remain a central part of future discussion.

Additionally, the interpretation of statements may have varied across respondents, especially with more extreme statements (e.g., *total transparency, building trust is the most important criterion).* Although the interview format allowed for clarification, differences in how respondents interpreted these statements might have impacted the results.

While this research successfully captured key perspectives, certain statement refinements could have provided an even clearer distinction between viewpoints. The high consensus on some criteria may have stemmed from overlapping concepts, and certain statements may have been too broad, leading to varied interpretations. However, these methodological challenges did not compromise the validity of the findings, as three distinct perspectives still emerged.

One such statement is Statement 13: *"Specialization within sectors, rather than integration, ensures better decision-making."* Given that the research focused on integration, this statement may have been somewhat redundant or an open-ended question. It may have been more insightful if it had solely focused on the concept of specialization without making a direct comparison to integration, allowing respondents to evaluate its value independently.

Similarly, Statement 16: "*Striving for consensus is essential, even if it requires more time and compromises on individual interests,"* may have led to varying interpretations. Some respondents focused on the time aspect—judging whether extended deliberation is beneficial or detrimental—while others emphasized the compromises involved or the value of consensus itself. Although the broad scope of the statement led to relatively consistent placements across perspectives, an underlying contradiction emerged: some viewed consensus as a means to incorporate all objectives and interests, while others saw it as a process of compromise, which could have influenced their responses differently.

Another statement that posed challenges was Statement 22: "*(Healthy) competition is needed to develop creative, adaptive solutions that effectively integrate energy considerations into spatial plans".* Respondents found it difficult to evaluate, as the type of competition being referred to was unclear. Some associated it with economic or market dynamics, questioning its relevance to this issue. Others, considering spatial competition, felt that having sufficient space was preferable to relying on creativity driven by competitive pressures. This ambiguity made it difficult for respondents to clearly position this statement.

Additionally, certain statements appear to be overlapping or indirectly reinforcing the same criteria, potentially contributing to a higher degree of consensus than expected. For instance, Statement 12: "*Effective collaboration relies more on strong institutional arrangements than on achieving shared goals,"* and Statement 21: *"A clear task and goals must be defined before starting the decision-making process,"* both touch on the importance of goal-setting in integration. It could have been more effective to refine Statement 12 by focusing solely on institutional arrangements, removing the comparative element related to shared goals.

A similar issue arose with Statement 18: "*The focus must be on direct project realization rather than on strategy and policy."* While this statement provided valuable insight into how respondents weighed short-term versus long-term approaches, it may have been more useful to separate these two aspects into distinct statements. Other statements (such as Statements 26 and 21) already emphasized the importance of long-term planning. Separating project realization from strategy and policy considerations could have yielded a more nuanced understanding of respondents' preferences.

Statement 20 and statement 6 also demonstrated potential redundancy, as they conveyed similar underlying meanings. Both statements focus on local challenges and the identity and possibilities of an area, conveying the same core message.

Another limitation is that during the Q-sorting process, respondents often provided additional comments on their statement's placements., such as adding conditions (e.g. I see this as important if…). This underscores the challenge of translating complex issues into short, definitive statements. However, despite these limitations, respondents generally found the method useful for the scoping of the issue and initiating discussions.

Further Research

This research also provided some areas for further research.

Expanding the Scope
Further research should explore different provinces. Each province operates with distinct political objectives, level of urgency, structure, and spatial and energy constraints, as became clear in this research. In addition, Gelderland has multiple RES regions, whereas some provinces have only one RES region, encompassing the entire province. These differences shape the stakeholder landscape, affecting how energy and spatial planning integration unfolds. Investing in this provincial distinction would provide deeper insights into the challenges and opportunities. In addition, the European level is overlooked in this research design, but its influence is expected to grow on several issues such as energy, making it a critical factor in shaping the future of the energy infrastructure and interesting for further research.

Cross-Sector Analysis and Interdependencies
Beyond geographical scope, further research should examine the involvement of other sectors. The stakeholder landscape of spatial planning is highly complex, with numerous interdependencies that remain unexplored. A comprehensive analysis of how sectors such as mobility, water management, and agriculture development interact with energy planning would clarify the broader network dynamics. Understanding these interconnections could help identify key stakeholders, define responsibilities, and determine who should feel the urgency to act and compare it with reality. Currently, there is limited interaction between various sectors and the energy sectors.

Political Decision-Making and Governance
This research has also highlighted the critical role of political decision-making in energy and spatial planning integration. Future studies should investigate how stakeholders make strategic choices, how different actors navigate political negotiations, and what consequences these decisions have on long-term energy and spatial planning. With spatial planning undergoing revisions due to electricity shortages, political and sectoral challenges must be considered together. This brings up several questions like: How will different sectors bring their interests to the negotiation table, what will the negotiation process look like, and what potential solutions could emerge?

Roles & Responsibilities
While respondents in this study broadly agreed that certain responsibilities should move from the local to the provincial and national levels, further research may be interesting to determine the roles of key stakeholders without formal authorities, in a political issue. Grid operators possess essential knowledge of the energy system. However, many infrastructure-related decisions are ultimately political, including choices about energy sources, prioritization during electricity shortages, and which industries should be sustained. An interesting analysis would be to ask the question of what extent a grid operator can influence these socially and politically sensitive issues. Additionally, the findings of the research showed that the region level may be important in integration. Many other sectors also operate through regional structures—NOVI areas, regional mobility strategies, GGD Health regions, and Water boards—yet the formal responsibilities of these regions vary. The RES regions currently lack formal competencies but play a crucial role in sustainable energy generation. Therefore, it would be interesting to analyze these RES regions in more depth and what their role could be in this integration.

More In-Depth Focus on How the Integration Looks Like
As this research focuses on stakeholder collaboration in the integration, further research should address how integration should ultimately be structured. Interesting questions are:

- Are current procedures of spatial planning effective for the integration of energy infrastructure?
- To what extent should energy planning be incorporated into spatial planning frameworks?
- How does the integration of energy compare with other sectors such as water management, nature conservation, and transportation?

By addressing these questions, future research can provide practical recommendations on governance structures, policy instruments, and institutional frameworks needed for a more seamless integration.

Further Research in Statistical Analysis
In this research, some statistical tests were conducted using SPSS to explore whether there are objective patterns in the identified perspectives. These findings suggest that there might be influence from professional background characteristics on their view on essential elements of integration. While these insights are interesting, they are not statistically significant and conclusive enough, requiring further research with for example a bigger data set.

Recommendation for Practice

The following recommendations are based on the findings of this research and directed at key stakeholders, including municipalities, grid operators, provinces, national government agencies, and other stakeholders involved in the energy and spatial domain.

The findings of this research provided some interesting perspectives on the criteria necessary to improve collaboration between stakeholders in the energy and spatial planning domains. Differences emerged around governance structures, preferred approaches, and responsibilities. These diverse views highlight that efforts to force alignment or consensus may be less effective than embracing and managing diversity of the perspectives. Recognizing that not all stakeholders need to fully agree—but do need to be heard and understood—can lead to a more robust and resilient collaboration structure. Stakeholders—such as spatial planners, grid operators, and government bodies—often operate from different logics, which can hinder collaboration. Embracing this diversity calls for a shift toward more networked governance, where negotiation and co-creation replace command-and-control approaches. Structured moments for reflection and exchange, such as project kick-offs, periodic update meetings, or dedicated collaboration sessions such as the RES Sessions, are needed.

However, this approach demands time, active participation, and willingness from all stakeholders. A key risk is that, without commitment, these efforts may fail to produce concrete outcomes or remain symbolic. While municipalities and provinces take a leading role in facilitating these collaborative spaces, their efforts depend on political priorities and available capacity. Political leadership is therefore a crucial enabler—or blocker—of progress. Even when civil servants and professionals advocate for integration, their efforts may be limited by political priorities. If the urgency of the integration is not recognized across political parties, it may receive low priorities, funding, or legal backing. Therefore, responsibility cannot rest solely with them. Other stakeholders, such as grid operators, must actively contribute—particularly by making system challenges tangible in joint sessions to create shared urgency and momentum.

Ultimately, doing nothing is not a viable option. The findings of this research offer a structured way to facilitate discussions by highlighting areas of agreement and disagreement. Making the different perspectives explicit supports more deliberate, and inclusive decision-making.

Focus on Shared Criteria and Areas of Agreement

Given that perspectives also contradict, focusing on the criteria with the highest level of agreement across all perspectives could be beneficial.

- Establishing Clear Goals

Although not emphasized equally across all perspectives, there is agreement that collaboration relies more on achieving shared goals than institutional arrangements (Statement 12, P1 -2, P2 -3, P-4). A recommendation therefore would be to focus on achieving a shared goal among stakeholders. This can be achieved through workshops where participants first present their individual objectives. These goals can then be compared, to make the differences and similarities visual. For example, spatial planners could map out planned spatial developments, while grid operators overlay energy infrastructure requirements and constraints. Visualizing these elements side by side makes challenges and opportunities tangible, setting the stage for constructive dialogue. Such sessions should include a broad range of stakeholders, including municipalities, provinces, grid operators, and relevant industries. They can also be adapted for public engagement, using visual tools to explain bottlenecks and trade-offs in clear, accessible language—avoiding sector-specific jargon. When shared goals are established, this should be institutionalized as a shared goal check in the decision-making procedures. Plans can then be tested against the defined shared goals, whether they are in line or not. This will be performed by municipalities, provinces, regional regions, or national government, depending on the size and scale of the project.

While this recommendation also requires willingness and time from all participants, similar sessions have already taken place (Interview respondents 14 & 15) and were experienced as very useful.

- Improving Communication and Understanding

The three perspectives agree that successful collaboration relies on speaking and understanding each other's language (statement 34, P1 +2, P2 +4, P3 +4). A recommendation would therefore be to invest in understanding each other jargon and improve communication. Workshops and training could be set up for grid operators, municipalities, provinces, and regions, where they learn each other's jargon. In addition,

people can be assigned as formal intermediaries, having hybrid knowledge, to bridge the communication gap between technical and policy teams. These intermediaries could for example be located in RES regions. The key terms used in this integration, which may be confusing or misunderstood, could be documented and made available to stakeholders. Also, communication checkpoints meetings in the planning processes, or just a check whether everything is understood at the beginning of a meeting could be useful.

Although this approach may require considerable time and effort, it should be seen as a long-term investment to prevent later on miscommunication and misunderstanding. Moreover, existing related initiatives—such as the development of a dedicated course on Spatial Energy Planning—demonstrates a growing willingness among stakeholders to invest in collaborative training efforts.

- *Energy Test*

The results highlight the need for a shift from reactive to proactive. Even though the perspective differs in the degree of importance, all three perspectives highlight a proactive approach as important (Statement 2, P1 +4, P2 +3, P3 +2), the same applies to the agreement on the importance of an adaptive approach (Statement 1, P1 +2, P2 +2, P3 +1). Given the growing pressure from grid congestion, spatial demands, and time constraints, waiting until problems escalate is no longer an option. To avoid future bottlenecks, energy consideration must be integrated into spatial planning at an earlier stage. To move beyond short-term political cycles, this integration could be institutionalized through a mandatory *energy test* (*Energietoets*), comparable to the existing *water test* (*Watertoets*). This would require municipalities and provinces to assess the energy implications of all spatial developments, such as housing projects, industrial zones, and mobility infrastructure. The goal is to ensure these plans align with long-term energy system needs and grid capacity.

Implementing the energy test will require time, effort, and cross-sector investment. For this to succeed, energy must be elevated on the policy agenda. Raising awareness of its urgency is essential, and this responsibility should not fall solely on grid operators. Spatial planners, municipalities, provinces, and other sectors impacted by grid congestion must also contribute by highlighting how the energy transition affects their projects and long-term strategies. Once awareness is raised, a multi-stakeholder process must define the content, scope, and methodology of the energy test. This task should be led by provinces and RES regions, in collaboration with grid operators and municipalities, and supported by knowledge institutes. The resulting proposal must then be submitted for approval by the national government, which also bears responsibility for formally embedding the test within the *Omgevingswet* and providing the legal and procedural framework.

Implementation should begin with pilot projects in selected provinces to test the tool in practice. These tools should be evaluated by relevant ministries in collaboration with provinces and grid operators, with lessons used to refine the framework before nationwide rollout. To embed the energy test into practice, municipalities and planners need targeted training and practical toolkits. Grid operators should support this by offering data and participating in regular knowledge-sharing sessions to align priorities and improve communication.

A key risk is that without clear national leadership and commitment from all levels, the energy test could remain underdeveloped or inconsistently applied. If responsibilities are unclear or the process lacks coordination, it could create an administrative burden without solving the underlying issues.

This research has revealed that while different perspectives exist on how integration should be achieved, including several tensions—short-term versus long-term, formal versus informal approaches, degree of participation, and decentralization versus centralization—there is a shared understanding that something must happen. The focus should now shift from debate to action. By prioritizing areas of agreement, adopting a proactive governance approach, strengthening coordination, and improving cross-sector collaboration, stakeholders can work toward a more effective and integrated approach to energy and spatial planning. The urgency is clear—the time for action is now.

Reflection

The research has been a learning journey, one where the complexity of integrating energy into spatial planning not only became clearer but also more overwhelming. What began as an exploration of programs, laws, and stakeholders gradually transformed into a deeper understanding of the underlying dynamics and bottlenecks. As the pieces of the puzzle started to fall into place, the bigger picture raised more

questions: not just about how to integrate energy into spatial planning, but what is meant by integration, who feels the urgency to act, who must feel the urgency to act, and what the consequences are for all sectors involved and even the residents. The more clarity emerged, the more it became evident that there is no straightforward solution, just a complex web of perspectives, responsibilities, and trade-offs that all need to be carefully navigated.

At first, spatial energy planning felt like a fairly focused topic—about improving collaboration between energy and spatial planning domains. But, diving deeper into the topic, it became clear this is about much more: systemic choices, political influences, deeply embedded structures, and even the different language people speak across sectors. The research questions—*What are the perspectives on how to improve the integration of spatial planning and energy in Gelderland in The Netherlands*—proved to be a relevant and insightful starting point. The question allowed for a broad exploration of viewpoints, while still providing enough focus to identify concrete challenges and opportunities for collaboration. It helped to uncover not only how stakeholders think integration could be improved, but also what integration of energy into spatial planning means to different stakeholders. This revealed that integration is not a fixed concept, but one shaped by underlying values and objectives, and that improving integration is not just a matter of better tools or coordination, but building mutual understanding and confronting tensions. However, throughout the process, it became clear that the question may have understated the complexity and scale of the issue. While the research provided insight into diverse views on collaboration and the trade-offs involved, it also revealed that the urgency to collaborate and integrate is not universally felt. Fundamental questions remain—what do we mean by integrating energy into spatial planning? And what are the consequences for the energy sector, the spatial planning sector, and other connected sectors? Although the focus on improving collaboration and integration provided more clarity, taking a step back to explore these questions might have uncovered more of the root causes and structural bottlenecks. In retrospect, focusing first on truly understanding the nature of the problem—before jumping to possible solutions—might offer interesting insights.

The Q-methodology turned out to be a useful way to scope the topic and bring clarity to different stakeholder perspectives. While the Q-study naturally limited the number of respondents, the richness and depth of the interviews provided highly valuable insights. Not all relevant stakeholders could be included due to the relatively small sample size, but this reflects a conscious trade-off: opting for a smaller group allowed for the use of tools like Q-sorts and offered more time to delve into details, open-ended conservations. Rather than covering a broad set of predefined topics with a larger sample, this approach prioritized depth over breadth—however, there is something to be said for every choice. The method helped to make tensions more tangible and provided clear structure in interviews on overwhelming and broad topics. Looking back, conducting some exploratory interviews before diving into the Q-sort design would be beneficial. The discussions during the interviews helped to make sense of the landscape, more than reading endless reports and documents. Conducting interviews beforehand to both setup statements and also check whether the statements capture the important aspects may also be beneficial. Especially, as during the interviews the statements really became tangible, which would have been hard to achieve when these interviews had not taken place.

The research provided new knowledge on the current situation, tensions, views, and objectives. What had been understood as integrating and improving collaboration was actually much bigger and more complex. It provided a better understanding on how collaboration can break down not just on big institutional barriers, but also on small things, like using different jargon or having different assumptions. Despite strong motivation and smart ideas, processes often stall because of unclear roles, misaligned timeliness, or political decisions beyond anyone's control. The research made clear what is at stake and why this topic matters.

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Appendix

Appendix **A**
Search Strings

Table A.1 provides the search strings used to identify literature on governance and collaboration criteria for defining the Q-set.

Table A.1 *Overview of Search Strings*

Search String	**Results without inclusion criteria**	**Results with inclusion criteria (English & 2020 onwards)**
characteristic AND ("Effective collaboration " OR "Sector Integration")	218	89
("Effective collaboration" OR "successful collaboration") AND ("key characteristics" OR "criteria")	161	152
"Collaborative Public Management"	87	21
"Cross-collaboration" AND "Design"	37	21
"Cross-sector Interaction"	34	9
"Integrated Planning" AND Netherlands	38	3
"Cross-sector Integration" AND "Spatial Planning"	1	-
"Sector Integration" AND "Spatial Planning"	2	-
"Sectoral Integration" AND "Spatial Planning"	8	5
"Sectoral Integration" AND Netherlands	1	-
"Success Factors" AND "Collaborative Governance"	26	15
"Collaborative Governance" AND "Energy Infrastructure"	1	0
"Collaborative Governance" AND "Energy System"	17	13
"Adaptive Governance" AND "Criteria"	23	9
"Adaptive Governance" AND "Public Policy"	31	13
"Polycentric Governance" AND "Public Policy"	32	29
"Adaptive Governance" AND " Criteria"	15	10

Appendix **B**
Interview

B.1 Interview Setup
Here the interview design is provided, which has been used to structure the interviews. It was a setup, so the interview may have gone slightly different than provided in this design. However, it gives an idea of the general structure of the interview. While all the interviews were in Dutch this design is also made in Dutch.

Algemene Informatie
- Bedanken voor deelnamen
- Voorstellen
- Consent, samenvatting die meegenomen zal worden in onderzoek
-

Uitleg Afstudeeronderzoek
Mijn naam is Doortje en ik voer een onderzoek uit voor het afronden van mijn master Engineering and Policy Analysis aan de TU Delft, in samenwerking met Andersson Elffers Felix als stagiaire. Het doel van het onderzoek is om te bepalen wat 'effectieve samenwerking en integratie' tussen energie en ruimtelijke planning, door het in kaart te brengen van perspectieven onder betrokkenen/belanghebbenden op dit onderwerp. De resultaten worden gebruikt om perspectieven op te stellen voor de governance structuren (verantwoordelijkheden, processen, structuren van samenwerking) van de integratie & samenwerking van Energie in ruimtelijke planning (*Energieplanologie*).

Wat moet er veranderen of juist meer prioriteit krijgen?

Stap 1. Voorsortering

Lees de volgende stellingen zorgvuldig met daarbij de volgende vraag in gedachten:

Belangrijk voor een effectieve samenwerking en integratie tussen Energie en Ruimtelijke planning is ….

Verdeel de stellingen zo over 3 groepen: een groep met stellingen waar u het **mee eens** bent, een groep met stellingen waar u het **oneens** bent en een groep met stellingen waar u **geen uitgesproken mening over** heeft.

Stap 2. Sortering
Prioriteer de voorsortering die u in de vorige stap heeft gemaakt door de stellingen uit die 3 groepen te sorteren in het raster. Houd daarbij nog steeds dezelfde vraag in gedachten:

Belangrijk voor een effectieve samenwerking en integratie tussen Energie en Ruimtelijke planning is ….

Stellingen die u het meest belangrijk vindt voor een effectieve samenwerking, zet u helemaal rechts in het raster en stellingen die u hiervoor het minst belangrijk vindt, zet u helemaal links.

Werkwijze
1. Beschouw de stellingen die u in de groep 'mee eens' heeft geplaats (groene box). Kies daaruit de 2 stellingen die u het meest belangrijk vindt en plaats deze in de kolom +4.
2. Kies uit de overgebleven stellingen in deze groep vervolgens de 3 stellingen die u daarna het meest belangrijk vindt en plaats deze in kolom +3
3. Herhaal dit proces totdat alle stellingen uit deze eerste groep in het raster geplaatst zijn.
4. Herhaal deze stappen vervolgens voor de groep 'mee oneens' (rode vakken), beginnen bij -4 kant van het raster
5. Neem als laatste de groep 'Geen uitgesproken mening' en plaats deze stellingen in de overgebleven plekken binnen het raster

Opmerkingen

- De verticale oriëntatie van de stellingen binnen een kolom is niet van belang
- Het aantal stellingen dat in iedere kolom kan worden geplaatst, is gelimiteerd – u kunt dus niet meer stellingen toevoegen aan een kolom dan aangegeven.
- Tijdens het sorteren van de stellingen, zal ik vragen stellen over de reden van plaatsing

Mogelijke vragen voor tijdens het sorteren

- Beargumenteer waarom die stellingen het belangrijkste (positie +4)
- Beargumenteer waarom die stellingen het minst belangrijk (positie -4)

Stap 3. Vragenlijst

Tot slot wil ik u vragen om de volgende vragen te beantwoorden over uw achtergrond:

1. In welke sector bent u actief? (public, private, Non-profit, Academic, Public Utility Sector*)
2. Voor welke organisatie werkt u? (open answer)
3. Wat is uw rol binnen deze organisatie? (project manager, team lead, researcher, consultant, policy maker, other)
4. Hoeveel jaar ervaring heeft u binnen de energie en/of ruimtelijke planning? (0-5, 5-10, 10-15, 15-10, 20+)
5. Op welk niveau werkt u het meeste aan opdrachten? *Meerdere opties zijn mogelijk* (local, regional, provincial, national)
6. Geef antwoord op de volgende stellingen:
    a. Ik heb ervaring in het meewerken aan energieprojecten
    b. Ik heb ervaring in het meewerken aan ruimtelijke planning projecten
    c. Ik heb ervaring in het meewerken aan projecten tussen ruimtelijke planning en energie

*The Public Utility Sector has been added after the interviews were performed, while these respondents explained that they did not fit in the others)

Afronding

- Nog dingen die u kwijt wil?
- Tips voor personen om nog verder te spreken?
- Vervolg
    - Heeft u behoefte om een samenvatting te ontvangen over de resultaten van het interview?

B.1 Dutch Statements

While all respondents were Dutch speaking the statements were translated for the interview. The translation of the statements is provided here in table B.1.

Table B. 1 *Dutch Translation of the Statements*

Nr.	**English Translation**	**Dutch Translation**
1	Collaboration between spatial planning and energy must take an adaptive form to adjust to new information	De samenwerking tussen Ruimtelijke planning en Energie moet een adaptieve vorm aannemen om zich aan te passen aan nieuwe informatie
2	A more proactive approach in spatial planning, and consequently in the integration of energy, is essential	Een pro actievere aanpak in de ruimtelijke planning, en daarmee in de integratie van Energie, is essentieel
3	Standardized procedures are essential to effectively integrate energy considerations into spatial planning	Gestandaardiseerde procedures zijn essentieel om energieoverwegingen effectief te integreren in ruimtelijke planning
4	Conflict resolution mechanisms must be part of the decision-making process to ensure that the process can continue even when stakeholders disagree	Conflict oplossende mechanismen moeten deel uitmaken van het besluitvormingsproces om ervoor te zorgen dat het proces kan doorgaan, zelfs als belanghebbende het niet met elkaar eens zijn
5	Monitoring and evaluating is essential to ensure effective decision-making process in the collaboration between spatial planning and energy	Monitoren en evalueren zijn essentieel om een effectief besluitvormingsproces te garanderen in

		de samenwerking tussen ruimtelijke planning en energie
6	The process of integrating energy into spatial planning must be tailored to address local challenges	Het proces van de integratie van energie in ruimtelijke planning moet worden afgestemd op lokale uitdagingen
7	Decision-making on the energy vision, including the integration in spatial planning, needs to be decentralized in multiple decision-making centers/clusters	De besluitvorming over de energievisie, inclusief de integratie in de ruimtelijke planning, moet worden gedecentraliseerd in meerdere besluitvormingscentra/clusters
8	For effective collaboration, coordination mechanisms must be clear and formally established, including working groups, platforms, and scheduled periodic meetings	Voor een effectieve samenwerking moeten coördinatiemechanismen duidelijk en formeel worden vastgesteld, inclusief werkgroepen, platforms en geplande periodieke vergaderingen
9	Assigning an independent chair or program manager improves coordination and decision-making	Het aanstellen van een onafhankelijke voorzitter of programmamanager verbetert de coördinatie en besluitvorming
10	Regional steering groups are the heart of the cooperation; they create the space where the objectives, goals and considerations are discussed	Regionale stuurgroepen (Regio niveau) vormen het hart van de samenwerking; zij creëren de ruimte waar de doelstellingen, doelen en overwegingen worden besproken
11	Defined roles and responsibilities must be clearly assigned, recorded, and made transparent	Gedefinieerde rollen en verantwoordelijkheden moeten duidelijk worden toegewezen vastgelegd en transparant worden gemaakt
12	Effective collaboration relies more on strong institutional arrangements, such as roles, responsibilities and processes than on achieving shared goals	Effectieve samenwerking hangt meer af van sterke institutionele regelingen, zoals rolverdeling, verantwoordelijkheden en processen, dan van het overeenkomen van gedeelde doelen.
13	Specialization within sectors, rather than integration, ensures better decision-making	Specialisatie binnen sectoren, in plaats van integratie, zorgt voor betere besluitvorming
15	Governance structures of the collaboration are most effective when energy vision and spatial planning are jointly developed	Bestuursstructuren van de samenwerking zijn het meest effectief wanneer de energievisie en ruimtelijke planning gezamenlijk worden ontwikkeld
15	The current grid limitations should not be an excuse to avoid investing in long-term electrification pathways.	De huidige beperkingen van het elektriciteitsnet mogen geen excuus zijn om investeringen in elektrificatie trajecten op de lange termijn uit te stellen
16	Striving for consensus is essential, even if it requires more time and compromises on individual interests.	Het streven naar consensus is essentieel, ook al kost dat meer tijd en zijn er compromissen nodig op het gebied van individuele belangen
17	Joint-fact finding is essential for effective decision-making and the integration of energy in spatial planning	Joint-fact finding is essentieel voor effectieve besluitvorming en de integratie van energie in ruimtelijke planning
18	The focus must be on direct project realization rather than on strategy and policy development	De focus moet liggen op directe project realisatie en niet op de ontwikkeling van strategie en beleid
19	It is important to invest in building both personal and cross-sectoral relationships to improve collaboration	Het is belangrijk om te investeren in het opbouwen van zowel persoonlijke als sector-overschrijdende relaties om de samenwerking te verbeteren
20	The identity and possibilities of the area should guide decision-making	De identiteit en mogelijkheden van een gebied moeten richtinggevend zijn voor de besluitvorming
21	A clear task and clear goal must be defined together, as a shared framework, before starting with the decision-making process.	Er moet samen een duidelijke taak en duidelijk doel worden gedefinieerd, als een gedeeld kader, voordat er met het besluitvormingsproces wordt begonnen

22	(Healthy) competition is needed to develop creative, adaptive solutions that effectively integrate energy considerations into spatial plans	(Gezonde) concurrentie is nodig om creatieve, adaptieve oplossingen te ontwikkelen die energieoverwegingen effectief integreren in ruimtelijke planning
23	Building trust between stakeholders is the most important criteria for effective collaboration	Het opbouwen van vertrouwen tussen belanghebbende is het belangrijkste criterium voor effectieve samenwerking
24	The province must take on a more coordination role	De provincie moet een meer coördinerende rol op zich nemen
25	The sustainability of the greenhouse horticulture sector must be coordinated regionally	De verduurzaming van de glastuinbouwsector moet regionaal worden afgestemd
26	Given the major impact on the electricity system, the grid operator must be able to say no to electricity demand from the brick factories	Gezien de grote impact op het elektriciteitssysteem moet de netbeheerder nee kunnen zeggen tegen de vraag naar elektriciteit van de baksteenfabrieken
27	Municipalities must take the lead in coordinating the spatial integration of energy infrastructure	Gemeenten moeten het voortouw nemen bij de coördinatie van de ruimtelijke inpassing van energie-infrastructuur
28	Residents determine whether a heating network will be installed in their neighborhood	Bewoners bepalen zelf of er een warmtenet in hun buurt komt
29	It is desirable that the national government is responsible for setting boundaries, preconditions, and preventing unwanted situations that could hinder collaboration	Het is wenselijk dat de nationale overheid verantwoordelijk is voor het stellen van grenzen, voorwaarden en het voorkomen van ongewenste situaties die de samenwerking kunnen belemmeren
30	Total transparency in information sharing is a must for any effective collaboration	Volledige transparantie in het delen van informatie is een must voor elke effectieve samenwerking
31	Area users such as Brick Valley/Greenhouse Horticulture sector must be given an active voice in decision-making	Gebiedsgebruikers zoals Brick Valley/Glastuinbouwsector moeten een actieve stem krijgen in de besluitvorming
32	Collaboration is most effective when local communities are engaged from the start	Samenwerking is het meest effectief als lokale gemeenschappen vanaf het begin betrokken worden
33	Involving all relevant stakeholders from the start is crucial for successful collaboration, even if it slows down decision-making processes or complicates finding timely solutions	Het betrekken van alle relevante belanghebbenden vanaf het begin is cruciaal voor succesvolle samenwerking, zelfs als dit besluitvormingsprocessen vertraagt of het vinden van tijdige oplossingen bemoeilijkt
34	Successful collaboration relies on stakeholders speaking and understanding each other's language	Succesvolle samenwerking is afhankelijk van het feit dat belanghebbenden elkaars taal spreken en begrijpen

B.2 Coding Scheme

In Table B.2 an overview is provided with the number of times a code is used in ATLAS.ti during the analysis of the interview transcripts.

Table B. 2 *Coding Scheme*

Category	Code	Number of Quotations
Governance Process	Statement 1	17
	Statement 2	18
	Statement 3	23
	Statement 4	14
	Statement 5	15
	Statement 6	20
	Statement 7	28
Governance Structure	Statement 8	20

	Statement 9	13
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Appendix C
Stakeholder Analysis

An overview of part of the stakeholder analysis is presented in this section. For the stakeholder analysis an overview of several current programs and collaborations is made, to provide an understanding in what is going on at the moment within the field of energy, spatial planning and the integration of these two domains. The programs and collaboration initiatives are provided in Table C.1, Table C.2, and Table C.3 grouped by level—National, Provincial, and Local and Regional. Additionally, a network of all the programs and collaboration initiatives was provided in the rapport. This network is based on the connections described in Table C.4. Furthermore, an overview with the rights, responsibilities, objectives, rights, perceptions and solutions of each stakeholder who is analyzed within the stakeholder analysis is provided. The programs are referred to by their abbreviations, as listed in the abbreviations list.

C.1. Overview of the Current Programs and Initiatives

National Level

On national level many programs (NPE, PEH, NPLW) are focusing on the energy infrastructure of the future. While all the programs highlight the importance of working together, only *Integraal Programmeren* focusses really on this process –the integration and collaboration of multiple domains and stakeholders. Notable, is that within programs specifically focused on spatial planning (NOVEX, NOVI) grid operators are not from the start involved. While this might be reasonable in the past, nowadays the energy infrastructure might need to have a more important role in these kinds of programs focusing on the living environment. All the programs and visions on national level will be described in Table C.1.

Table C. 1 *Description of Current National Programs and Initiatives*

Program	Objective	Key Stakeholders	Progress
nMIEK	Focusing on the choices related to the energy- and raw materials infrastructure and prioritizing which projects must be realized first *("MIEK Handleiding 2024", 2024.*	National Government, Grid operators, provinces, municipalities, companies, and other relevant stakeholders	The MIEK has been expanded to including more sectors like housing and mobility. It also resulted in a closer cooperation between the government, provinces, and grid operators to plan infrastructure needs more efficiently. In addition, it is now also focusing on shorten procedures and resolve grid congestion (*Kamerstuk || 2023/24, nr. 201, p. 1*).
Integraal Programmeren	Developing joint decisions on regional energy system configurations and integrating energy into spatial planning.	Provinces, National Government, Municipalities and Grid Operators	Initiates dialogue on long-term energy system choices and fosters cross-domain cooperation.
LAN	Working on grid congestion in collaboration with other parties. It focuses on three goals: faster building, stronger coordinating, and increasing flexible capacity.	Grid operators, national government, other governmental bodies, and market parties	Important steps have been made in collaboration on national level between multiple stakeholders. In addition, energy boards have become active in every province, as agreed in the LAN (*Kamerstuk || 2023/24, Nr. 515*). Progress is being made in tackling grid congestion, but demand for energy transport capacity is still growing faster than supply. Finaly, a communication network is being developed with multiple stakeholders.
NPE	A long-term vision of the energy system in 2050; how a sustainable, reliable, and affordable energy system looks like in the future. How everyone can	National government, municipalities, provinces, and grid operators	The NPE showed that discussing the design of the energy system is very valuable. This dialogue offers the opportunity to shape the governance and collaborative relationships that are needed.

	contribute from their own role (RVO, 2024).		
NOVI	A long-term vision of the national government regarding the future and development of the environment in The Netherlands. The NOVI proposes a new approach: integral, together with other governments and social organizations and with more control from the central government. Working on priorities with a careful consideration of interests.	National government.	The NOVI offers many opportunities to retain or improve the living environment, but there is room for improvement, especially in the way of monitoring (Planbureau voor de Leefomgeving, 2024).
PEH	The PEH shows which new national energy infrastructure is needed towards 2050 and where these can be placed cleverly. The ambition is to ensure sufficient space for a national energy network in a timely manner, based on an integral consideration of other tasks and interests, within an (inter)national context and where a good quality living environment is a prerequisite (RVO, 2024a).	National government, provinces, municipalities, port companies, and grid operators.	*The PEH has been established on March 1st 2024. Therefore, no concrete evaluation has been taken place.*
NOVEX	The NOVI has assigned NOVEX areas. In these areas governmental bodies are working together to a plan for the design of the living environment of that special area (Ministerie van Binnenlandsezaken en Koninkrijksrelaties, n.d.).	National government, provinces, municipalities, and waterboards.	The NOVEX initiative has made notable progress in promoting integrated spatial planning and collaboration. However, it continues to face significant governance challenges that require ongoing attention and resolution (Hinterleitner, 2024).
NPLW	The NPLW inspires and supports municipalities with knowledge and action perspectives on the heating transition (NPLW, n.d.).	National government, VNG, IPO, NetbeheerNL, and Aedes	The NPLW has made significant progress in supporting Dutch municipalities with the local heat transition. Key achievements include monitoring and reporting, identification of the challenges and support and guidance (NPLW, 2024; NPLW, n.d.-a).
planMER	Defining the climate consequences, on for example livability, landscape and nature, of projects and strategies (ILPO, n.d).	Initiator of the project/plan	The planMER succeed in finding sustainable locations for solar- and wind energy with minimum impact on nature and the environment. Therefore, it contributes to environmental protection, policy coordination, participation and support, and climate adaptation.

Provincial Level

Because of the scope of the research, the analyzed programs are limited to those within the province of Gelderland, and therefore might not be comparable for other provinces. The stakeholder landscape around energy infrastructure and spatial planning in Gelderland is characterized by a high degree of complexity, with overlapping initiatives and partially overlapping stakeholder groups. While the provincial government holds a central coordination role, the actual success of integration depends heavily on the technical feasibility assessments of grid operators, the policy coherence from national to local levels, and the meaningful involvement of societal actors like energy cooperatives and local communities. Also evident from the progress of the initiatives is that the process is or lacking behind, stagnating due to shortage

of financial support, or has trouble in achieving cohesive and actionable strategies. This indicates that there is room for improvement. The programs active in Gelderland are mentioned in Table C.2

Table C. 2 *Description of Current Provincial Programs and Initiatives*

Program	Objective	Stakeholders	Progress
POVI (Gaaf Gelderland)	The POVI outlines the provincial approach to managing the living environment, integrating various domains such as spatial planning, water management, energy transition, and infrastructure.	Province	While provinces have made significant strides in integrating various policy domains, challenges remain in achieving cohesive and actionable strategies (Planbureau voor de Leefomgeving, 2024a).
GEIS	With this program the province of Gelderland provides direction for provincial efforts on energy infrastructure. This approach knows three tracks: 1) accelerating the realization of energy infrastructure, 2) integrated programming of energy infrastructure in relation to spatial-economic developments, and 3) developing smart regional energy solutions (Provincie Gelderland, n.d.).	Province, grid operators, RES, municipalities, waterboards, and the network of GEA	*At the moment there is no evaluation or monitoring of the GEIS.*
GEA	Gelderland Climate Neutral in 2050 (Gelders Energieakkoord, n.d.).	Multiple parties like grid operators, governmental bodies, NGO's, energy cooperations, companies, and local communities (Gelders Energieakkoord, n.d.-b).	The annual energy-saving targets are slightly lagging behind, the share of renewable electricity is growing exponentially, but the reduction in greenhouse gas emissions remains stagnant (Gelders Energieakkoord, 2024).
planMER	It focuses on the effect of wind farms and solar fields on the living environment, biodiversity, nature, energy system, environment, and landscape (Groene Metropoolregio Arnhem-Nijmegen, 2025; IPLO, n.d.).	Province and multiple consultancy's (Provincie Gelderland, 2023)	*The planMER has recently been made available for inspection.*
Energy Boards	The energy boards focus on the coordination and alignment of the energy system in the province (RVO et al., 2024a).	Province, municipalities, and grid operators	*Currently, there is no progress information available, because the energy boards were constituted in June 2024.*
pMIEK	The pMIEK focuses on the integrated programming of energy infrastructure in relation to spatial-economic developments. The pMIEK provides a list of priority energy	Grid operators and province of Gelderland.	The first version of the pMIEK consists of projects provided by the province and grid operators. Therefore, this version has not used the integral programming approach, so the included projects relate to development that are of provincial importance. For the

	infrastructure projects (Provincie Gelderland, 2023a).		next version, the integral programming approach will be applied.
VLGG	The VLGG describes per region what is needed there in the coming twelve years, for sustainable agriculture, nature, clean and sufficient water, and in preparation for changes is out climate (Provincie Gelderland, 2024).	Province, municipalities, waterboards, nature organizations, and agriculture sector.	Giving the current funding, the province is focusing on the most urgent areas. In these areas, measures are being taken for nature restoration and nitrogen reduction (Provincie Gelderland, n.d.-a).

Regional & Local level

The programs and initiatives on local level show that municipalities are responsible for defining key visions, like the municipal *Omgevingsvisie* and *Transitievisie Warmte*, but they still have significant freedom in how they do this and what to incorporate in these programs. Therefore, the level of ambition, quality, and coherence will vary greatly between municipalities. This creates a patchwork of policies rather than a uniform strategy. Even though the programs on regional level emphasize collaboration between stakeholders, they depend among others heavily on the willingness and capacity of individual municipalities. Also, while municipalities focus also on many other local needs, like housing, mobility, and nature, there is a risk that local spatial planning does not sufficiently account for provincial or national energy infrastructure needs. Leading to possible tensions between local autonomy and system integration. In Table C.3 the programs on regional (like the RES) and local level are provided.

Table C. 3 *Description of Current Regional & Local Programs and Initiatives*

Program	Objective	Stakeholders	Progress
RES	Facilitating regional collaboration to integrate sustainable energy generation and spatial planning.	Local and regional governments, and grid operators	Development of broadly supported plans and learning networks.
Gemeentelijke Omgevingsvisie	Outlining their long-term vision on the living environment. This vision focuses more on local issues.	Municipality	It is permitted for every municipality to define an O*mgevingsvisie*, and the content depends per municipality.
TVW	In these visions municipalities define plans to get off natural gas.	Municipalities	The current visions appear to concern intentions and plans more often than released CO2 reduction in 2030 (Gelders Energieakkoord, 2022).
Regio-arrangementen	The *Regioarrangementen* focusses on the integrated spatial development of Gelderland, combining themes such as housing, work, mobility, nature, economy, and the energy transition (Provincie Gelderland, 2024b).	Municipalities and waterboards	The first collaboration agreements have taken place. Indicating that there are already elaborations for many issues. This has been established by working together with other parties.

Program Network

Some of these programs are also connected to each other by being part of, anchored, support, or contact. These connections are visualized in a network diagram based on the connections defined in Table C.4.

Table C. 4 *Overview Connections between Programs*

Program	Connection	Source
RES & Omgevingsvisie/ POVI/ GOVI	Anchored	(RES, n.d.) (Provincie Gelderland, n.d.-a)
RES & planMER	Part of	(VNG, n.d.)

RES & GEA / GEIS/ NPLW/ pMIEK/ Integraal Programmeren/ TVW	Contact	(Gelders Energieakkoord, n.d.-b) (ROmagazine.nl, 2023) (NPLW, n.d.-b) (VNG, n.d.-b) (NPRES, 2023)
PEH & planMER	Part of	(Eerste Kamer der Staten-Generaal, 2024)
LAN & PEH/ RES/ PMIEK/ NPLW/ nMIEK	Anchored	(Wesselink, 2023)
NOVI & planMER/ RES/ PEH/ GOVI/ POVI/ NPLG/NOVEX	Part of	(Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2022) (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2020)
VLGG & NPLG/POVI	Part of	(Provincie Gelderland, n.d.-a)
Integraal Programmeren & nMIEK/pMIEK/NPE/PEH	Part of	(Werkgroep Integraal Programmeren, 2022)
Integraal Programmeren & NOVI/GOVI/POVI	Support	(Werkgroep Integraal Programmeren, 2022)
nMIEK & NOVI/pMIEK/GOVI	Part of	(Ministerie van Economische Zaken en Klimaat et al., 2024).
pMIEK & POVI	Part of	(Ministerie van Economische Zaken en Klimaat et al., 2024).
GOVI & pMIEK/TVW	Anchored	(Ministerie van Economische Zaken en Klimaat et al., 2024). (Uithoorn, 2023)
pMIEK& GEA/GEIS	Contact	(VNG, z.d.-c) (Provincie Gelderland, 2023a)
Regio-Arrangmenten & VLGG/GEIS	Contact	(Provincie Gelderland, 2023b)
POVI & TVW/ GOVI	Contact	(NPRES, n.d.-b)
NPLW & TVW	Support	(Uithoorn, 2023)
planMER & GOVI/POVI	Part of	(IPLO, n.d.)

C.2. Characteristics of the Stakeholders

Here the characteristics of the stakeholders are explained. These characteristics were used to determine a better understanding of the context of the stakeholders individually.

C.2.1 Rights & Responsibilities

Table C.5 provides the rights and responsibilities of the stakeholders, which was used to set up a formal chart and provide a better understanding on the formal procedures and legislation.

Table C. 5 *Overview of Stakeholders' Rights and Responsibilities*

Stakeholder	Rights	Responsibilities
Ministry of Climate and Green Growth (KGG)	- Develop and implement national climate and energy policies - Oversee the execution of the Climate Act	- Coordinate national climate policy - Promote sustainable energy production and CO_2 reduction
Ministry of Housing and Spatial Planning (VRO)	- Establish national frameworks for spatial planning - Supervise compliance with the Environment Act	- Develop policies for housing and spatial planning - Coordinate the integration of energy facilities into spatial plans
Netherlands Environmental Assessment Agency (PBL)	- Conduct independent research - Advise on environmental, nature, and spatial issues	- Monitor progress of climate and energy policies - Publish evaluations and future outlooks

Authority for Consumers & Markets (ACM)	- Regulate the energy market - Supervise competition	- Ensure fair competition - Protect consumer interests in the energy sector
Spatial Agencies	- Implement spatial policies - Advise on spatial developments	- Support governments in spatial planning issues - Promote sustainable spatial development
Province of Gelderland	- Draft provincial environmental visions - Supervise municipal spatial plans	- Coordinate regional energy and climate goals - Facilitate sustainable spatial developments
Association of Provincial Authorities (IPO)	- Represent provinces at the national level - Advocate for joint provincial interests	- Align provincial policies - Promote cooperation between provinces on energy and spatial planning
Integrated Programming	- N/A	- Process of aligning various policy objectives and projects for cohesive implementation
NOVEX	- N/A	- National Spatial Planning Extra: program to accelerate and strengthen spatial projects of national importance
Energy Suppliers	- Right to supply energy to consumers and businesses	- Ensure reliable and sustainable energy supply - Contribute to national climate goals
Grid Operators	- Manage and maintain energy networks	- Ensure a stable and safe energy infrastructure - Facilitate the connection of renewable energy sources
Renewable Energy Cooperatives	- Develop and operate renewable energy projects	- Promote local participation in renewable energy generation - Contribute to the energy transition at the local level
Energy Cooperatives	- See Renewable Energy Cooperatives	- See Renewable Energy Cooperatives
Municipalities	- Draft municipal environmental plans - Issue environmental permits	- Integrate energy facilities into spatial plans - Achieve local climate and energy goals
Association of Netherlands Municipalities (VNG)	- Represent municipalities at the national level - Advocate for municipal interests	- Support municipalities in policy development and implementation - Promote knowledge sharing and cooperation between municipalities
Water Boards	- Manage water systems and flood defenses	- Integrate water management into spatial planning - Contribute to climate adaptation and mitigation
Association of Water Boards (UvW)	- Represent water boards at the national level - Advocate for joint interests	- Align policies between water boards - Promote cooperation in water management and climate issues
Regional Energy Strategies (RES)	- N/A	- Collaborations between governments, grid operators, societal organizations, and market parties to implement the energy transition regionally.

C.2.2 Objective & Interest

Interests refer to the issues that matter most to an actor, while objectives indicate what they aim to achieve, the changes they seek to implement, or the conditions they wish to preserve. These characteristics are provided in Table C.6.

Table C. 6 *Overview of Stakeholders' Objectives & Interest*

Sector		**Stakeholder**	**Objective**	**Interest**
Public	Ministries	Ministry KGG	Sustainable, reliable and available energy that is affordable to everyone. By 2030, sustainable energy sources must account for 27% of the Netherlands Energy consumption. By 2050, nearly all energy facilities need to be entirely sustainable (Ministerie van Algemene Zaken, 2024).	Working towards a cleaner and stronger Netherlands. Working towards a climate-natural society and investing in people, innovation and sustainable energy (Ministerie van Klimaat en Groene Groei, 2024).
		VRO	Incorporating energy into long-term spatial plans to assure resilient, climate-adaptive urban and rural areas, encourage innovation and sustainability in spatial development, and balance conflicting land use needs (Interview Respondent 4 & 29).	Working together towards a Netherlands that is ready for the future. Finding balance and creating space for living, working, agriculture, nature, and infrastructure in a beautiful and livable country (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2024).
		PBL	Providing actionable insights and governance recommendations to support policy makers in integrating energy infrastructure into spatial planning in a sustainable, efficient and fair manner.	Research into the living environment and policies in the Netherlands. Considering the environment, nature and spatial planning (Planbureau voor de Leefomgeving, n.d.) .
	Provinces	Province Gelderland	The province of Gelderland wants to build new homes, achieve energy neutrality, and improve the sustainability of agriculture. In addition, the province wants to preserves, strengthen, or protect the positive developments (*Gelderse Omgevingsvisie*, n.d.) Climate neutrality by 2050 is the ultimate goal. As a result, they favor an accelerated energy transition, that is consistent with the province's characteristics and aims to significantly increase the share of sustainable energy (Provincie Gelderland n.d.-b).	Healthy and safe living environment and livable cities and villages.
		IPO	Achieving carbon neutrality by 2050, tackling net congestion, and striking a balance between spatial claims and difficulties.	The IPO is committed to a regionally strong economy, sets the agenda for social issues, and advocates for good public administration
	Municipalities	33 municipalities	The sustainable energy alternatives need to be achievable, affordable, and feasible, not only for municipalities themselves but also for their residents (*De Cruciale Rol van Gemeenten in de Energietransitie*, n.d.). In addition, it needs to balance with all the other local tasks.	Healthy and safe living environment and livable municipality for its residents (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2024a).

		VNG	A sustainable, affordable, and reliable energy system with a role for local authorities. The municipalities must be empowered to integrate the energy transition effectively into spatial planning while balancing local needs, spatial constraints, and sustainability goals. In order to minimize the spatial impact, they seek to focus on energy saving, optimal supply of sustainable energy, and energy infrastructure (*Nationaal Plan Energiesysteem (NPE)	VNG*, n.d.).	The aim of the VNG is to join forces of municipalities and act jointly in the interest of the local government and its residents.
	Waterboards	3 waterboards	Recognizing the direct impacts of climate change, such as drought and flooding, they emphasize that new energy infrastructure and generation must be climate-neutral and account for water systems in planning (interview). They aim to achieve energy neutrality by 2050 (Unie van Waterschappen, 2022).	Interested in ensuring water safety and quality.
		UvW	Their ambition is to be 100% climate neutral by 2050. But in order to perform their daily task, they require electricity.	The UvW represents the interest of the waterboards and encourage knowledge exchange and collaboration.
	Grid operators	Stedin, Liander, and Enexis.	They aim for a transition to renewable energy infrastructure (Alliander, n.d.). Thereby a more urgent position of energy is needed in the spatial planning. Therefore, they aim for better integration (Van den Bragt et al., 2023).	Reliable, reachable, and affordable energy system. Where the focus will be on decentral generation (Alliander, n.d.).
		NetbeheerNL	They aim that energy will be incorporated in spatial planning, so that new energy infrastructures can be integrated into the environment in a timely manner to provide everyone with energy now and in the future (*Ruimtelijke Inpassing | Netbeheer Nederland*, n.d.).	An accessible, reliable, and affordable energy system that makes the transition to a sustainable energy infrastructure possible (Netbeheer Nederland, n.d.).
		Tennet / Gasunie	They aim for a future proof energy system: that is both climate neutral by 2050, affordable, and profitable (TenneT, n.d.). Promoting the energy transition (Gasunie, 2021).	Stable and reliable grid, ensures supply security, and integration of European energy systems.
Private	Spatial planners	Companies focused on spatial planning	Ensuring that the spatial planning supports the integration of energy infrastructure, so they aim that the energy infrastructure is integrated into spatial planning in a way that it supports the energy transition, respects special quality, and balances competing land-use priorities.	Focusing on issues about spatial development, where they provide advice for complex spatial assignments. They want to develop long-term, adaptive plans that balance all the competing spatial claims.
	Renewable energy cooperations		Facilitate the integration of renewable energy infrastructure, focusing on green energy like wind and solar, into spatial planning to support	Ensure a secure, sustainable and affordable green energy supply while supporting the energy transition. They promote the production and consumption of

			climate goals. making sure the cities and villages are sustainable.	renewable energy (*Energie Samen*, n.d.).
	Consultancy's	Spatial planning related	Develop integrated spatial plans that accommodate energy projects while maintaining spatial quality.	Balancing energy infrastructures needs with broader spatial claims (housing, nature, and agriculture).
		Energy related	Facilitate the development of energy infrastructure that aligns with policy goals.	Ensuring that renewable energy projects are technically and financially viable while support energy goals.
	Energy suppliers	Eneco etc.	The goal of energy suppliers is that the Netherlands is Climate neutral by 2050. Therefore, they aim to focus on renewable energy and decarbonized heat networks. In addition, it must be reliable, sustainable, and affordable.	Their interest is to deliver electricity and gas to your home. So, everyone can live and work sustainable, while maintaining market competitiveness and customer trust.
Social groups	Residents & community groups		Advocate for community participation in energy planning and ensure local energy equity.	Ensure livable, affordable, and sustainable environment for all citizens.
	Environmental NGOs	Natuur en Milieu Gelderland	Clean energy and care for nature and landscape. They are committed to nature-inclusive energy transition (Natuur en Milieu Gelderland, n.d.).	They are committed to an attractive landscape, rich biodiversity, and a healthy living environment for people, plants, and animals (Natuur en Milieu Gelderland, 2024).
	Agriculture NGO's/ associations		Promoting energy invocation while balancing energy demands and spatial claim to maintain the agriculture sector's sustainability and competitiveness.	Preserve the availability of enough land,resources for farming, and safeguard profitability.
	Housing Cooperation's		Ensuring that new housing developments have access to energy infrastructure and renewable energy options while simultaneously reducing heat demand, keeping it affordable for renters and balancing the competition for space between new homes and the new energy infrastructure (Aedes, n.d.).	Providing good, affordable and sustainable housing.
	Energy Cooperations		Energy Cooperatives aim to integrate energy production with spatial planning by promoting local renewable energy solutions that align with community development goals.	Their interest lies in enhancing energy self-sufficiency, supporting sustainable land use, and ensuring democratic control over energy infrastructure.
	Industry Cooperations		Drive sustainable industrial growth while committed to find solutions for social challenges like transitioning to low-carbon energy systems.	Contribute to a sustainable and prosperous future for The Netherlands.
	Construction Cooperations		By 2050, all buildings in The Netherlands are climate neutral (Bouwend Nederland, n.d.).	Ensuring a vital construction sector that build on sustainable changes of the environment (Bouwend Nederland, n.d.-a).
Public cooperation programs	RES		To generate at least 35TWh of large-scale sustainable electricity on land by 2030 (RES, n.d.).	There is a need for affordable sustainable electricity and heating. Therefore, the RES works on generating renewable energy on land. Looking for sustainable

			heating alternatives for natural gas (RES, n.d.).
SP IPE		The energy system needs to be fully integrated into the spatial planning process. (Werkgroep Integraal Programmeren, 2022).	Integraal Programmeren is a joint process aimed at designing and planning and making choices about future energy, infrastructure, storage and conversion in close connection with spatial and sectoral planning for demand and supply (Werkgroep Integraal Programmeren, 2022).

C.2.3 Perception & Solutions

Perception refers to the way a stakeholder understands, interpret, frames a particular situation or issue, and what suitable solutions would be. These characteristics are provided in Table C.7.

Table C. 7 *Overview of Stakeholders' Perception and Solutions*

Sector		Stakeholder	Perceptions	Solutions
Public	Ministries	KGG	Net congestion and the absence of long-term infrastructure planning hinder the transition of climate-neutral economy. The current planning processes are not adaptive enough, there is a lack of collaboration, and the lengthy regulatory processes hinger the expansion of the energy infrastructure.	The expansion of the grid infrastructure must be accelerated and therefore stakeholders must collaborate more, energy must be incorporated into spatial planning, and there must be focus on research and innovation on the future of the energy infrastructure.
		VRO	The energy infrastructure is not sufficient integrated into spatial planning; there is a lack of collaboration and a reactive approach instead of a proactive one.	Encourage collaborative decision-making across municipalities, provinces, and energy stakeholders. Spatial energy plans need to be created on provincial and municipal level to align with national goals. In addition, the spatial needs to look for more multi-function usage of space.
		PBL	The issue requires governance reform and long-term policy alignment between spatial planning and energy transition goals.	There is a need for a more coherent approach, where there is attention for efficiency and what is needed for renew task. This requires inter-administrative cooperation.
	Provinces	Gelderland provinces	Major interventions in the environment are needed to achieve the transition to alternative, sustainable energy sources. The pace and the force of this change must increase (*Energietransitie - Gaaf Gelderland*, z.d).	There must be focus on energy efficiency and reduction of energy consumption, accelerate the sustainable energy generation, establish a collaborative approach while focusing on the infrastructure planning and coordination to ensure that spatial plans accommodate future energy demands.
		IPO	The energy transition is increasingly becoming a spatial planning issue with grid congestion, not just a technical one. Provinces see a growing misalignment between	Involve integrating energy into spatial policies, accelerating grid expansion, and promoting decentralized energy systems and regional collaboration.

		energy demand, supply infrastructure, and spatial development, leading to delays in housing projects and economic initiatives.	
Municipalities	33 municipalities	Municipalities see the energy transition as a pressing local issue, with grid congestion hindering housing developments and business growth due to the absence of energy considerations in spatial planning. They identify inadequate grid capacity, lack of regulatory clarity, and funding shortages as key challenges.	Their solutions focus on integrating energy planning into local zoning, fostering partnerships with grid operators, and promoting decentralized renewable energy initiatives.
	VNG	They see fragmented policies, insufficient financial resources, and unclear roles between municipalities, provinces, and grid operators as key issues.	There is a need to an integrated and strategic approach to the energy system and spatial planning, advocating for early and continuous stakeholder involvement to minimize conflicts. They promote strong local governance and decision-making, long-term planning, and close collaboration with stakeholders.
Waterboards	3 waterboards	There is a lack of integration between energy and water infrastructure planning (Interview Respondent 6).	Improved collaboration with the waterboards, and looking to their possible contributions like producing renewable energy and providing space possibilities for renewable energy projects.
	UvW	The UvW see challenges in the lack of coordination between energy and water infrastructure planning, the growing energy demand, and the need for climate-neutral operations.	More focus on integration sustainable energy solutions into water management, optimizing the use of water infrastructure for energy generation, and advocating for stronger collaboration.
Grid operators	e.g. Stedin, liander	Energy became a spatial issue due to the change of the renewable energy infrastructure and grid congestion. However, at the moment energy is not or too late integrated into spatial planning.	Grid operators advocate for a more proactive approach, improved environmental managements, and enhancing expertise beyond sectoral knowledge. Therefore, better integration of energy in spatial planning is crucial.
	NetbeheerNL	The energy transition is a challenge due to increasing electricity demand and gird congestion. Besides, the lack of integration between spatial planning and energy infrastructure creates inefficiencies and delays in achieving climate goals.	They advocate for better coordination between stakeholders, long-term investing, integrating energy infrastructure into spatial planning, and strengthening collaboration.
	TenneT / Gasunie	Grid congestion is a crucial issue in the energy transition. The increased rate at which additional transport capacity is being requested exceeds the speed at which grid operators can expand the electricity grid	They emphasize the need to prepare now for rapid planning and construction, while fostering innovation, overcoming barriers, and enhancing collaboration with spatial planning. They stress the urgency of expanding the grid,

			(TenneT, 2023).	encouraging behavioral change, and working towards an integrated European energy system to support the energy transition effectively (Gasunie, 2021).
Private	Spatial planners	Spatial planning agencies	The problem lies in the fragmentated governance, misaligned planning timelines, and rigid policies.	Creating integrated frameworks, align processes, use spatial tools, engage communities, and foster collaboration.
	Renewable energy cooperations		The current energy grid is not equipped to handle the demands of the new energy infrastructure, leading to grid congestion. The increasing space required for renewable energy sources creates competition with other sectors, while existing processes remain too top-down, limiting flexibility, and local engagement.	They emphasize the need to invest in new energy systems and foster long-term collaboration. Aligning energy generation and consumption, promoting decentralization with local ownership, and encouraging greater participation from local stakeholders and businesses are key strategies.
	Consultancy's	Spatial planning related	The lack of adaptive governance frameworks and fragmented decision-making cause inefficiencies in spatial planning.	Create spatial-energy integration frameworks, use data-driven tools, and foster multi-level collaboration.
		Energy related	Misalignment between energy infrastructure needs and spatial planning timeline's delays projects realizations.	Provide technical expertise and strategic advice to streamline energy project development.
	Energy Supplier	Eneco etc.	The energy transition is hindered by grid congestion, spatial constrains, and misaligned planning processes.	There is need for more collaboration and investment in renewable energy sources, smart grids, and heat networks.
Social groups	Residents & community groups		They have concerns about the affordability, local impact, and decision-making transparency.	They advocate for greater participation, ensuring local ownership of energy projects, and fair distribution of costs and benefits.
	Environmental NGOs	Natuur en Milieu Gelderland	Damage that can be caused by the energy transition; by the forms of energy but also by the choice of location.	Careful handling of nature and landscape, thus economical use of space, well-considered choice of location, and integration with attention to nature (Natuur en Milieu Gelderland, n.d.).
	Agriculture NGO's/ associations		The competition of agriculture land with the energy infrastructure and renewable projects.	Advocate for dual land use and integrate farm-based energy projects. and a financial compensation for land use (LTO, n.d.).
	Housing Cooperation's		Many spatial claims by diverse sectors like water, housing, energy, climate, and agriculture. All these claims result in more involved stakeholders and objectives.	There needs to be more collaboration, by sitting together, pooling capacities, and how we can create new combinations to use space efficiently (Jager, 2024).
	Industry Cooperations		The energy transition increases operational costs, requires technological innovation, and competes for resources like space	Invest in energy efficiency, renewable energy integration, collaboration, and involvement during the planning processes.
	Construction Cooperations		The limited space on the electricity grid hinders the scaling up of housing construction and the	Major investment is needed, more regie on the energy infrastructure, and intensive collaboration with grid operators.

			sustainability of the build environment.	
	Energy Cooperations		The grid congestion, regulatory barriers, and limited (financial) resources hinder the ability to scale up projects and too much focus on centralization.	Stronger policies that support decentralized energy generation and better integration of local energy initiatives into regional planning. There is a need for better collaboration between stakeholders.
Public cooperation programs	RES		There are challenges such as gird congestion and the complexity of multi-level governance, where spatial and energy processes are often misaligned.	Develop balances visions that integrate renewable energy development with competing spatial demands. They emphasize the need for coordination across levels. In addition, they advocate for flexible governance framework that can adapt to evolving energy and spatial planning needs.
	SP IPE		They emphasize the challenges due to grid congestion and the major other challenges the Netherlands has.	A comprehensive and integrated approach is needed to align various plans and developments with the available energy system capabilities. It requires smart utilization while prioritizing projects based on urgency. Effective planning should consider both the energy system and spatial development in a cohesive and strategic manner (Werkgroep Integraal Programmeren, 2022).

C.3. Sources Stakeholder Analysis

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Appendix **D**

Respondents' Q-sorts

Here the Q-sorts of every respondent is provided. Table D.1 shows the position of each statement in de respondents' Q-sorts, with the statement numbers as columns and the respondents as rows.

***Table D. 1** Q-sorts of Respondents*

Resp.	S1	S2	S3	S4	S5	S6	S7	S8	S9	S10	S11	S12	S13	S14	S15	S16	S17	S18	S19	S20	S21	S22	S23	S24	S25	S26	S27	S28	S29	S30	S31	S32	S33	S34
13	2	1	-1	3	-2	-3	-2	2	0	-2	1	-3	-1	0	4	1	1	-3	-1	4	3	1	2	2	0	0	-4	-4	-2	0	0	-1	-1	3
35	-2	0	-1	-2	1	-1	0	2	3	3	3	2	-3	4	1	-1	-4	-3	2	-1	0	0	2	1	-1	-4	-2	-2	1	4	-3	0	1	0
14	2	3	0	-2	1	1	-3	0	0	0	1	-2	-1	4	1	-1	4	-3	2	1	2	-2	-2	3	-1	-3	-1	-4	2	-1	-4	0	0	3
15	-1	3	2	2	1	1	-2	-2	-1	-1	1	-3	-2	0	2	-3	0	-4	0	0	3	-4	4	1	-2	3	-3	-1	2	0	-1	0	1	4
16	4	4	0	0	0	-1	-2	-1	-3	1	0	-3	3	-1	1	-1	1	0	2	3	3	-2	2	-2	2	-3	-1	-2	-4	-4	1	1	2	0
17	3	4	-2	0	-4	1	-1	0	-2	3	2	-3	-1	2	-2	1	1	-1	-2	-1	3	0	0	0	2	-3	-3	-1	-4	4	1	2	0	1
18	3	-1	-3	3	0	1	-1	0	0	0	1	-2	-4	2	0	-2	3	2	2	1	2	-1	4	-2	-1	-2	-3	-4	1	-3	-1	0	1	4
19	3	4	0	-1	0	3	-1	-1	1	0	2	0	-3	-2	4	-4	2	-2	0	-1	1	-2	1	1	0	2	-2	-3	1	3	-4	-1	-3	2
20	2	3	0	1	-2	1	1	0	-1	-1	1	-2	-1	0	-2	2	2	-1	2	-3	3	-3	4	-2	-4	-4	1	-1	4	0	-3	0	0	3
21	1	3	1	0	-1	2	-3	0	-1	3	1	-3	-4	-2	2	0	3	-2	2	4	0	0	2	1	-1	-1	-2	-1	1	0	-2	-4	-3	4
22	1	3	-1	1	1	0	-4	-2	-1	1	2	-1	-3	2	-1	-2	0	-4	3	4	3	0	4	1	-3	0	-2	-3	0	2	-2	0	-1	2
23	0	4	-2	0	0	-3	-1	-1	3	1	-2	-2	0	4	3	-1	0	-1	1	-1	1	2	3	-2	-4	0	-3	-4	1	2	-3	2	1	2
24	2	2	-2	2	-2	3	0	-2	-3	0	2	3	-3	1	1	-3	4	0	1	-2	-1	1	4	-1	-1	0	1	-4	0	3	-4	-1	0	-1
1	-2	4	-1	0	2	2	1	-1	-2	-1	-1	-3	-3	4	3	-2	3	0	1	3	-1	-3	1	2	2	-4	1	-4	1	0	-2	0	0	0
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12	1	-1	-1	-3	1	4	0	0	-2	0	0	-4	-3	1	4	-2	1	-4	0	1	2	-1	-2	0	-1	-1	2	2	-3	3	-2	3	2	3
25	3	4	0	-1	-1	-1	0	0	0	-2	0	-2	-4	1	1	-1	-1	-3	1	0	4	-2	3	2	-2	-4	2	-3	-3	2	1	1	2	3
26	-1	1	0	0	0	0	-4	2	2	1	4	0	-3	-2	3	-2	2	-1	1	0	3	-2	2	-3	-1	-2	-3	-1	4	3	-1	1	-4	1
3	2	4	0	2	0	0	-3	0	1	-2	4	1	-1	-1	-3	3	1	3	0	1	2	-3	2	-2	-1	-4	-1	-4	0	1	-2	-1	-2	3
27	-1	3	-3	-4	1	0	-2	1	-4	-1	-1	-3	-2	-2	3	-3	2	0	1	0	2	0	4	3	-2	0	1	2	4	-1	-1	2	1	0
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28	4	0	-4	2	1	-3	0	1	-1	0	-2	-4	-1	-1	4	-1	-2	-2	0	3	1	3	3	2	-3	2	0	-1	-3	2	-2	0	1	1
10	3	2	4	0	3	2	-1	1	0	3	-2	-3	-2	-4	-1	-2	-1	1	0	-2	1	-1	4	2	0	1	-3	-3	1	-4	0	0	-1	2
29	0	2	0	-1	2	3	-2	-2	0	0	-1	-2	-3	-1	-1	0	1	-4	-4	1	0	-1	2	3	-3	1	-3	1	-2	3	2	1	4	4
6	-2	0	0	0	2	-2	-3	0	0	0	1	-4	-4	1	-2	-1	3	2	2	4	4	-1	2	1	-1	-1	-2	-3	-1	3	-3	1	1	3
30	2	0	-2	2	-2	1	-1	-1	1	0	-1	-4	-3	-1	1	-1	0	-2	0	0	2	0	4	-3	-2	-4	2	-3	3	4	1	1	3	3
4	0	4	1	2	1	2	-3	-3	-1	-2	0	-2	-1	-2	2	-1	1	-4	3	0	3	2	4	1	-3	-1	0	-4	3	-2	0	-1	0	1
31	2	4	-1	0	0	1	4	0	3	2	0	-2	-3	2	1	-1	3	-3	1	3	-2	2	-1	-2	-4	-3	-1	-2	-1	1	-4	1	0	0
32	1	2	2	0	-2	-1	-2	2	1	3	1	-3	-4	2	-1	0	3	-1	-1	4	1	1	0	0	-3	-4	-2	-2	4	0	-3	-1	0	3
33	1	2	-1	1	2	0	-2	-3	1	3	3	-1	-4	-3	1	-3	3	0	2	-2	4	0	4	0	-1	-4	0	-2	-1	-2	-1	0	2	1
2	1	0	-2	-1	-1	4	0	-1	-2	-3	-1	1	0	-2	0	-1	3	2	2	4	-3	2	3	-4	0	1	1	-4	-3	2	0	-2	1	3
8	3	4	-2	-1	0	2	-1	1	-1	0	0	-1	-3	1	3	-1	-2	-3	1	0	2	2	-2	2	-2	-4	1	-3	4	0	-4	0	1	3
34	2	2	-1	0	-1	1	-1	-2	-2	-1	0	-1	-3	2	0	2	4	-3	4	3	1	-3	1	-2	0	-4	-2	-4	0	3	0	1	1	3
5	0	3	0	2	2	2	-2	3	0	-2	1	-2	-2	4	1	-3	-1	-1	1	0	0	-3	-1	4	1	0	-3	-4	2	3	-4	-1	-1	1
7	4	3	2	1	0	-1	-4	1	3	-2	2	-3	-4	2	-3	-3	0	-2	3	4	0	-1	2	1	0	-2	-1	-2	-1	1	-1	0	0	1

Appendix **E**

Q-Analysis Correlation Overview

In this section the correlation between the Q-sorts of the respondents is provided in Table E.1. A correlation is highlighted when it has a score of 40 or higher.

Table E. 1 *Correlation between Respondents' Q-sorts*

Resp.	13	35	14	15	16	17	18	19	20	21	22	23	24	1	9	12	25	26	3	27	11	28	10	29	6	30	4	31	32	33	2	8	34	5	7
13	100	7	37	43	37	34	44	33	9	50	51	39	7	21	4	13	45	31	30	9	7	61	15	24	43	29	40	20	41	19	13	29	40	35	44
35	7	100	30	12	-24	16	11	22	15	11	41	45	19	21	31	15	32	39	12	1	33	8	-9	7	26	24	4	34	33	22	-23	41	21	44	29
14	37	30	100	41	28	26	44	50	42	52	56	41	26	61	44	38	45	33	35	30	52	7	18	20	49	21	45	44	63	36	-3	68	60	63	51
15	43	12	41	100	19	9	39	57	39	48	64	39	21	31	25	29	43	43	19	41	27	24	46	55	42	36	64	7	29	39	-3	28	34	48	38
16	37	-24	28	19	100	39	36	4	18	23	29	13	1	27	23	11	39	-1	29	17	-1	23	30	2	21	16	31	9	9	42	20	10	39	-5	33
17	34	16	26	9	39	100	21	21	23	22	31	21	22	14	6	29	46	16	33	-4	38	13	1	32	27	31	-2	24	28	23	1	19	46	17	29
18	44	11	44	39	36	21	100	29	48	43	50	39	42	38	60	9	35	36	47	19	22	24	36	11	54	51	39	29	48	59	33	31	54	29	45
19	33	22	50	57	4	21	29	100	26	58	49	33	57	34	23	33	33	58	29	29	35	21	36	26	24	24	43	35	27	39	19	48	32	57	34
20	9	15	42	39	18	23	48	26	100	33	36	33	37	23	43	9	48	37	57	29	49	-3	22	8	26	57	48	29	46	43	4	44	51	16	25
21	50	11	52	48	23	22	43	58	33	100	62	19	29	38	38	24	28	50	36	31	14	25	40	30	46	29	52	38	67	42	27	43	49	33	47
22	51	41	56	64	29	31	50	49	36	62	100	51	41	36	46	24	54	46	41	30	34	42	23	40	65	41	64	37	51	49	18	44	59	47	68
23	39	45	41	39	13	21	39	33	33	19	51	100	28	26	36	10	38	32	18	21	33	44	9	18	38	44	39	53	40	28	5	42	34	33	28
24	7	19	26	21	1	22	42	57	37	29	41	28	100	36	36	11	23	26	29	18	26	13	1	3	16	33	36	34	15	42	48	29	39	28	17
1	21	21	61	31	27	14	38	34	23	38	36	26	36	100	59	33	39	15	19	36	36	7	8	11	42	25	34	42	35	28	19	43	54	57	33
9	4	31	44	25	23	6	60	23	43	38	46	36	36	59	100	18	39	37	34	46	35	11	10	-1	54	48	31	22	36	59	22	33	46	23	34
12	13	15	38	29	11	29	9	33	9	24	24	10	11	33	18	100	45	12	-21	34	36	34	-9	46	27	34	8	34	14	18	12	42	35	19	14
25	45	32	45	43	39	46	35	33	48	28	54	38	23	39	39	45	100	18	36	29	49	40	18	42	41	59	44	32	31	48	9	52	56	29	56
26	31	39	33	43	-1	16	36	58	37	50	46	32	26	15	37	12	18	100	45	28	13	-3	17	4	41	38	34	17	46	44	-4	28	34	34	33
3	30	12	35	19	29	33	47	29	57	36	41	18	29	19	34	-21	36	45	100	-11	16	-11	17	3	44	29	28	14	41	38	23	21	49	28	46
27	9	1	30	41	17	-4	19	29	29	31	30	21	18	36	46	34	29	28	-11	100	36	30	25	24	28	26	45	1	18	36	1	40	10	16	6
11	7	33	52	27	-1	38	22	35	49	14	34	33	26	36	35	36	49	13	16	36	100	25	1	34	27	31	9	41	33	27	-29	48	36	39	25
28	61	8	7	24	23	13	24	21	-3	25	42	44	13	7	11	34	40	-3	-11	30	25	100	11	27	28	35	26	29	11	16	18	31	9	14	24
10	15	-9	18	46	30	1	36	36	22	40	23	9	1	8	10	-9	18	17	17	25	1	11	100	25	18	11	42	-3	21	43	-4	16	-3	21	26
29	24	7	20	55	2	32	11	26	8	30	40	18	3	11	-1	46	42	4	3	24	34	27	25	100	31	33	26	16	21	21	11	15	29	16	24
6	43	26	49	42	21	27	54	24	26	46	65	38	16	42	54	27	41	41	44	28	27	28	18	31	100	36	27	24	56	45	18	19	53	42	57
30	29	24	21	36	16	31	51	24	57	29	41	44	33	25	48	34	59	38	29	26	31	35	11	33	36	100	47	31	42	46	26	45	54	11	34
4	40	4	45	64	31	-2	39	43	48	52	64	39	36	34	31	8	44	34	28	45	9	26	42	26	27	47	100	19	31	56	18	51	39	26	36
31	20	34	44	7	9	24	29	35	29	38	37	53	34	42	22	34	32	17	14	1	41	29	-3	16	24	31	19	100	56	25	19	47	44	22	38
32	41	33	63	29	9	28	48	27	46	67	51	40	15	35	36	14	31	46	41	18	33	11	21	21	56	42	31	56	100	31	-3	53	46	34	54
33	19	22	36	39	42	23	59	39	43	42	49	28	42	28	59	18	48	44	38	36	27	16	43	21	45	46	56	25	31	100	6	32	34	6	34
2	13	-23	-3	-3	20	1	33	19	4	27	18	5	48	19	22	12	9	-4	23	1	-29	18	-4	11	18	26	18	19	-3	6	100	-3	39	-8	12
8	29	41	68	28	10	19	31	48	44	43	44	42	29	43	33	42	52	28	21	40	48	31	16	15	19	45	51	47	53	32	-3	100	38	50	32
34	40	21	60	34	39	46	54	32	51	49	59	34	39	54	46	35	56	34	49	10	36	9	-3	29	53	54	39	44	46	34	39	38	100	31	49
5	35	44	63	48	-5	17	29	57	16	33	47	33	28	57	23	19	29	34	28	16	39	14	21	16	42	11	26	22	34	6	-8	50	31	100	51
7	44	29	51	38	33	29	45	34	25	47	68	28	17	33	34	14	56	33	46	6	25	24	26	24	57	34	36	38	54	34	12	32	49	51	100

Appendix **F**
Factor Analysis Solutions

Here are the results of all performed factor analyses. The factor analysis has been made for up to 8 factors with the PCA method. The results consist of a table with the loading of respondents on the defined factors and a table with the correlation between the factors. To determine the number of factors suitable for this research, several criteria were applied. The outcomes of some of these criteria are reflected in the table showing respondents' loadings on each factor.

F.1 Factor Analysis with 2 Factors

Table F. 1 *Loadings of Respondents on Two Factors*

Respondent	Factor 1	Factor 2
32	**0.7572**	-0.0322
8	**0.7392**	0.1895
14	**0.7052**	0.3497
5	**0.6526**	0.1406
2	**0.6465**	-0.1128
31	**0.6124**	0.1307
12	**0.5871**	-0.0293
25	**0.5765**	0.4241
23	**0.5617**	0.2658
11	**0.5483**	0.4067
1	**0.5384**	0.3025
19	**0.5207**	0.3785
29	0.384	0.1776
17	0.3553	0.2244
27	0.3537	0.2526
28	0.3477	0.1935
18	0.2356	**0.7443**
4	0.2626	**0.6688**
33	0.2465	**0.6681**
3	0.1012	**0.6404**
21	0.3618	**0.6299**
*22**	**0.5578**	**0.6087**
16	-0.0723	**0.5967**
*34**	**0.4683**	**0.5686**
6	0.4194	**0.544**
7	0.4316	**0.5189**
15	0.4062	**0.5102**
10	-0.0264	**0.5068**
9	0.3728	**0.5045**
20	0.355	**0.4979**
13	0.2927	**0.4965**
30	0.4143	**0.4902**
35	-0.1688	**0.4729**
26	0.3505	0.4388
24	0.3014	0.391

- Scores highlighted **bold** are the factors that fulfil the rules: > 2,58 /$\sqrt{N}$ (0.442)
- Scores marked with a * indicates that the respondents have multiple factors with a significant loading (> 2,58 /$\sqrt{N}$)
- Scores marked with ** indicates that the q-sort is not significant enough to belong to a factor, while it does not fulfil the rule: $f^2 > h^2/2$
- Number of defined sorts (> 2,58 /$\sqrt{N}$ (0.442)): 29

Correlation of 2 Factors

Table F. 2 *Correlation between Two Factors*

	Factor 1	**Factor 2**
Factor 1	1	0,6507
Factor 2	0,6507	1

F.2 Factor Analysis with 3 Factors

Table F. 3 *Loadings of Respondents on Three Factors*

Respondent	**Factor 1**	**Factor 2**	**Factor 3**
11	**0.7263**	-0.0276	0.2176
35	**0.7227**	-0.0012	-0.097
8	**0.6736**	0.1676	0.3169
14	**0.6683**	0.3663	0.2388
5	**0.6246**	0.1525	0.1973
31	**0.6184**	0.1772	0.0974
*32**	**0.5492**	**0.4594**	0.1104
1	**0.5169**	0.3244	0.1655
23	**0.5015**	0.2445	0.2739
*19***	0.4199	0.3167	0.3814
17	0.3131	0.2094	0.1867
3	0.1805	**0.7682**	-0.1737
18	0.1946	**0.7532**	0.1815
33	0.1611	**0.6247**	0.3017
34	0.4456	**0.6002**	0.1664
9	0.3914	**0.5727**	0.0346
20	0.3747	**0.566**	0.0282
21	0.2467	**0.5579**	0.4017
*4**	0.0959	**0.5371**	**0.5261**
*22**	0.4269	**0.5287**	**0.4787**
6	0.3497	**0.52**	0.2851
7	0.3677	**0.5006**	0.2704
26	0.3611	**0.4935**	0.0499
16	-0.1979	**0.4883**	0.3519
2	-0.2018	**0.4538**	0.078
24	0.3233	**0.4528**	0.0085
30	0.3295	**0.4465**	0.3231
28	0.1199	-0.027	**0.6895**
29	0.1641	-0.0331	**0.674**
15	0.1956	0.3293	**0.6651**
13	0.119	0.3493	**0.544**

12	0.4316	-0.1701	**0.5267**
27	0.1877	0.1035	**0.5245**
25	0.4334	0.3214	**0.5083**
10	-0.1804	0.3647	0.4341

- Scores highlighted **bold** are the factors that fulfil the rules: > 2,58 $/\sqrt{N}$ (0.442)
- Scores marked with a * indicates that the respondents have multiple factors with a significant loading (> 2,58 $/\sqrt{N}$)
- Scores marked with ** indicates that the q-sort is not significant enough to belong to a factor, while it does not fulfil the rule: $f^2 > h^2/2$
- Number of defined sorts (> 2,58 $/\sqrt{N}$ (0.442)): 32

Correlation of 3 Factors

Table F. 4 *Correlation Between Three Factors*

	Factor 1	**Factor 2**	**Factor 3**
Factor 1	1	0.583	0.4724
Factor 2	0.583	1	0.4607
Factor 3	0.4724	0.4607	1

F.3 Factor Analysis with 4 Factors

Table F. 5 *Loadings of Respondents on Four Factors*

Respondent	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**
21	**0.759**	0.1251	0.1158	-0.2223
32	**0.7404**	0.2996	-0.0084	0.3146
3	**0.7294**	0.1116	0.3035	0.0795
34	**0.5696**	0.3439	0.1988	-0.0239
2	**0.546**	0.3378	0.225	-0.0549
28	**0.5355**	-0.3219	-0.077	0.1856
*16**	**0.5303**	0.1195	**0.4661**	0.0881
17	**0.5294**	0.2715	0.2694	0.2292
12	**0.5186**	0.2179	0.1461	0.3661
29	**0.5175**	0.2899	0.2477	0.2275
14	**0.5162**	-0.32	0.1586	0.3503
8 **	**0.4955**	0.3558	**0.4553**	0.3353
24	**0.4748**	0.2743	0.1033	0.001
6	0.0655	**0.7334**	-0.0444	-0.0243
20	0.0777	**0.6834**	0.0169	0.3242
22	0.0986	**0.6507**	0.3353	0.0547
7	0.1861	**0.6452**	0.2584	0.2731
27	0.3713	**0.6328**	0.2858	0.1709
30	0.343	**0.5235**	-0.1374	0.3038
19 **	**0.4683**	**0.5082**	0.2167	0.0611
10	0.3696	**0.4626**	0.1391	0.1766
11	0.287	**0.4454**	0.1753	0.2764
5	0.1395	0.2066	**0.7674**	0.2853
33	0.108	-0.1295	**0.734**	-0.0111
25	0.3619	0.0839	**0.6973**	0.1756
35	-0.03	0.207	**0.5505**	0.2562

4	0.1978	0.4339	**0.5391**	0.1246
*23**	**0.4513**	0.2138	**0.5379**	0.1592
*15 **	0.3535	0.3997	**0.4539**	-0.2167
9	0.0394	0.0156	0.1958	**0.7278**
1	-0.037	0.3394	0.0211	**0.6732**
26	-0.0231	0.0976	0.3062	**0.624**
31	0.4251	0.3033	0.1626	**0.5852**
18	0.3535	0.0231	0.3223	**0.479**
*13 **	0.3956	0.1762	-0.1862	0.4319

- Scores highlighted **bold** are the factors that fulfil the rules: > 2,58 $/\sqrt{N}$ (0.442)
- Scores marked with a * indicates that the respondents have multiple factors with a significant loading (> 2,58 $/\sqrt{N}$)
- Scores marked with ** indicates that the q-sort is not significant enough to belong to a factor, while it does not fulfil the rule: $f^2 > h^2/2$
- Number of defined sorts (> 2,58 $/\sqrt{N}$ (0.442)): 34

Correlation of 4 Factors

Table F. 6 *Correlation between Four Factors*

	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**
Factor 1	1	0.5267	0.5343	0.4059
Factor 2	0.5267	1	0.4425	0.4856
Factor 3	0.5343	0.4425	1	0.4893
Factor 4	0.4059	0.4856	0.4893	1

F.4 Factor Analysis with 5 Factors

Table F. 7 *Loadings of Respondents on Five Factors*

Respondent	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**
15	**0.7492**	0.2105	0.2943	0.1748	0.1125
10	**0.7444**	-0.088	-0.0234	0.1015	0.0232
4	**0.6816**	0.0349	0.1823	0.1488	0.4059
21 ****	**0.5339**	0.2115	0.0856	**0.4374**	0.2532
*19***	**0.5115**	0.4173	0.1562	0.1233	0.2413
*27***	**0.5046**	0.1154	0.4006	-0.3169	0.3689
*26***	**0.447**	0.4161	-0.2294	0.22	0.274
35	-0.0775	**0.7317**	0.0116	0.0905	0.0995
5	0.3127	**0.6937**	0.0521	0.2527	-0.0135
14	0.2547	**0.6028**	0.1541	0.3339	0.3108
11	-0.0391	**0.5997**	0.4041	-0.0126	0.2977
8	0.209	**0.5757**	0.3351	0.0689	0.3476
32 ****	0.2059	**0.511**	-0.0197	**0.4954**	0.2382
*31***	-0.1708	**0.449**	0.2776	0.2972	0.3267
*23***	0.1462	0.3977	0.2639	0.2578	0.2692
12	-0.0306	0.2366	**0.7346**	-0.0158	0.1753
28	0.1739	-0.0322	**0.6935**	0.2416	-0.0136
29	0.2838	0.0741	**0.61**	0.191	-0.0633
*25***	0.1303	0.2079	**0.5358**	0.3928	0.379
13	0.334	0.0587	0.3124	**0.6936**	-0.0932
7	0.251	0.3065	0.0831	**0.6727**	0.1354

3	0.1374	0.1228	-0.3759	**0.6069**	0.4082
*34***	-0.0238	0.2039	0.1992	**0.5862**	0.5583
6	0.2644	0.2528	0.1215	**0.5515**	0.2728
17	-0.1919	0.1373	0.305	**0.5448**	0.1298
*22***	0.4397	0.3313	0.2532	**0.5246**	0.2897
*16***	0.1741	-0.3714	0.2131	**0.4805**	0.2709
9	0.1679	0.2205	0.0063	0.0828	**0.7547**
20	0.2005	0.2413	-0.0421	0.1344	**0.6609**
24	0.0759	0.1599	0.0293	0.0507	**0.6512**
33	0.4489	0.0313	0.0846	0.1718	**0.6029**
30	0.1155	0.0907	0.3484	0.2441	**0.5957**
*18**	0.3012	0.0412	-0.0131	**0.4626**	**0.5834**
1	0.1038	0.3765	0.1955	0.1515	**0.4712**
*2***	-0.0679	-0.4206	0.095	0.2796	**0.463**

- Scores highlighted **bold** are the factors that fulfil the rules: > 2,58 /$\sqrt{N}$ (0.442)
- Scores marked with a * indicates that the respondents have multiple factors with a significant loading (> 2,58 /$\sqrt{N}$)
- Scores marked with ** indicates that the q-sort is not significant enough to belong to a factor, while it does not fulfil the rule: $f^2 > h^2/2$
- Number of defined sorts (> 2,58 /$\sqrt{N}$ (0.442)): 34

Correlation of 5 Factors

Table F. 8 *Correlation between Five Factors*

	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**
Factor 1	1	0.3528	0.4006	0.4168	0.5178
Factor 2	0.3528	1	0.4552	0.5094	0.5494
Factor 3	0.4006	0.4552	1	0.4548	0.3472
Factor 4	0.4168	0.5094	0.4548	1	0.583
Factor 5	0.5178	0.5494	0.3472	0.583	1

F.5 Factor Analysis with 6 Factors

Table F. 9 *Loadings of Respondents on Six Factors*

Respond-ent	**Factor 1**	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**	**Factor 6**
20	**0.7564**	0.2225	-0.0779	0.1734	0.2144	-0.0114
9	**0.6663**	0.2781	-0.0318	0.1591	0.1006	0.3124
33	**0.634**	0.0545	0.0539	0.4371	0.2313	0.1109
30	**0.5846**	0.126	0.314	0.1054	0.2932	0.1871
5	-0.1174	**0.755**	0.0554	0.3019	0.1554	0.0384
35	0.1337	**0.7134**	0.0058	-0.108	0.0616	-0.1387
14	0.2583	**0.6517**	0.1371	0.237	0.2987	0.0685
8	0.3298	**0.6017**	0.3193	0.1843	0.0465	0.0656
*32***	0.2127	**0.5494**	-0.0363	0.1922	0.4771	-0.0084
31	0.1475	**0.5367**	0.2571	-0.171	0.2366	0.3096
*11***	0.476	**0.5305**	0.387	-0.0863	0.0399	-0.2423
19 ***	0.0508	**0.5262**	0.1503	**0.5144**	0.0283	0.3043
*1***	0.2833	**0.4741**	0.1724	0.1041	0.0949	0.3761
*26***	0.2265	**0.4591**	-0.2408	0.4368	0.1891	0.049

23	0.2086	**0.4459**	0.2487	0.136	0.2322	0.1162
12	0.1548	0.2591	**0.7255**	-0.0433	-0.0253	0.1166
28	-0.1009	0.0356	**0.6926**	0.1839	0.2105	0.1825
29	0.0221	0.0683	**0.6118**	0.2721	0.2101	-0.1203
25 ***	0.4629	0.2094	**0.5098**	0.1097	**0.4533**	-0.0328
10	0.1221	-0.0949	-0.0202	**0.7383**	0.1313	-0.1485
15	0.1432	0.2408	0.2932	**0.7377**	0.1652	-0.0374
4	0.3336	0.1086	0.1662	**0.6832**	0.1414	0.224
21	0.064	0.3343	0.0737	**0.5474**	0.3686	0.3066
27	0.4295	0.11	0.3903	**0.4836**	-0.2904	0.0508
7	0.0676	0.3741	0.0695	0.252	**0.6476**	0.0551
13	-0.2048	0.152	0.3112	0.3513	**0.647**	0.1143
3	0.3483	0.1766	-0.4044	0.1415	**0.6266**	0.1104
17	0.2055	0.1276	0.2867	-0.2029	**0.5974**	-0.1109
*34**	0.391	0.3088	0.1626	-0.0165	**0.5756**	0.3641
16	0.2723	-0.3331	0.1915	0.1872	**0.5446**	0.114
6	0.1985	0.3221	0.1025	0.2646	**0.5373**	0.1245
*22***	0.1731	0.4265	0.2362	0.4405	**0.4835**	0.1964
*18***	0.4386	0.142	-0.0464	0.3116	**0.4631**	0.3473
2	0.0127	-0.2096	0.0697	-0.0091	0.1897	**0.8821**
24	0.3348	0.3076	-0.0009	0.0947	-0.0244	**0.6509**

- Scores highlighted **bold** are the factors that fulfil the rules: > 2,58 /$\sqrt{N}$ (0.442)
- Scores marked with a * indicates that the respondents have multiple factors with a significant loading (> 2,58 /$\sqrt{N}$)
- Scores marked with ** indicates that the q-sort is not significant enough to belong to a factor, while it does not fulfil the rule: $f^2 > h^2/2$
- Number of defined sorts (> 2,58 /$\sqrt{N}$ (0.442)): 35

Correlation of 6 Factors

Table F. 10 *Correlation between Six Factors*

	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**	**Factor 6**
Factor 1	1	0.4861	0.238	0.5376	0.5547	0.2537
Factor 2	0.4861	1	0.3554	0.4281	0.5501	0.0268
Factor 3	0.238	0.3554	1	0.3443	0.3488	0.1829
Factor 4	0.5376	0.4281	0.3443	1	0.4802	0.126
Factor 5	0.5547	0.5501	0.3488	0.4802	1	0.2819
Factor 6	0.2537	0.0268	0.1829	0.126	0.2819	1

F.6 Factor Analysis with 7 Factors

Table F. 11 *Loadings of Respondents on Seven Factors*

Respondent	**F1**	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**
7	**0.704**	0.1984	0.1352	0.2487	0.0761	0.0271	0.1419
3	**0.6858**	-0.0323	-0.3019	0.1257	0.3832	0.1012	0.0738
*13**	**0.6107**	-0.0713	**0.449**	0.3363	-0.1341	0.1371	0.0939
*34***	**0.6061**	0.3851	0.1606	-0.0278	0.3662	0.3066	0.0148
6	**0.579**	0.2268	0.1444	0.2589	0.2015	0.0907	0.1006
32	**0.5708**	0.2479	0.0148	0.2082	0.2158	-0.0387	0.3674
17	**0.5591**	0.1342	0.3374	-0.2292	0.2043	-0.129	-0.028

22 **	**0.5126**	0.1923	0.3096	**0.4456**	0.2087	0.1797	0.2831
1	0.2213	**0.7719**	0	0.1255	0.1601	0.2576	-0.0144
*14**	**0.4468**	**0.6973**	0.0319	0.2618	0.1605	-0.0363	0.18
*5***	0.3354	**0.5709**	-0.0173	0.3522	-0.1886	-0.0351	0.3994
*11***	0.0882	**0.5369**	0.2978	-0.0678	0.4023	-0.3117	0.294
*8***	0.1213	**0.5079**	0.2567	0.2152	0.2851	0.0058	0.3836
28	0.0839	-0.0788	**0.7871**	0.1739	-0.0237	0.2226	0.148
29	0.1418	0.1567	**0.6169**	0.2561	0.0226	-0.1352	-0.0521
*12**	-0.0465	**0.5583**	**0.599**	-0.0376	0.0762	0.0479	-0.016
25 **	0.3993	0.2656	**0.5304**	0.0861	**0.4609**	-0.0675	0.0302
15	0.1813	0.1804	0.3052	**0.7376**	0.1531	-0.0639	0.0856
10	0.1331	-0.0505	0.0032	**0.7171**	0.1378	-0.1606	-0.1925
4	0.1319	0.0852	0.1957	**0.6747**	0.3676	0.2086	0.036
*21***	0.439	0.2673	0.0869	**0.554**	0.0636	0.2667	0.0908
*19***	0.1279	0.3834	0.1149	**0.5507**	0.0343	0.2604	0.3334
*27***	-0.2932	0.389	0.2669	**0.4852**	0.374	-0.0115	-0.0744
26 **	0.2824	0.036	-0.1639	**0.4625**	0.2703	0.0498	**0.4603**
20	0.2307	0.1403	-0.056	0.1634	**0.7645**	-0.0402	0.1585
33	0.2081	0.0697	0.0873	0.4144	**0.6603**	0.0899	-0.0111
30	0.2078	-0.0138	0.4056	0.0877	**0.6525**	0.2015	0.2131
9	0.1539	0.3714	-0.0892	0.1614	**0.6313**	0.2505	0.0831
18 **	**0.4698**	0.0757	0.0203	0.2947	**0.4756**	0.3306	0.0388
2	0.1346	-0.0072	0.0905	-0.026	0.0487	**0.8865**	-0.2191
24	0.018	0.2393	-0.0172	0.1183	0.3456	**0.6287**	0.2754
35	0.1569	0.188	0.0504	-0.0573	0.1488	-0.1377	**0.7525**
16 **	**0.4663**	0.0572	0.2019	0.1258	0.2618	0.0799	**-0.5687**
23	0.2243	0.0205	0.3556	0.1558	0.2801	0.1416	**0.5522**
*31***	0.282	0.3435	0.2624	-0.1427	0.1426	0.2845	0.429

- Scores highlighted **bold** are the factors that fulfil the rules: > 2,58 /$\sqrt{N}$ (0.442)
- Scores marked with a * indicates that the respondents have multiple factors with a significant loading (> 2,58 /$\sqrt{N}$)
- Scores marked with ** indicates that the q-sort is not significant enough to belong to a factor, while it does not fulfil the rule: $f^2 > h^2/2$
- Number of defined sorts (> 2,58 /$\sqrt{N}$ (0.442)): 34

Correlation of 7 Factors

Table F. 12 *Correlation between Seven Factors*

	Factor 1	**Factor 2**	**Factor 3**	**Factor 4**	**Factor 5**	**Factor 6**	**Factor 7**
Factor 1	1	0.5946	0.331	0.5076	0.5944	0.2519	0.1932
Factor 2	0.5946	1	0.3114	0.4945	0.5015	0.0889	0.3333
Factor 3	0.331	0.3114	1	0.3854	0.2367	0.1934	0.1451
Factor 4	0.5076	0.4945	0.3854	1	0.5467	0.1623	0.0723
Factor 5	0.5944	0.5015	0.2367	0.5467	1	0.246	0.2334
Factor 6	0.2519	0.0889	0.1934	0.1623	0.246	1	-0.1349

F.7 Factor Analysis with 8 Factors

Table F. 13 *Loadings of Respondents on Eight Factors*

Respondent	F1	F2	F3	F4	F5	F6	F7	F8
7	**0.728**	0.167	0.1939	0.1483	0.1049	0.0084	0.1203	0.0858
3	**0.6578**	-0.1303	0.1045	0.0303	0.4063	0.1858	-0.3512	0.0604
*13**	**0.6365**	-0.0522	0.2799	0.1487	-0.0726	0.055	**0.4924**	-0.0289
32	**0.6173**	0.2332	0.1419	0.061	0.2427	-0.0536	0.0593	0.3305
6	**0.6162**	0.2664	0.1764	0.0712	0.2353	0.0211	0.1925	0.0339
*34***	**0.5605**	0.2837	-0.0167	0.3766	0.3327	0.3772	-0.0223	-0.0043
*22***	**0.5479**	0.1745	0.4111	0.1851	0.235	0.169	0.2986	0.2097
1	0.2838	**0.8099**	0.0644	0.0654	0.1218	0.2126	-0.0013	0.0005
*14**	**0.4964**	**0.6459**	0.232	0.2076	0.125	-0.0105	-0.0658	0.2086
27 **	-0.2474	**0.5107**	**0.4634**	0.0677	0.3486	-0.0813	0.2452	-0.0664
*8***	0.1597	**0.4865**	0.2135	0.248	0.2515	0.0262	0.1843	0.3903
*5***	0.4211	**0.4751**	0.3425	0.0944	-0.2085	0.0199	-0.0525	0.4281
15	0.2021	0.1239	**0.775**	0.244	0.1453	-0.0066	0.1511	0.0785
10	0.1627	-0.015	**0.698**	-0.058	0.1666	-0.176	-0.0204	-0.2018
4	0.1757	0.1547	**0.6363**	-0.0037	0.3967	0.1657	0.2324	-0.0211
*19***	0.1607	0.2213	**0.6282**	0.2301	-0.006	0.4148	-0.0477	0.36
21 **	**0.4884**	0.2309	**0.5281**	0.0625	0.0794	0.2814	0.0721	0.051
17	0.4293	-0.0902	-0.116	**0.6816**	0.1401	0.0447	-0.0727	-0.0038
29	0.0575	-0.0215	0.3997	**0.6728**	-0.0457	0.0141	0.2047	-0.0304
*12**	-0.1021	**0.4434**	0.0728	**0.6423**	-0.0259	0.1437	0.2486	0.0245
*25***	0.3299	0.1993	0.1287	**0.5755**	0.4204	-0.0185	0.257	0.01
*11***	0.042	0.4083	0.0155	**0.5575**	0.3113	-0.1836	-0.0178	0.3709
20	0.1852	0.0813	0.1873	0.2163	**0.7383**	0.0578	-0.2076	0.1851
33	0.2029	0.1249	0.3816	0.0744	**0.6733**	0.0742	0.0602	-0.0437
30	0.1568	-0.0156	0.1018	0.3244	**0.6506**	0.2206	0.3098	0.1514
*9**	0.2099	**0.5233**	0.0456	-0.1434	**0.6475**	0.139	0.068	0.0474
18 **	**0.5001**	0.167	0.1949	-0.0772	**0.5258**	0.2457	0.1455	-0.048
2	0.1217	0.0119	-0.0419	-0.0428	0.0626	**0.861**	0.1596	-0.3043
24	0.021	0.1596	0.1559	0.0791	0.3175	**0.7294**	-0.0503	0.2669
28	0.1058	0.0412	0.1304	0.2028	0.0197	0.0736	**0.8687**	0.0084
23 **	0.2785	0.1009	0.0835	0.0377	0.3298	0.0516	**0.5148**	**0.4507**
35	0.2076	0.1467	-0.0782	0.0641	0.155	-0.1117	0.1189	**0.7463**
16	0.4233	0.1422	0.066	0.1474	0.2785	-0.0176	0.1336	**-0.6272**
26 **	0.3317	-0.0262	**0.4492**	-0.0683	0.2979	0.1202	-0.1199	**0.45**
*31***	0.2995	0.3052	-0.1569	0.2223	0.129	0.2913	0.2593	0.3878

- Scores highlighted **bold** are the factors that fulfil the rules: > 2,58 $/\sqrt{N}$ (0.442)

- Scores marked with a * indicates that the respondents have multiple factors with a significant loading (> 2,58 /$\sqrt{N}$)
- Scores marked with ** indicates that the q-sort is not significant enough to belong to a factor, while it does not fulfil the rule: $f^2 > h^2/2$
- Number of defined sorts (> 2,58 /$\sqrt{N}$ (0.442)): 34

Correlation of 8 Factors

Table F. 14 *Correlation between Eight Factors*

	F1	**F2**	**F3**	**F4**	**F5**	**F6**	**F7**	**F8**
Factor 1	1	0.5604	0.5245	0.5048	0.5992	0.2739	0.3047	0.0642
Factor 2	0.5604	1	0.4131	0.4201	0.4661	0.2341	0.0754	0.0585
Factor 3	0.5245	0.4131	1	0.3873	0.5256	0.1674	0.2595	-0.0607
Factor 4	0.5048	0.4201	0.3873	1	0.4575	0.1019	0.3736	0.079
Factor 5	0.5992	0.4661	0.5256	0.4575	1	0.3015	0.1674	0.0719
Factor 6	0.2739	0.2341	0.1674	0.1019	0.3015	1	0.1829	-0.1561

Appendix **G**
Outlier Analysis

Here are the results of the factor analysis without the outliers provided. It provides a table with the loadings of each respondent on the three factors (Table G.1), the correlation between the three factors (Table G.2), and the positions of the statements in the corresponding Q-sorts of the factors (Table G.3).

Removing the outliers caused some interesting findings, especially regarding the structure of the factor solution. The factor loadings of factor one and factor two are swapped, when the outliers were removed. Respondents who originally loaded on factor one now loads on factor two, and vice versa. This suggested that the factor solution is fundamentally shifting due to the outlier removal. An explanation for this might be while the correlation matrix of the q-sorts has changed due to the removal. While the factor analysis identified the best mathematical solution based on the correlation among the Q-sort, removing the outliers influenced the determination of the factors. When comparing both factors in both cases—with outliers and without outliers—it became evidence that everything has been swapped: the loaded respondents, the distinguishing statements, and the defined Q-sorts of the factors.

There were however some differences. The factors without the outliers had more double loadings, eight instead of two when the outliers were not removed. This suggest that the structure of the factors became weaker after removing the outliers. The removed outliers might have previously provided clarity by anchoring specific factors. Furthermore, there were more Q-sorts (respondents) who did not have a significant loading on one of the factors. It increased from one to six. This might indicate that the dataset now explained less variance clearly in the factors, which may indicate that the removed outliers were influencing the facture structure more than expected.

Since the distinguishing statements are based on which items differentiate the factor, it is obvious that this switch aligns with the loading shift. Also, the eigenvalues remain similar (Table G.4), meaning that the variance explained is still in the same order, indicating that the factor interpretation has been disrupted.

So, a clear explanation of the shift is unknow, however it is probably mathematical and not conceptual. However, while the outliers might have helped to structure the factor solution, and therefore improved the clarity of the factor loading—less double loadings and more significant sorts—the outliers are kept in the dataset.

Table G. 1 *Loadings of Respondents on Three Factors without the Three Outliers*

Respondent	Factor 1	Factor 2	Factor 3
32	**0.7936**	0.0844	-0.1547
4	**0.7191**	0.1885	0.1856
18	**0.6381**	0.1387	0.1289
33	**0.6317**	0.1091	0.3071
5	**0.6227**	0.296	0.0413
*7**	**0.5848**	0.1555	**0.4442**
35	**0.5666**	0.4099	0.0289
16 **	**0.5638**	0.3579	**0.5024**
34	**0.5613**	0.4336	0.135
2	**0.5406**	0.3072	0.2945
28 **	**0.534**	**0.5223**	0.1342
21	**0.5295**	0.3197	0.2711
15	0.4162	0.3352	0.0392
*25***	0.4149	0.3602	0.3186
13	0.1686	**0.6883**	0.076
11	0.0762	**0.6866**	0.2029
14	0.243	**0.6392**	0.3203

*12**	**0.4443**	**0.6146**	0.2356
26	0.158	**0.5985**	-0.064
17	0.3065	**0.5821**	0.141
*19**	-0.217	**0.5508**	**0.4878**
10 **	0.2954	**0.4891**	**0.4653**
1	0.2866	**0.4774**	0.2795
*8**	0.295	**0.4769**	0.2448
24	0.4122	0.0499	**0.7186**
30	-0.0297	0.1464	**0.6856**
9	-0.1105	0.2378	**0.6583**
*20**	**0.5468**	0.0319	**0.5587**
3	0.3242	0.112	**0.5379**
29	0.1233	0.173	**0.5328**
*6***	0.42	-0.3289	**0.4758**
*22***	0.3963	0.2871	**0.4474**

- Scores highlighted **bold** are the factors that fulfil the rules: > 2,58 /$\sqrt{N}$ (0.442)
- Scores marked with a * indicates that the respondents have multiple factors with a significant loading (> 2,58 /$\sqrt{N}$)
- Scores marked with ** indicates that the q-sort is not significant enough to belong to a factor, while it does not fulfil the rule: $f^2 > h^2/2$
- Number of defined sorts (> 2,58 /$\sqrt{N}$ (0.442)): 33

Correlation of 3 Factors without Outliers

Table G. 2 *Correlation between Three Factors without the Three Outliers*

	Factor 1	**Factor 2**	**Factor 3**
Factor 1	1	0.5591	0.4775
Factor 2	0.5591	1	0.4907
Factor 3	0.4775	0.4907	1

Ranking Statements of Three Factors without Outliers

Table G. 3 *Ranking of the Three Factors without Outliers*

Statement	**Factor 1**	**Factor 2**	**Factor 3**
1	+2	+2	+1
2	+2	+4	+3
3	-1	-2	-1
4	+1	-1	+1
5	0	+1	+1
6	0	+1	0
7	-3	0	-3
8	0	-1	-1
9	+1	0	-2
10	+1	0	-1
11	+3	0	0
12	-2	-2	-4
13	-4	-3	-3
14	0	+4	-1
15	-1	+3	+3

16	-1	-2	-2
17	+3	+2	+1
18	+1	-3	-4
19	+2	+1	-1
20	+1	0	+2
21	+3	+1	+2
22	-2	-1	0
23	+4	-1	+4
24	-1	+3	+3
25	-2	-2	-3
26	-3	-3	+2
27	-2	-1	-2
28	-3	-3	-2
29	+2	+2	0
30	0	+3	+1
31	-3	-4	0
32	0	+1	0
33	-1	0	+2
34	+4	+2	+4

Characteristics of the Three Factors without the Three Outliers

Table G. 4 *Characteristics of the Three Factors without Three Outliers*

	Factor 1	**Factor 2**	**Factor 3**
Eigenvalues	11.5196	2.334	2.2314
% Explained Variance	36	7	7
Cumulative % explained variance	36	43	50

Appendix **H**
Statements Statistics

Diverse analyses are performed on the statements, including defining the minimum and maximum position of statements across all Q-sorts, the gap between these positions, the most and least common positions, the average positions, and the standard deviation. These findings are provided in Table H.1. The findings reveal that there are many big gaps—a gap of 8—between the minimum and maximum position of the statements. This implies that the placement of these statements is very spread out. So, even though there seemed to be a high level of consensus, there are still several statements (cel highlighted darker green in Table H.1) where there is a large spread of level importance for effective integration. The findings do also not result in any small gaps.

Comparing the average score with the most common score helps in determining what consensus statements are. When the average score is close to the most common score, it implies that this statement is a consensus statement. This is the case for a few statements—highlighted by the scores in *Italics*. Most consensus statements are within the theme of *Governance Structure,* implying that there is mostly consensus regarding the importance of criteria of governance structure for effective integration and collaboration.

There are also some statements where the respondents agree on the negative tendency of the statements. However, to what extent differs. These statements are marked by making the scores **bold**. The most negative tendency is on the statements regarding the theme *Formal Roles & Collaboration.*

There are some statements where there is consensus on the neutrality view on the importance of this criterion. These statements have a most common and average score close to zero. These statements are mainly from the theme of *Governance Structure*. So, there is a neutral view on how the governance structure can contribute to an effective collaboration and integration. These values are marked by making the most common and average cell of these statements darker green.

Alos, the standard deviation (S.D.) of every statement is on the high side, indicating that there is a high distribution and clear divide among the respondents how they view the statement. There are few statements—cel highlighted orange—with a standard deviation higher than 2. Notable is that these statements are in all themes except for *Governance Process.* In addition, these statements are also distinguishing statements of perspectives, which will be described in more detail further on in this chapter.

Finally, the findings showed that some average scores of the statements do not align with the most common value of the statements. This suggests that extreme respondents balance each other out, indicating diverse opinions on these statements. This is the case for the themes *Objective of Collaboration* and *Formal Roles & Responsibilities*. These statements are marked by making the scores underlined.

Table H. 1 *Statement Statistics*

Statement	Min	Max	Gap	Most Common	Least Common	Average	S.D.
1	-2	4	6	2	-3 / -4	1.31	1.79
2	-1	4	5	4	-2 / -3 / -4	2.29	1.58
3	-4	4	8	0	3	-0.74	1.76
4	-4	3	7	*0*	4	*0.17*	1.59
5	-4	3	7	1	4 / -3	0.14	1.50
6	-3	4	7	1	-4	0.54	1.84
7	-4	4	8	**-2**	3	**-1.29**	1.70
8	-3	3	6	*0*	4 / - 4	*-0.26*	1.48
9	-4	3	7	*0*	4	*-0.23*	1.73
10	-3	3	6	*0*	4 / - 4	*0.20*	1.72
11	-2	4	6	*1*	-3 / -4	*0.66*	1.53
12	-4	3	7	*-2*	4	*-1.86*	1.66
13	-4	3	7	**-3**	1 / 2 / 4	**-2.34**	1.49
14	-4	4	8	2	3 / -3 / -4	0.57	2.19
15	-3	4	7	*1*	-4	*0.86*	2.00

16	-4	3	7	*-1*	-3	*-1.14*	1.59
17	-4	4	8	3	-3	1.26	1.87
18	-4	3	7	**-3**	4	**-1.31**	2.03
19	-4	4	8	2	-3	1.00	1.62
20	-3	4	7	0	-4 / 2	0.97	2.13
21	-3	4	7	3	-4	1.46	1.68
22	-4	3	7	0	4	-0.74	1.89
23	-2	4	6	4	-3 / -4	1.97	1.92
24	-4	4	8	1	-4 / -1	0.34	2.07
25	-4	2	6	***-1***	3 / 4	***-1.26***	1.61
26	-4	3	7	**-4**	4	**-1.66**	2.11
27	-4	3	7	**-3**	4	**-0.91**	1.84
28	-4	2	6	**-4**	4 / 3 / 0	**-2.26**	1.73
29	-4	4	8	1	-4 / -2 / 3	0.43	2.38
30	-4	4	8	3	-3	1.00	2.19
31	-4	2	6	**-1**	4 / 3	**-1.57**	1.71
32	-4	3	7	*0*	4 / -3	*0.14*	1.27
33	-4	4	8	1	-4 / -2 / -3 / 4	0.29	1.61
34	-1	4	5	3	-4 / -3 / -2	1.97	1.40

Appendix I

Grids of Chosen Factors

Here the three factors are displayed as a Q-sort—the fixed grid form. ** indicates that the statement is distinguishing at 0.01, * at 0.05. The arrow indicated where the z-score of that statement is higher (>) or lower (<) than in all other factors.

Perspective 1

-4	-3	-2	-1	0	1	2	3	4
26. Given the major impact on the electricity system, the grid operator	18. The focus must be on direct project realization rather than on	27. Municipalities must take the lead in coordinating	** ◄ 23. Building trust between stakeholders is the most important	8. For effective collaboration, coordination mechanisms must	** ◄ 21. A clear task and clear goal must be defined together, as a	** ◄ 34. Successful collaboration relies on stakeholders speaking and	30. Total transparency in information sharing is a must for any	** ► 14. Governance structures of the collaboration are most
** ◄ 31. Area users such as Brick lley/Greenhouse Horticulture sector must be	* 28. Residents determine whether a heating network will be	3. Standardized procedures are essential to effectively integrate	** ► 7. Decision-making on the energy vision, including the	5. Monitoring and evaluating is essential to ensure effective	** ► 9. Assigning an independent chair or program manager improves	1. Collaboration between spatial planning and energy must	** ► 29. It is desirable that the national government is responsible for	** ► 2. A more proactive approach in spatial planning, and
	13. Specialization within sectors, rather than integration,	12. Effective collaboration relies more on strong institutional	* ◄ 4. Conflict resolution mechanisms must be part of the decision-making	33. Involving all relevant stakeholders from the start is crucial for	** 19. It is important to invest in building both personal and	** 15. The current grid limitations should not be an excuse to	24. The province must take on a more coordination role	
		25. The sustainability of the greenhouse horticulture	22. (Healthy) competition is needed to develop creative,	* ◄ 20. The identity and possibilities of the area should guide	** 11. Defined roles and esponsibilities must be clearly assigned,	** ► 10. Regional steering groups are the heart of the cooperation;		
			16. Striving for consensus is essential, even if it requires more	32. Collaboration is most effective when local	17. Joint-fact finding is essential for effective decision-making			
				6. The process of integrating energy into spatial planning must				

Figure I. 1 *Grid of Perspective 1*

Perspective 2

-4	-3	-2	-1	0	1	2	3	4
26. Given the major impact on the electricity system, the grid operator	12. Effective collaboration relies more on strong institutional	25. The sustainability of the greenhouse horticulture	32. Collaboration is most effective when local	33. Involving all relevant stakeholders from the start is crucial for	** ► 4. Conflict resolution mechanisms must be part of the decision-making	21. A clear task and clear goal must be defined together, as a	** ► 17. Joint-fact finding is essential for effective decision-making	23. Building trust between stakeholders is the most important
* ◄ 28. Residents determine whether a heating network will be	7. Decision-making on the energy vision, including the	** ◄ 24. The province must take on a more coordination role	16. Striving for consensus is essential, even if it requires more	5. Monitoring and evaluating is essential to ensure effective	6. The process of integrating energy into spatial planning must	** ► 11. Defined roles and esponsibilities must be clearly assigned,	** ► 19. It is important to invest in building both personal and	34. Successful collaboration relies on stakeholders speaking and
	13. Specialization within sectors, rather than integration,	22. (Healthy) competition is needed to develop creative,	27. Municipalities must take the lead in coordinating	10. Regional steering groups are the heart of the cooperation;	** 29. It is desirable that the national government is responsible for	1. Collaboration between spatial planning and energy must	2. A more proactive approach in spatial planning, and	
		* 31. Area users such as Brick lley/Greenhouse Horticulture sector must be	8. For effective collaboration, coordination mechanisms must	** ◄ 15. The current grid limitations should not be an excuse to	30. Total transparency in information sharing is a must for any	20. The identity and possibilities of the area should guide		
			3. Standardized procedures are essential to effectively integrate	* 14. Governance structures of the collaboration are most	** ► 18. The focus must be on direct project realization rather than on			
				** 9. Assigning an independent chair or program manager				

Figure I. 2 *Grid of Perspective 2*

Perspective 3

-4	-3	-2	-1	0	1	2	3	4
18. The focus must be on direct project realization rather than on	27. Municipalities must take the lead in coordinating	* ◄ 14. Governance structures of the collaboration are most	* ► 31. Area users such as Brick lley/Greenhouse Horticulture sector must be	* 4. Conflict resolution mechanisms must be part of the decision-making	1. Collaboration between spatial planning and energy must	2. A more proactive approach in spatial planning, and	** ► 15. The current grid limitations should not be an excuse to	34. Successful collaboration relies on stakeholders speaking and
** ◄ 12. Effective collaboration relies more on strong institutional	25. The sustainability of the greenhouse horticulture	** ◄ 9. Assigning an independent chair or program manager improves	** ◄ 11. Defined roles and esponsibilities must be clearly assigned,	17. Joint-fact finding is essential for effective decision-making	5. Monitoring and evaluating is essential to ensure effective	** ► 33. Involving all relevant stakeholders from the start is crucial for	24. The province must take on a more coordination role	23. Building trust between stakeholders is the most important
	13. Specialization within sectors, rather than integration,	7. Decision-making on the energy vision, including the	** ◄ 29. It is desirable that the national government is responsible for	8. For effective collaboration, coordination mechanisms must	30. Total transparency in information sharing is a must for any	20. The identity and possibilities of the area should guide	21. A clear task and clear goal must be defined together, as a	
		16. Striving for consensus is essential, even if it requires more	3. Standardized procedures are essential to effectively integrate	10. Regional steering groups are the heart of the cooperation;	32. Collaboration is most effective when local	** ► 26. Given the major impact on the electricity system, the grid operator		
			** ◄ 19. It is important to invest in building both personal and	22. (Healthy) competition is needed to develop creative,	6. The process of integrating energy into spatial planning must			
				** ► 28. Residents determine whether a heating network will be				

Figure I. 3 *Grid of Perspective 3*

Appendix **J**

Overviews of Perspectives' Scores on Representative Criteria

To interpret the perspectives the distinguishing and most extreme statements of the corresponding factor are analyzed, in comparison with the other factors. These statements are visualized in spiderwebs by theme. These spiderwebs are provided here.

Formal Roles & Responsibilities

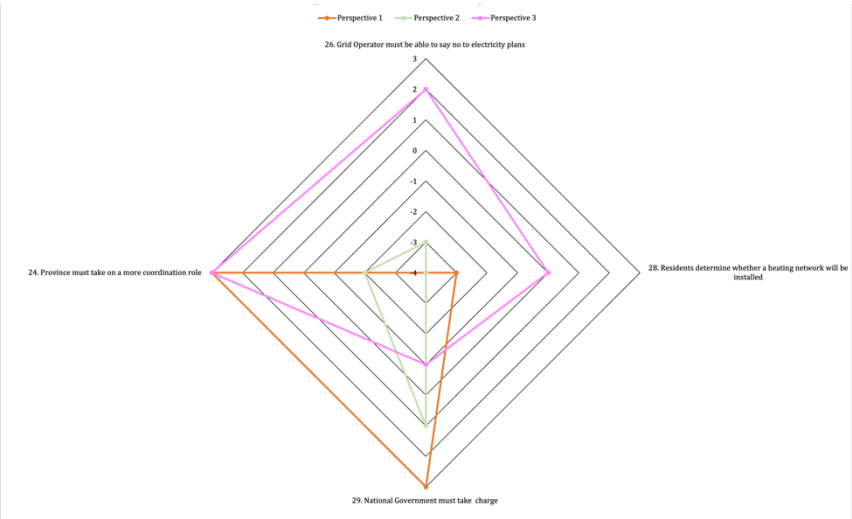

Figure J. 1 *Overview of Perspectives' Score on Representative Statements from the theme Formal Roles & Responsibilities*

Objective of Collaboration

Figure J. 2 *Overview of Perspectives' Score on Representative Statements from the theme Objective of Collaboration*

Participation & Communication

Figure J. 3 *Overview of Perspectives' score on Representative Statements from the Theme Participation & Communication*

Governance Structure

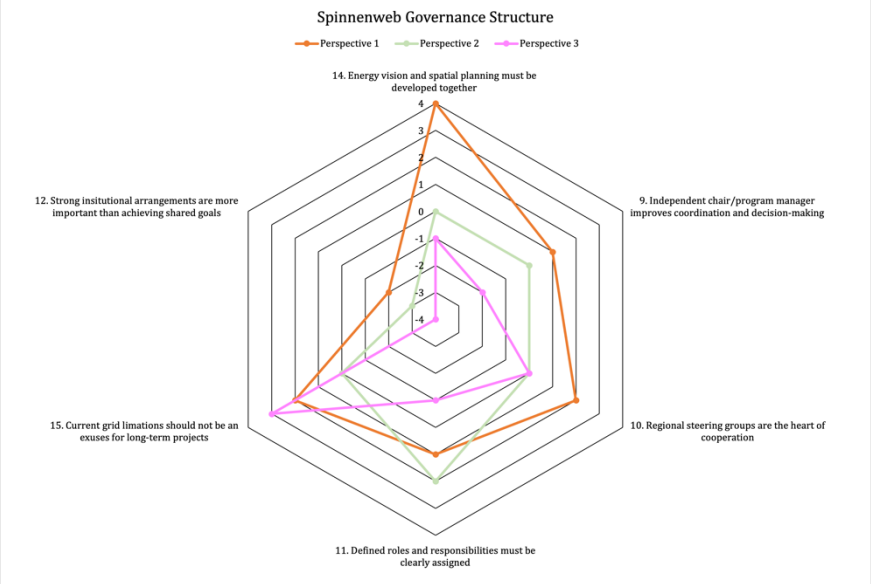

Figure J. 4 *Overview of Perspectives' Score on Representative Statements from the theme Governance Structure*

Governance Process

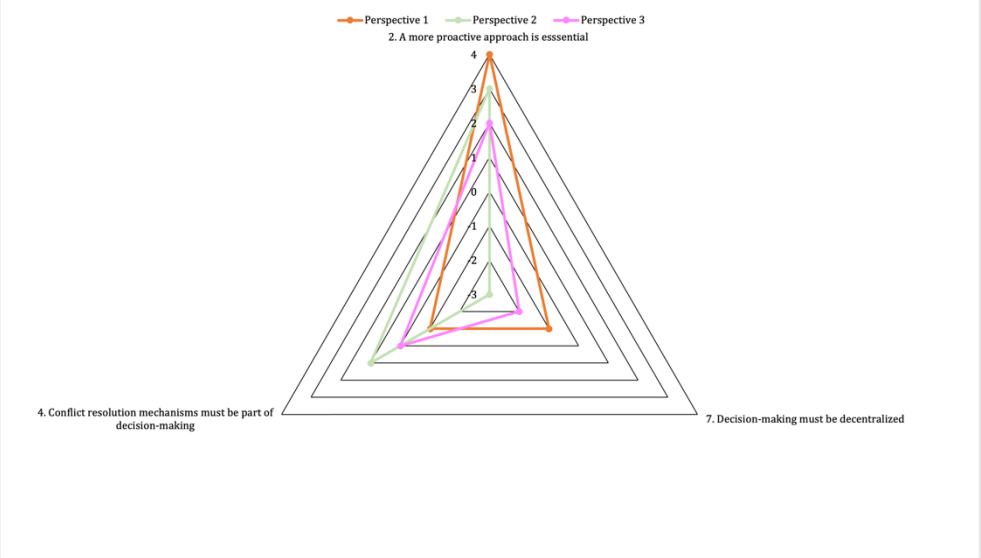

Figure J. 5 *Overview of Perspectives' Score on Representative Statements from the Theme Governance Process*

Appendix **K**
SPSS Analysis on Professional Background Characteristics

In order to gain insight into the differences in perspectives on the integration of energy and spatial planning, a statistical analysis is performed. Statistical tests are performed in SPSS to determine whether there is a difference between the two domains. Using SPSS, various other analyses were applied including independent t-test and Crosstab analysis to investigate whether there were factors influencing the perception of respondents on the integration and collaboration. The factors, that are analyzed are the domain of the respondent, project experience, and sector. In addition, a cluster analysis is applied to verify the number of chosen factors.

K.1 Statistical Tests

Domain

To analyze whether there is a difference between the two domains on how they look at the three perspectives the average of each factor per domain is calculated (Table K.1) The table shows the average loading and the number of respondents who are loading on that specific perspective. This analysis has also been performed to analyze on which perspective respondents have the lowest loading (TableK.2).

Table K. 1 *Average of Each Factor per Domain: Highest Loading*

Group Statistics

	Domain	*N*	% loading on this perspective (within domain)	*Mean*	*Std. Deviation*	*Min.*	*Max.*
Perspective 1	Energy	7	33%	0.5738	0.13451	0.31	0.73
	Spatial Planning	4	29%	0.5794	0.14250	0.42	0.72
Perspective 2	Energy	7	33%	0.5289	0.11484	0.45	0.77
	Spatial Planning	9	64%	0.5735	0.07982	0.49	0.75
Perspective 3	Energy	7	33%	0.5560	0.09024	0.43	0.69
	Spatial Planning	1	7%	0.6740	0.67	0.67	-

Table K. 2 *Average of Each Factor per Domain: Lowest Loading*

Group Statistics

	Domain	*N*	% loading on this perspective (within domain)	*Mean*	*Std. Deviation*	*Min.*	*Max.*
Perspective 1	Energy	4	19%	-0.159	0.20258	-0.2	0.2
	Spatial Planning	4	28%	0.2327	0.14347	0.10	0.43
Perspective 2	Energy	6	29%	0.0588	0.17144	-0.17	0.32
	Spatial Planning	5	36%	0.1389	0.15232	-0.03	0.32
Perspective 3	Energy	11	52%	0.1231	0.14049	-0.17	0.32
	Spatial	5	36%	0.1393	0.1005	0.03	0.27

Planning						

Moreover, an independent t-test is performed (Table K.3)—since the data is normally distributed (Shapiro-wilk test, $p > 0.05$). With the independent t-test, it is explored whether the average strength of preference for a perspective significantly differs between the domains. While crosstabs simplify preference to highest loading, an independent t-test uses the actual factor score, capturing variation across all perspectives.

Based on the means of the loadings of the domains (Table K.3) on factors, there is not really a difference between the domains. The biggest difference between the domains is on factor 2 (0.3159, energy & 0.412, spatial planning). In addition, the Cohen's d (-0,445) (Table K.4) also gives a medium effect, which suggest that spatial planning and energy experts have a decent difference in factor loading. However, this difference is not significant ($p = 0.206$). Even though factor two is normally distributed, the Shapiro-wilk test was closely to 0,05 (0,087). Therefore, the Mann-Whitney U-test can also be performed to have a more robust test. This test showed also a big difference in ranking between the two domains (Table K.6). Even though this was still not significant (0.106, Table K.7) it is an interesting analysis. There seems to be a difference on the view of the two domains on the perspective and it may be interesting to perform the analysis with a bigger data sample set.

Table K. 3 *Group Statistics of the Independent T-Test*

	Domain	**Mean**
Perspective 1	Energy	0.309
	Spatial Planning	0.368
Perspective 2	Energy	0.316
	Spatial Planning	0.418
Perspective 3	Energy	0.286
	Spatial Planning	0.282

Table K. 4 *Results of the Independent T-Test*

T-Test

		Standardizer[a]	*Point Estimate*	*95% Confidence Interval*	
				Lower	*Upper*
Perspective 1	Cohen's d	.2440132	-.241	-.918	.439
	Hedges' correction	.2497398	-.236	-.897	.429
	Glass's delta	.1865691	-.315	-.996	.377
Perspective 2	Cohen's d	.2302034	-.445	-1.126	.243
	Hedges' correction	.2356059	-.434	-1.100	.238
	Glass's delta	.2403526	-.426	-1.114	.277
Perspective 3	Cohen's d	.2221573	.018	-.659	.694
	Hedges' correction	.2273710	.017	-.644	.678
	Glass's delta	.2081681	.019	-.658	.695

Table K. 5 *Significance of Independent T-test*

		Significance	
		One-Sided p	Two-Sided p
Perspective 1	Equal variances assumed	.245	.489
	Equal variances not assumed	.228	.456
Perspective 2	Equal variances assumed	.103	.206
	Equal variances not assumed	.108	.215
Perspective 3	Equal variances assumed	.480	.959
	Equal variances not assumed	.479	.958

Table K. 6 *Results of the Mann-Whitney Test*

	Domain	**Mean Rank**
Perspective 1	Energy	17.75
	Spatial Planning	18.33
Perspective 2	Energy	16.20
	Spatial Planning	20.40
Perspective 3	Energy	17.50
	Spatial Planning	18.67

Table K. 7 *Statistics Mann-Whitney Test*

Test Statistics[a]			
	Perspective 1	Perspective 2	Perspective 3
Mann-Whitney U	134.000	99.000	146.000
Wilcoxon W	365.000	330.000	251.000
Z	-.438	-1.616	-.034
Asymp. Sig. (2-tailed)	.662	.106	.973
Exact Sig. [2*(1-tailed Sig.)]	.678[b]	.110[b]	.987[b]

K.2 Cluster Analysis

A hierarchical cluster analysis was performed in SPSS to verify the number of factors identified in the Q-methodology factor analysis. Cluster analysis can reveal how many natural groupings exist in the dataset. Ward's method was chosen for clustering, as it minimizes within-cluster variance and typically results in more balances and interpretable groupings. This makes it well-suited for Q-methodology, where the goal is to identify shared patterns of viewpoints among respondents.

The number of clusters was determined based on visual inspection of the dendrogram, using the common approach of selecting a point just before a major jump in linkage distance. This is an interpretative rather than strictly mathematical decision. Based on this method, three clusters were identified. Cluster membership for each respondent was saved in SPSS using "Cluster Membership" option and visualized in the dendrogram (Figure K.1). In this visualization, the x-axis represents individual respondents, while the vertical line indicates when and how dissimilar groups are merged: the higher the vertical line, the greater the dissimilarly between combined groups, and thus the more divergent their Q-sorts.

To assess how well the clustering results aligned with the Q-methodology factor structure, a crosstab analysis was performed (Table K.8). The results (Table K.9) show a statistically significant relationships between cluster membership and factor loading ($p < 0.001$). This suggest that the cluster solution supports the factor structure. Table K.10 compares the cluster classification of respondents with their factor

classification. Most respondents in Cluster 3 predominantly loaded on Factor 2 (9 out of 10), and most in Cluster 2 loaded on Factor 1 (8 out of 11). Cluster 1 showed more mixed pattern, but still contained a majority of Factor 2 and 3 loadings. The overall distribution across clusters and factors of the respondent is about the same. These patterns further support the alignment between cluster structure and the factor perspectives identified through Q-methodology

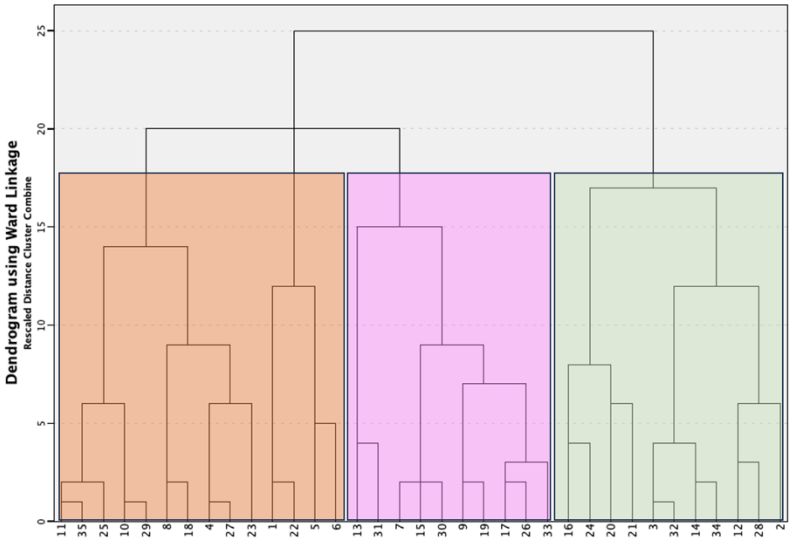

Figure K. 1 *Dendrogram of Hierarchical Clustering with Three Clusters*

Table K. 8 *Crosstabulation: Assigned Cluster and Assigned Factor*

	Factor 1	**Factor 1**	**Factor 3**	**Total**
Cluster 1	3	7	4	14
Cluster 2	8	0	3	11
Cluster 3	0	9	1	10
Total	11	16	8	35

Table K. 9 *Chi-Square Test Crosstab Analysis: Assigned Cluster and Assigned Factor*

	Value	**df**	**Asymptotic Significance (2-sided)**
Pearson Chi-square	19.950	4	< 0.001
Likelihood Ratio	25.765	4	<0.001
Linear-by-Linear Association	0.009	1	0.924

Table K.10 *Comparison Assigned Cluster vs. Assigned Perspective*

Number	**Domain**	**Assigned Factor**	**Cluster**
1	Energy	1	2
2	Energy	2	3
3	Energy	2	3
4	Spatial planning	2	1
5	Energy	1	2
6	Energy	2	1
7	Spatial planning	2	1
8	Spatial planning	1	2
9	Energy	2	3

10	Energy	3	1
11	Energy	1	2
12	Energy	3	2
13	Energy	3	1
14	Energy	1	2
15	Energy	3	1
16	Energy	2	1
17	Energy	1	1
18	Spatial planning	2	3
19	Spatial planning	1	1
20	Spatial planning	2	3
21	Spatial planning	2	1
22	Spatial planning	2	1
23	Spatial planning	1	2
24	Energy	2	3
25	Energy	3	3
26	Spatial planning	2	1
27	Energy	3	2
28	Energy	3	1
29	Spatial planning	3	2
30	Energy	2	3
31	Energy	1	2
32	Energy	1	1
33	Spatial planning	2	3
34	Spatial planning	2	3
35	Spatial planning	1	2

K.3 Crosstab Analysis

Sector

In addition to the difference between the two domains also an analysis has been performed on the influence of sector on the perspective. The type of sector is coded as followed: 1) Public Sector, 2) Private Sector, 3) Non-profit, 4) Academic, and 5) Public Utility Sector.

The findings in Table K.11 indicate that respondents from the public and private sector mostly frequently align with perspective two and the least often with perspective three. In contrast, perspective three is mostly associated with respondents from the public utility sector (grid operators). However, this relationship is not significant (Table K.12). Therefore, a larger data sample would be required to determine whether this pattern is coincidental or reflects genuine trend.

Table K.11 *Results Crosstab Analysis on Sector*

Sector	Perspective 1	% of total per sector	Perspective 2	% of total per sector	Perspective 3	% of total per sector	Total
1	8	31%	13	50%	5	19%	26
2	1	33%	2	66%	0	0%	3
3	1	100%	0	0%	0	0%	1
5	1	20%	1	20%	3	60%	5

Table K.12 *Significance Results Crosstab Analysis on Sector*

Chi-Square Tests			
	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	7.366[a]	6	.228
Likelihood Ratio	7.438	6	.282
Linear-by-Linear Association	1.339	1	.247
N of Valid Cases	35		
a. 9 cells (75.0%) have expected count less than 5. The minimum expected count is .23			

Project Experience

Finally, a crosstab analysis has been performed looking at the impact of project experience. For this analysis, three individual crosstab analyses are performed—experience on energy projects, spatial planning projects, and projects integrating energy and spatial planning—on the loadings on factors. The percentage distribution within each experience group was analyzed to assess whether experience influences perspective preference. This approach allows comparison of how respondents with and without relevant experience differ in terms of which perspective they primarily align with. The results are combined and shown in Table K.13. Respondents having experience in energy projects tend to prefer factor two, as well as the respondents having no experience in energy projects. However, respondents having no experience have also preference in perspective three. There is a shift to more preference on perspective one, when having gained experience in energy projects. Perspective two is also preferred when having or not having experience in spatial planning projects, and the results shows a slight shift towards a more preference to perspective three however, this is relatively small to really draw a conclusion of it. Experience in projects integrating energy and spatial planning, also have a preference for perspective two, and comparing the percentage it shows that gaining experience keep focus on perspective two and also more preference for perspective one than perspective three.

The results are not significant and the correlation is very low (see table K.14), however, this is also because of the small sample size.

Table K.13 *Overview Results Crosstab Analysis on Project Experience*

			Perspective 1	**Perspective 2**	**Perspective 3**
Experience in energy projects	Yes	Count (N)	10	13	6
		% within Experience in energy project	34,5%	44,8%	20,7%
	No	Count (N)	1	3	2
		% within Experience in energy project	16,7%	50%	33,3%
Experience in spatial planning projects	Yes	Count (N)	8	11	6
		% within Experience in energy project	32%	44%	24%
	No	Count (N)	3	5	2
		% within Experience in energy project	30%	50%	20%
	Yes	Count (N)	10	14	7

Experience in integrated projects		% within Experience in energy project	32,3%	45,2%	22,6%
	No	Count (N)	1	2	1
		% within Experience in energy project	31,4%	45,7%	22,9%

Table K.14 *Significance & Correlation Results Crosstab Analysis on Project Experience*

Test	**Value**
Association between experience in energy projects and preferred perspective	
Pearson Chi-square	0.644
Pearson's R (correlation)	0.157
Association between experience in spatial planning projects and preferred perspective	
Pearson Chi-square	0.944
Pearson's R (correlation)	-0.12
Association between experience in integrated projects and preferred perspective	
Pearson Chi-square	0.958
Pearson's R (correlation)	0.042

Project Experience & Domain

Analyses were conducted to explore how professional experience in combination with domain may shape perspectives on integration and collaboration. These three separate analyses are performed in SPSS with the crosstab analysis. Each analysis examined whether respondents' dominant factor loading (i.e. preferred perspective) was associated with having experience in: (1) energy projects, (2) spatial planning projects, and (3) integrated projects involving both domains. All results of this analysis are not significant, and the correlation are low, indicating that the strength of the relationship is weak as well. However, the sample size is too small for robust chi-square testing which maybe affects reliability (Table K.18).

Combination of Domain and Experience in Spatial Planning Projects

Exploring the influence of experience in spatial planning projects in the viewpoint, shows some interesting insights (Table K.15). Respondents with spatial planning experience in the energy domain is distribution fairly even, with a slight preference for perspective three. However, respondents without spatial planning experience in the energy domain, are also balanced but slightly favoring perspective one and two. This shows, that experience in spatial planning projects shifts the preference to perspective three. In the spatial planning domain, perspective two is dominant (58,3%). This preference was even more pronounced among respondents without experience**,** though the sample size was limited (n=2). Overall, experience with spatial planning projects, appears to increase the likelihood of aligning with perspective two. However, spatial planning experience have a stronger effect within the spatial planning domain itself, potentially because the values represented in perspective two may already be embedded in spatial planning culture and practices.

Combination of Domain and Experience in Energy Projects

The results of this analysis are shown in Table K.16. In the energy domain**,** professionals with project experience were evenly distributed across all three perspectives, suggesting that practical involvement in energy projects fosters a balanced or multidimensional view. In contrast, non-experienced energy professionals tended to align more with perspective two and three possibly reflecting a more idealistic or theoretical understanding of integration. In the spatial planning domain, respondents with energy experience showed a strong preference for perspective two, emphasizing informal and pragmatic collaboration.

While the small number of non-experienced spatial planners limits strong conclusions. The overall pattern shows that both with and without experience in energy projects, the respondents in both domains preferer perspective two, fostering a more adaptive and informal approaches. The least preferred perspective is number three, as the results also showed, having experience influence a less preference for perspective thee compared with having no experience in energy projects. Even though due to the relatively small sample size, this suggest that having experiences makes a goal-oriented, adaptive, and inclusive integration less preferable.

Combination of Domain and Experience in Integrated Projects

The respondents with experience in projects integrating energy and spatial planning in the energy domain are equally distributed across all three perspectives. Professional in the energy domain who have worked in integrated projects show a balances perspective, suggesting they may appreciate multiple forms of collaboration. This implies also for respondents without experience in these kinds of projects, however, this is a small sample (N=3), so not very informative. In the spatial planning domain, those with integration project experience are heavily aligned with perspective two (61,5%). Also, without experience, perspective two is preferred, however, this is not conclusive due to N=1. Overall, these results suggest that working in integrated projects may shape professionals' collaborative views**,** encouraging either a more balanced (in energy) or more grounded/pragmatic (in spatial planning) conceptualization of integration (Table K.17)

Table K.15 *Overview Results Crosstab Analysis: Combination Project Experience & Domain: Spatial Planning Projects*

				Perspective 1	**Perspective 2**	**Perspective 3**
Energy	Experience in spatial planning projects	Yes	Count (N)	4	4	5
			% within Experience in spatial planning project	30,8%	30,8%	38,5%
		No	Count (N)	3	3	2
			% within Experience in spatial planning project	37,5%	37,5%	25%
Spatial planning	Experience in spatial planning projects	Yes	Count (N)	4	7	1
			% within Experience in spatial planning project	33,3%	58,3%	8,3%
		No	Count (N)	0	2	0
			% within Experience in spatial planning project	0%	100%	0%
Total	Experience in spatial planning projects	Yes	Count (N)	8	11	6
			% within Experience in spatial planning project	32%	44%	24%
		No	Count (N)	3	5	2
			% within Experience in spatial planning project	30%	50%	20%

Table K.16 *Overview Results Crosstab Analysis: Combination Project Experience & Domain: Energy Projects*

				Perspective 1	**Perspective 2**	**Perspective 3**
Energy		Yes	Count (N)	6	5	5

	Experience in energy projects		% within Experience in energy project	37,5%	31,3%	31,3%
		No	Count (N)	1	2	2
			% within Experience in energy project	20%	40%	40%
Spatial planning	Experience in energy projects	Yes	Count (N)	4	8	1
			% within Experience in energy project	30,8%	61,5%	7,7%
		No	Count (N)	0	1	0
			% within Experience in energy project	0%	100%	0%
Total	Experience in energy projects	Yes	Count (N)	10	13	6
			% within Experience in energy project	34,5%	44,8%	20,7%
		No	Count (N)	1	3	2
			% within Experience in energy project	16,7%	50%	33,3%

Table K.17 *Overview Results Crosstab Analysis: Combination Project Experience & Domain: Integrated Projects*

				Perspective 1	**Perspective 2**	**Perspective 3**
Energy	Experience in integrated projects	Yes	Count (N)	6	6	6
			% within Experience in integrated project	33,3%	33,3%	33,3%
		No	Count (N)	1	1	1
			% within Experience in integrated project	33,3%	33,3%	33,3%
Spatial planning	Experience in integrated projects	Yes	Count (N)	4	8	1
			% within Experience in integrated project	30,8%	61,5%	7,7%
		No	Count (N)	0	1	0
			% within Experience in integrated project	0%	100%	0%
Total		Yes	Count (N)	10	14	7

	Experience in integrated projects		% within Experience in integrated project	32,3%	45,2%	22,6%
		No	Count (N)	1	2	1
			% within Experience in integrated project	25%	50%	25%

Table K.18 *Overview Significance & Correlation Results Crosstab Analysis: Combination Project Experience & Domain*

Domain	**Test**	**Value**
Association between combination of experience in energy projects and domain on preferred perspective		
Energy	Pearson Chi-square	0.769
	Pearson's R (correlation)	0.137
Spatial planning	Pearson Chi-square	*0.741*
	Pearson's R (correlation)	*0.107*
Total	Pearson Chi-square	*0.644*
	Pearson's R (correlation)	*0.157*
Association between combination of experience in spatial planning projects and domain on preferred perspective		
Energy	Pearson Chi-square	0.817
	Pearson's R (correlation)	-0.12
Spatial planning	Pearson Chi-square	0.523
	Pearson's R (correlation)	0.157
Total	Pearson Chi-square	0.944
	Pearson's R (correlation)	-0.01
Association between combination of experience in integrated projects and domain on preferred perspective		
Energy	Pearson Chi-square	1
	Pearson's R (correlation)	0
Spatial planning	Pearson Chi-square	0.741
	Pearson's R (correlation)	0.107
Total	Pearson Chi-square	0.958
	Pearson's R (correlation)	0.042