Governing regional energy transitions? A case study addressing meta-governance of thirty energy regions in the Netherlands*

Hoppe, Thomas

Publication date
2021

Document Version
Final published version

Published in
Ekonomiaz

Citation (APA)
Hoppe, T. (2021). Governing regional energy transitions? A case study addressing meta-governance of thirty energy regions in the Netherlands*. *Ekonomiaz*, (99), 84-117.

Governing regional energy transitions? A case study addressing meta-governance of thirty energy regions in the Netherlands[*]

There is increasing scholarly and policy attention to energy transition at the regional scale. This perspective article presents empirical insights from the Netherlands, a frontrunner that has been experimenting with, formulating and scaling regional energy strategies to thirty 'energy regions', with the goal of these regions contributing to the national climate goal, including but not limited to 35 TWh of solar and wind energy. The research question is: What insights can be taken from the governance of regional energy transition in the Netherlands? Results reveal six issues that require the attention of policymakers: the trade-off between top-down and bottom-up; transparency in costs and benefits; lack of governing capacity; fit with current institutional frameworks; systemic efficiency and optimisation; and fair participation.

Cada vez es mayor la atención que se presta a la transición energética a escala regional en el ámbito político y académico. Este artículo expone las experiencias empíricas de los Países Bajos, líderes en experimentación, formulación y desarrollo de estrategias energéticas regionales en treinta «regiones energéticas», con el objetivo de que estas regiones contribuyan al reto climático nacional, incluyendo pero no limitándose a 35 TWh de energía solar y eólica. La pregunta a plantear es la siguiente: ¿Qué lecciones se pueden aprender de la gobernanza de la transición energética regional en los Países Bajos? Los resultados revelan seis cuestiones que exigen la atención de quienes formulan las políticas: el término medio entre top-down y bottom-up, transparencia de costes y beneficios, falta de capacidad de gobierno, adaptación a los actuales marcos institucionales, eficiencia y optimización sistémica, y participación justa.

Gero eta arreta handiagoa ematen zaio eskualde mailako trantsizio energetikoari esparru politikoan eta akademikoan. Artikulu honek Herbehereetako esperientzia enpirikoak azaltzen ditu, liderrak baitira hogeita hamar «energia-eskualdetan» eskualdeko energia-estrategien esperimentazioan, formulazioan eta garapenean. Esperientzia horien bidez, eskualde horiek klima-erronka nazionalean lagundu dezakete, eguzki-energiaren eta energia eolikoaren 35 TWh-ra mugatu gabe. Galdera hau egin behar da: Zer lezio ikas daitezke Herbehereetako eskualdeko trantsizio energetikoaren gobernantzatik? Emaitzek agerian uzten dituzte politikak egiten dituztenen arreta eskatzen duten sei gai: *top-down* eta *bottom-up* terminoen artekoa, kostuen eta etekinen gardentasuna, gobernu-gaitasunik eza, egungo esparru instituzionaletara egokitzea, efizientzia eta optimizazio sistemikoa, eta bidezko parte-hartzea.

[*] Spanish version available at https:/euskadi.eus/ekonomiaz.

Thomas Hoppe
Delft University of Technology

Table of contents

Keywords: climate policy, metagovernance, multilevel governance, energy transition; regional governance.

Palabras clave: política climática, metagobernanza, transición energética, gobernanza regional.

JEL codes: P18, Q28, Q48

Entry date: 2021/03/09 Acceptance date: 2021/04/01

Acknowledgements: The author thanks two independent reviewers for commenting on a previous version of this paper.

1. **BACKGROUND**

Recently there is more scholarly and policy attention to the region as administrative entity in which sustainable energy transitions can be governed (de Leeuw & Groenleer, 2018; Hoppe & Miedema, 2020; Kempenaar, Puerari, Pleijte, & van Buuren, 2020; Lutz, Fischer, Newig, & Lang, 2017; Mattes, Huber, & Koehrsen, 2015). Energy transition refers to a significant change for an energy system that could be related to one or a combination of resource use, system structure, scale, economics, end use behaviour and energy policy (Grübler, 1991). It does not only focus on (the change of) one technology, energy source, or policy, but instead focuses on systemic change of an entire energy system (e.g. an electricity system changes systemically following the change of its electricity generation mix, leading to for example new grid requirements and institutional change) (Geels, 2002). In sustainable energy transitions goals include CO_2 emission reductions, an increase in the rate of energy sav-

ing, and the energy system getting progressively more sustainable, using more renewable energy sources while replacing fossil fuel sources (Kemp, 2011). In order to achieve these goals state and non-state actors use their agency and undertake both individual and collective action. To coordinate strategy and actions to achieve sustainable energy transition goals in society governments engage in energy transition governance (Grin, Rotmans, & Schot, 2010). This not only includes national government induced governing but also applies to decentralised levels of government (Bulkeley H, 2005; Hoppe & Miedema, 2020).

Similar to supranational, national and local governance of climate change mitigation or low carbon energy transition, collective strategy and action also take place at the regional level. Taking a polycentric governance approach – which assumes decision-making between multiple semi-autonomous interdependent state and non-state actors (Aligica & Tarko, 2012; Ostrom, 1999) – or a multilevel governance approach – which assumes interdependency, cross-level interaction and coordination between actors at different tiers of government (Hooghe, 2001) – it is not surprising that the regional level deserves more attention. Recent attention to the region not only follows from the argument that it is a formerly forgotten level in climate policy that also needs attention, but that it is also the level where top-down policies and bottom-up initiatives are confronted with one another. In order to understand the governance of regional energy transition (RET) it is necessary to understand what regional governance is actually about. According to Fürst (2004) regional governance pertains to «forms of regional self-control in response to deficits and as a supplement to market and state control. It occurs where the interaction of state, municipal and private-sector actors is required in order to deal with problems. Therefore, it can be seen as an «intermediate form of control» (Fürst, 2004). Other scholars see regional governance as a coordination mechanism to resolve interlocal issues, e.g. (Feiock, 2007).

RET can be defined as a regional approach to drastically transform energy systems (van Engelenburg & Maas, 2018). Next to greening energy systems by increasing the use of renewable energy sources, this also includes energy savings and co-benefits, like job creation and contributing to the wellbeing of regional communities (Holm Olsen, 2014; Puppim de Oliveira, 2013). RET, however, is not easily realised. Whereas there are many civic initiatives at the regional level in many countries, they contribute but hardly leave a substantial mark on the greening of regional energy sectors at the system level. In the absence of sufficient civic and market pressure the drastically greening of regional energy systems arguably becomes a public sector matter provided that regional politics decides that public sector intervention is required. However, generation of electricity from renewable sources (and hence change of the electricity generation mix) is a liberalized activity in the EU, with investments freely made by economic agents. Public authorities may get involved in energy planning activities, and use certain economic incen-

tives to support the use or renewable energy sources, like subsidies, tax rates, feed-in-tariffs, and the like.

When it is decided that the public sector uses its agency to mobilise other actors and resources to achieve RET this is in the form of governance, which can either be done in the form of a regional authority governing RET – with the regional authority as a central, monocentric governing agent and regional stakeholders at the receiving end as target groups – or taking more of a polycentric governance approach which fits contemporary regional forms of governance fairly well (Klok, Denters, Boogers, & Sanders, 2018; Wäckerlin, Hoppe, Warnier, & de Jong, 2019) – assuming the regional authority as one of the actors depending on interaction with other state and non-state actors at both the regional and other levels. Regardless of the forms of governing taken in order to realise RET, inter-actor coordination is required to make sure that actors commit themselves to achieving the collective goal of realising RET, establishing joint visions, joining forces to establish sufficient capacities, co-create (i.e. actively involving citizens and stakeholders in the work of government or public decision-making (Parks *et al.*, 1981), for example, to formulate policy or co-design future pathways), regional strategies, formulate and implement policy mixes, set-up regional experiments, and align their actions to implement RET effectively, (Hoppe & Miedema, 2020). Although attention to RET and the governance thereof is increasing, there is still limited attention to the governance of RET in practice. Empirical studies that presume to address RET either focus on the local or sometimes the provincial level and not the region as 'supra-municipal' level in which inter-municipal disputes are resolved or issues are discussed and coordinated. Only a few empirical studies actually focus on regions as level in between the provincial and local level in which actions are undertaken to govern energy transitions (Hoppe & Miedema, 2020; Kempenaar *et al.*, 2020; Loorbach & Rotmans, 2010).

Governance of RET can also be viewed from a responsive or innovation oriented perspective. Looking for a way to govern energy transitions regionally has the advantage of taking an approach that more specifically fits the regional conditions, be more responsive to regional needs and offering more of a tailor made approach than implementing a Top-Down alternative central government. In this sense it can also be seen as a response to failed governance approached by (Dutch) central government from 1990s onward in the planning of wind energy in regions with characteristics favourable to wind energy park operation. A key shortcoming was central government passing by on regional needs, giving municipalities and local communities little say in the siting of wind park locations, leading to poor social acceptance, civil unrest and eventually public resistance when the latter got hold of the deals that were made with industrial wind park developers planning to erect wind turbines without local consent (Wolsink, 1996; Wolsink, 2007). Moreover, many objections were raised by local stakeholders to slow down and prevent the construction of onshore wind parks (Akerboom, 2018). The message was clear: governing by closing

down deals with energy market players while at the same time neglecting regional actors was a doomed approach. In response to this a need to develop a new, working mode of governance emerged. This can be seen in light of innovation of governance: searching for and using new ideas to develop new models of governance that work better.

When the purpose is to change or improve governance by means of innovation – assuming that this does not work in incremental fashion – one way to do so is using a specific metagovernance strategy, assuming that spaces of governance are not exclusively territorial and that reference to hierarchy indicates the key role of state power, that is the «governance of governance», with «multispatial metagovernance» (Jessop, 2002; Jessop, 2016). Metagovernance can be used to improve or change governance approaches that have failed in the past. It can be applied in a sense similar to Transition Management (TM) using a long term vision and goal, while developing pathways, policy, means of experimentation and discursive actor arenas to govern transitions (Kemp, Rotmans, & Loorbach, 2007; Loorbach, 2007). Next to focusing on multiple sectoral domains, a metagovernance approach may also focus on mobilising action among different levels of government, or even seek to change institutions, next to supporting change in governance arrangements. In addition this requires developing and replacing policy instruments mixes (Kern & Howlett, 2009; Kern, Rogge, & Howlett, 2019). This approach can also be applied with the aim to change governance structures with regard to RET. It calls for change in organisational structure, actor configuration, and institutions.

A country that is currently using such an approach to govern RET in a novel way is the Netherlands, which has been experimenting with RET governance and has recently scaled the approach to a national program with thirty so-called 'energy regions'[1]. In the present paper energy regions are defined as a partnership between actors on a regional scale to promote energy transition. These energy regions are a new phenomenon as they form no part of current constitutional-legal decentralised government, and there is no legal basis to them. Formally, they do not exist (Elzinga & Lunsing, 2020). Yet, despite this fact they have come into existence and have been assigned a key role in the national energy transition structure (SER, 2018). Within this structure the thirty energy regions have fair degree of autonomy but are coordinated and facilitated by the «National Programme Regional Energy Strategies» ('NP RES' from here onwards), organised at central state level.

Although the application to the energy domain is new the regional governance approach is not. As with previous forms of new regional governance in recent years, decentralised – in particular local – authorities were requested by the central government to cooperate in the formation of partnerships. Initially, these had a non-

[1] See appendix at the end of the article.

committed character, but were perceived as quite compelling by decentralised authorities. Eventually this resulted in some sort of mandatory voluntary cooperation. Via a law that takes precedence over general legislation the formal legislator (at national level) was able to transfer powers from the decentralised authorities to the new partnerships – in the case of RET in the Netherlands to the energy regions. Transferring these powers did contribute to a higher degree of national control (Elzinga & Lunsing, 2020), and increased central government's ability to govern.

The goal of this perspective paper is to create more insight into how RET governance is shaped, implemented, what energy regions are and how they work, how actors and multi-spatial tiers of government interact, and what governance issues emerge during this process. In this paper governance structure and empirical developments are analysed, addressing RET as a complex, multi-actor challenge, taking a reflective research approach. The main research question is: What insights can be taken from the governance of regional energy transition in the Netherlands, as a country experimenting with innovation of governance at the regional scale?

This paper is structured as follows. Section 2 presents research design and methodology, which mostly pertains to the use of a single case study approach, with qualitative data from reports from expert meetings, newspaper articles, online media, expert reports, expert interviews and case study reports. Section 3 presents a chronological overview of the emergence, structure and implementation of regional energy governance across thirty energy regions in the country. Section 4, then, addresses pressing governance issues. The paper ends with a conclusion, including suggestions for future research.

2. RESEARCH DESIGN, METHODOLOGY AND RESEARCH FRAMEWORK

In this paper, the research approach is that of a single case study. This was selected to explore and describe the governance of RET as a complex societal phenomenon in its real-life context, using in-depth, rich data (Yin, 2003). The case study selected in the present study is the Netherlands. This case was selected because the country can be considered a frontrunner in regional energy transition governance. This is unprecedented. The case study addresses the period between 2016 – when the first ideas were conceived and the first experimental pilots launched – until 2021 when a national program had been set up supporting thirty energy regions across the country. Whereas the present study mostly focuses on the general development, coordination and organisation of regional energy transitions from a national – metagovernance – perspective, the study also pays attention to illustrative pratices and development at the decentralised level, i.e. in a number of energy regions (e.g. Zealand, West-Brabant, and North-East-Brabant). In terms of data collection, treatment and analysis the present study can be classified as qualitative research. Data collection involved desk study reports, newspaper and online articles, secondary

data, and insights from three M.Sc and B.A. graduation studies at Delft University of Technology (covering three energy regions and over thirty expert interviews), all using a case study research approach. In addition, discussions and an expert interview were conducted with public officials at the NP RES programme organisation. Data analysis pertained to qualitative data analysis, including text interpretation of the aforementioned qualitative data, with text interpretation and reflection on empirical data using the theoretical lens of the Governance Assessment Tool framework (Bressers, Bressers, Kuks, & Larrue, 2016).

The Governance Assessment Tool (GAT) concerns a framework that enables the analysis of governance quality on a certain issue in a given context. It can also be used to assess or evaluate the quality of policy implementation of a given policy or policy process. The conceptual basis of the framework goes back to a long tradition of implementation studies as a subdomain to policy studies. More particularly it has a background in the Contextual Interaction Theory (de Boer & Bressers, 2011), which can be viewed as a «third generation» policy implementation theory in which policy implementation is not only viewed as a monocentric top-down process but as a multi-actor interaction process that is influenced by different context layers. In a similar fashion to the Contextual Interaction Theory, the Governance Assessment Tool framework sheds light on multi-actor and multi-level situations that influence the implementation of policies and projects under complex and dynamic conditions (Bressers *et al.*, 2016). From the governance literature theoretical frameworks, the Governance Assessment Tool framework is arguably the most comprehensive one covering the key governance dimensions, i.e. vertical (levels and scales) (Hooghe, 2001); horizontal (actors, networks, collaborative governance) (Bressers & O'Toole Jr, 1998; Klijn, 2008); problem perceptions and goals (Hoppe, 2010); policy congruency and alignment to strategy (Kern & Howlett, 2009); and resources, (policy) instruments, and 'policy mixes' (Bemelmans-Videc, Rist, & Vedung, 2011; Bressers & Klok, 1988; Kern *et al.*, 2019). As such, it covers multiple dimensions that can also be found in polycentric governance. Moreover, the attention to different (vertical) levels and scales, goals, alignment to strategy, and policy mixes also allows to reflect on the use of metagovernance in the RET context.

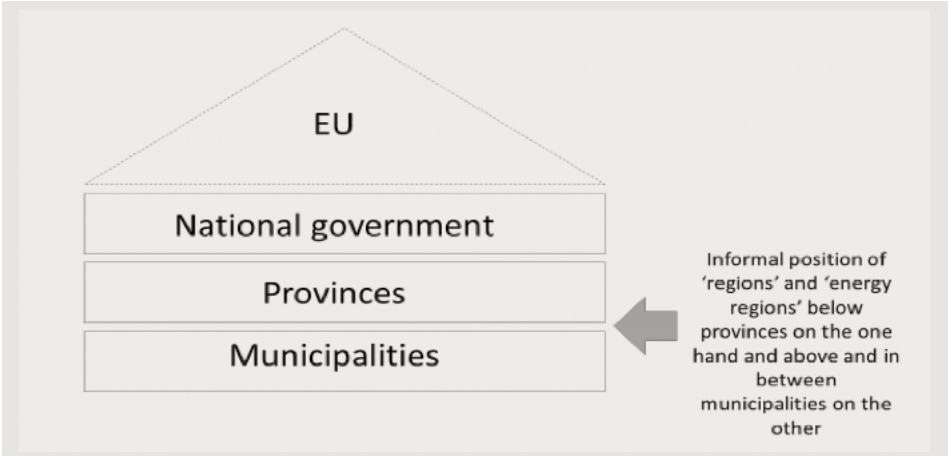
3. EMERGENCE, DEVELOPMENT AND STRUCTURE OF RET GOVERNANCE

Attention to energy transition at the regional level goes back a long time in the Netherlands. It has a background in national government, enabling decentralised government to formulate climate policies of their own. Since 2001 provinces – just like municipalities – could request funding from the national governments to formulate their own policy and build capacities. Ever since the provincial government has been enabled to do so and 'rich' counterparts were able to fund their own climate policies. For example, including schemes to co-fund innovative local

renewable energy or community energy initiatives (Hoppe, Kooijman-van Dijk, & Arentsen, 2011; Warbroek & Hoppe, 2017). Ambition and intensity varied across provinces, in particular between the rich ones – often with financial assets after selling shares in former provincial energy companies following the liberalisation of the energy market in the Mid 2000s – and their poorer counterparts (Arentsen, 2009). Although it stimulated action at the regional level there was no such thing as regional energy transition or climate mitigation policy. Due to its constitutional state structure, the Netherlands entails a rich body of decentralised administrative bodies that have a fair amount of autonomy - yet less than the States – 'Bundesländer – in Germany) (Boogers, Klok, Denters, Sanders, & Linnenbank, 2016) – or the Autonomous Communities in Spain, for instance. Next to local, provincial and decentralised functional governmental bodies (e.g. Water Boards), the country also has some sort of regional governance, which applies to a number of societal domains including healthcare, safety & policing, environmental affairs, and transport & mobility. It concerns issues that cannot only be arranged at the municipal level, but also requires supra- and inter-municipal coordination.

Despite this fact, there are basically no regional administrative entities that possess any form of autonomy. In the Netherlands, the region is not considered a formal tier of government. The country's original constitutional state structure in terms of levels of government contains (from top to bottom): national or central government, provincial government, and municipalities (See Figure 1). The EU was added to the original structure more recently. In addition to the provinces and municipalities there are also functional decentralised governments, in particular the water boards.

Figure 1. **CONSTITUTIONAL STATE STRUCTURE WITH DIFFERENT LEVELS OF GOVERNMENT IN THE NETHERLANDS**



Adapted from: (Bovens *et al.*, 2017).

Until 2015 administrative city-regions existed, but after a trial period the idea was abandoned. What was left was regions settling inter- and supra-municipal affairs. Here, several legal-organisational models are used, with the so-called «administrative arrangements» – introduced in 1984 – as the most prominent form. It serves to provide the formal foundation for collaboration between municipalities, provinces and water boards, mostly focused on the strengthening of inter-municipal collaboration. (Ibid.). Although climate (mitigation) policy has been around in the Netherlands since national government started formulating progressive environmental policy following the 1987 Brundtland report «Our Common Future» (Coenen, 1999), and the provincial and local governments adopting climate policies (strongly varying between jurisdictions) (Hoppe & Coenen, 2011), the regional level basically remained void of climate policy until 2016.

3.1. **Regional Energy Transition Pilots**

In 2016, the Association of Netherlands Municipalities (VNG) took the initiative to explore whether climate mitigation policy and more particularly low carbon energy transition could be governed at the regional level. It was aligned to the national 'Energy Agreement' (2013), which entailed the metagovernance and policy which was followed by the Dutch national government to contribute to climate change mitigation goals of the IPCC (i.e. Kyoto protocol) and the European Union (with amongst others a 14% share of renewables in the national energy mix). In response to the 2015 Paris COP21 Summit – in late 2016, the Dutch cabinet issued its 'Energy Agenda' which presented the region as a (potential) government level where energy transitions could be realised (Schuurs & Schwencke, 2017).

At that time the decentralised governments formulated the idea to organise pilot experiments that would focus on RET. VNG (muicipalities) and IPO (provinces) wanted the energy transition policy domain on a regional scale with more say for decentralised authorities. They felt that this time they should take the lead, and not the central government. This was also related to frustration they had experienced from decentralisation in the healthcare domain. Central government was subsequently involved out of necessity.

To initiate action, VNG drew the idea to make a Deal together with the national government (i.e., the ministries of Economic Affairs, the Interior and Kingdom Relations, and Infrastructure and the Environment), the Union of Water Boards (UvW) and the Association of Provinces of the Netherlands (IPO) to start RET governance experiments. This led to the development of the so-called «Regional energy strategy pilots» deal. Between 2016 and 2017, seven energy regions were selected to explore and learn how regional governance in the energy transition domain could be organised and developed (Schuurs & Schwencke, 2017). Issues explored included: What ambitions can municipalities and other regional actors share and where do they need to increase their collaboration efforts?; How

familiar are municipalities and other regional actors with the regional challenge, and how to explore and estimate the spatial and economic impact of the regional energy transition?; What is already done in the region with regard to the energy transition, and what else can municipalities and other regional actors do, and what is required in terms of knowledge, expertise, and what is the fit with current legislation and regulations?; And finally, which tasks and roles lie with which party in the region, and what would be a fair and justified division of tasks, costs and benefits? (Schuurs & Schwencke, 2017).

Eventually, pilots commenced in seven energy regions. To support them a total budget of 1.5 million euros was made available. In five energy regions (i.e., West-Brabant, Hart van Brabant, Midden-Holland, Fryslân and Drechtsteden) a project manager was appointed to support a project team of regional stakeholders (including public officials from multiple municipalities in the region), and served to guide the team towards developing a regional energy strategy with a long-term strategy including a step-by-step plan for the short term - to become energy neutral by or before 2050. The two energy regions remaining (i.e., North Veluwe and the Eindhoven metropolitan region) were allowed to delegate regional stakeholders to participate in a community of practice. The seven energy regions were also encouraged to share experiences. All seven received a budget to organise workshops and 'ateliers' with regional stakeholders in order to discuss and explore issues of climate, energy and spatial affairs, and co-create problem perceptions, visions, goals and strategies how to achieve them (Schuurs & Schwencke, 2017). Ateliers serve to involve stakeholders in discursive settings to co-research ongoing issues and find common problem definitions, co-create future visions and goals, and co-develop pathways and roadmaps to achieve them (Kempenaar *et al.*, 2020).

In 2017 the pilots were evaluated. Results showed that the pilot regions differ greatly in the degree of regional cooperation. Whereas inter-actor cooperation was well developed in some of the regions, sometimes even with regional administrative/executive bodies (i.e. using 'common schemes' to coordinate matters), it was more of incidental nature in others. Another insight from the pilot Deal was that regional energy strategy is developed in a more or less informal framework, in which public, private parties and civil society collaborate and coordinate actions. The way in which general and daily governance, organisation and implementation would be arranged is up to the actors involved, and is inherent to the autonomy the energy regions had to organise and coordinate their own regional energy transition strategies. Not surprisingly, variation was found in the ways the (pilot) energy regions organised this (Schuurs & Schwencke, 2017). More in general, the regional project organisation often consisted of a steering group, a program team with a program manager, and a regional coordinator responsible for the strategy process. These included several thematic working groups. In many regional project teams, the participants were surprised how complicated and comprehensive the (regional) energy transition is-

sue was, both in terms of process and the scope. An important benefit attributed to the pilots was that the parties involved experienced collaboration while working on a topic that was previously not familiar to them. This helped to raise awareness about the urgency and scope of the challenge while also stressing the importance of inter-actor dependency (Schuurs & Schwencke, 2017).

The pilots also revealed that the process of RET policymaking is complicated. Because the energy region is not a formal tier of government processing a regional energy transition strategy into formal policy is only possible through decision-making in the formal decision-making bodies of the participating decentralised governments (i.e. mostly municipalities, but also provinces and water boards). In the pilots local administrations were advised to use the regional energy strategy (RES) as a foundation for local spatial plans and co-developing visions to anchor the spatial impact in policies and plans. In other words, after presenting a RES with concrete recommendations, it was up to municipalities to make decisions about it. Finally, the evaluation showed that having sufficient implementation capacity available is of great importance. In line with this local administrations were advised to ensure that the plans and projects are implemented or adjusted (i.e. via implementing organisations), and would require an adaptive and programmatic approach (Schuurs & Schwencke, 2017). In sum, the evaluation of the RES pilots stressed that more work should be done to advance the RET policies and governance.

3.2. **The 2018 Climate Agreement and the road to Regional Energy Transition Strategies**

In 2018 the Dutch national government negotiated the national 'Climate Agreement' in close collaboration with societal partners from the public, private and civic sectors. It included a regional governance approach that foresaw thirty Dutch energy regions contributing a fair share to the national renewable energy goal of at least 35 TWh in wind and solar energy production (including both distributed generation and utility-scale wind and PV installations; other renewable electricity generation technologies are not included in this goal). This would align with the CO_2 emission reduction goal of 49% by 2030 (as compared to the 1990 level) (SER, 2018). The Climate Agreement and the related 2019 Climate Law would pave the way for the organisation and implementation of so-called 'Regional Energy Strategies' (RESs), giving regional energy transition governance a concrete and visible character for the first time. As with the pilots, the initiative did not come from the central government. During the 2016-17 Climate Agreement negotiations, the decentralised governments said: «This is ours. We want more say», also based on experiences with the RES pilots. In the summer of 2018, during the negotiations on the Climate Agreement, a discussion started between the Ministry of Economic Affairs and Climate Policy and the Ministry of the Interior and Kingdom Relations on the one hand and the local and other decentralised au-

thorities on the other. This led to the development of ideas about the organisation of the energy regions and the design of NP RES. It should be noted here that at the time there were still some hostile feelings between decentralised and central government, because the decentralised authorities felt disadvantaged. RVO, the national government agency that was to implement NP RES was initially seen as part of the central government and was therefore not welcome at consultations between the decentralised authorities.

At that time it was also determined which would become the energy regions. Oddly, these were (and are currently) not in line with existing formal decentralised structures, nor with the EU NUTS regions system. The energy regions were established in consultation with the relevant decentralised authorities, which expressed their preferences in doing so. Energy regions were designed taking into account existing decentralised administrative network structures. This initially led to establishing 37 energy regions. But the central government decided this was too much and started to exert pressure. That led to an integration of energy regions, after which 30 remained.

An overview of the energy regions can be found here: https://www.regionale-energiestrategie.nl/resregios/default.aspx and in the Appendix.

3.2.1. *Meaning*

In the national Climate Agreement RES has been defined in three separate ways. First, as an (policy) instrument to organise the spatial integration of the energy transition with social (i.e. citizen) involvement; second, as a means to support long-term regional inter-actor collaboration; and third, as a 'product' (i.e. text or 'policy' document) describing regional energy and low carbon goals, with deadlines, and including strategies (i.e. policy) on how to achieve this (Energiestrategie, 2019b).

3.2.2. *Relative autonomy in policymaking of decentralised public authorities*

In the RES approach, some degree of regional autonomy is allowed. The elaboration of the goals set for the RES in the Climate Agreement is not imposed by national government on decentralised administrative bodies. Instead, energy regions have a certain degree of autonomy to develop strategies on their own on how to achieve energy transition goals while contributing a fair share to the national goal. At the regional level stakeholders can give substance to the goals by participating in public decision-making, so that an independent regional pathway be developed, in particular in relation to large-scale generation of onshore wind and solar energy. According to some this can be considered a «constitutional novelty», basically giving some policymaking authority to a non-existing administrative entity to formulate and eventually implement a policy with drastic environmental, economic, social and even institutional repercussions (van der Steen, Ophoff, van Popering-Verkerk, & Koopmans, 2020). More in general, the magnitude and complexity of the issue at

hand and the scale on which this requires coordination calls for innovation of governance, resulting in the RES approach as a compromise between top-down national government induced meta-governance and bottom-up regional initiatives and projects (Hoppe & Miedema, 2020).

3.2.3. *Goals*

The goals of the RES governance approach are: 1) To attain a quantitative target for the energy regions: by 2030 at the latest, the energy regions will jointly produce at least 35 TWh of electricity from wind and large-scale onshore solar PV systems; 2) To draw up a Regional Heat Structure (RSW) with which they take control of the use of supra-local heat sources for municipal heat plans. The aim of the thirty energy regions individually developing RESs is to arrive at a regionally supported strategy following joint effort between social partners, the business community, governments and residents. As spatial impact is of key importance to the discourse in every energy region the RES is often considered as an approach to discussing and organising spatial integration of the energy transition with social involvement in a way to arrive at a social-political legitimate approach (Matthijsen *et al.*, 2021). Moreover, implications of the RES governance approach could become drastic and go beyond energy and spatial matters, property ownership, health, and landscape. Even freedom and prosperity would not be left untouched by it, according to some (Jesse, Koekkoek, Udo, Wentzel, & Zijlstra, 2020).

3.2.4. *Organising the metagovernance of RET*

In their effort to develop RESs of their own, all energy regions are supported by the national government. This is done via the National RES Program, which was established to support the thirty energy regions in making the RESs by developing and sharing knowledge, offering process support and facilitating a learning community. NP RES connects parties, puts bottlenecks on the agenda and identifies opportunities for linking to realise the ambitions. Support to energy regions from the NP RES comes in different forms. For example, in the process of developing the regional structure heat (RSW), an expert pool is made available, set up and coordinated by the Netherlands Enterprise Agency (RVO) (Energiestrategie, 2019b). NP RES can be considered as a metagovenance structure to facilitate RES formation and implementation processes at the regional scale.

The question can be raised why a decentralised approach with an important role for the regions was chosen? In addition to the aforementioned discussion initiated by the local authorities and started in 2017-18, the organisational set-up also deserves attention. The COP21 in Paris (2015) was used as a good practice, example, as there was a solid basis there with thematic consultation tables where quality discussions were held with experienced administrators and officials. This was adopted in the Dutch RET negotiations. In addition, it was important that the central gov-

ernment would guarantee the autonomy of regions and value it in the process. In addition, it was also considered important that a good inter-administrative consultation structure was created and that decision-making processes were properly supported (by a professional external process manager). VNG, IPO, UvW and the two ministries were the client for this. They managed a quartermaster group, that prepared ideation regarding the formation of the NP RES in which the interests of the five clients were taken into account, whereby the frameworks were designed in consultation with the energy regions. This also applied to the guide and other supporting documents that NP RES would produce to support the energy regions. In addition, it was considered important to develop a feeling for each other and to allow these consultations to return, whereby there was less strict control over the use of central government resources, and more reasoning and acting based on trust.

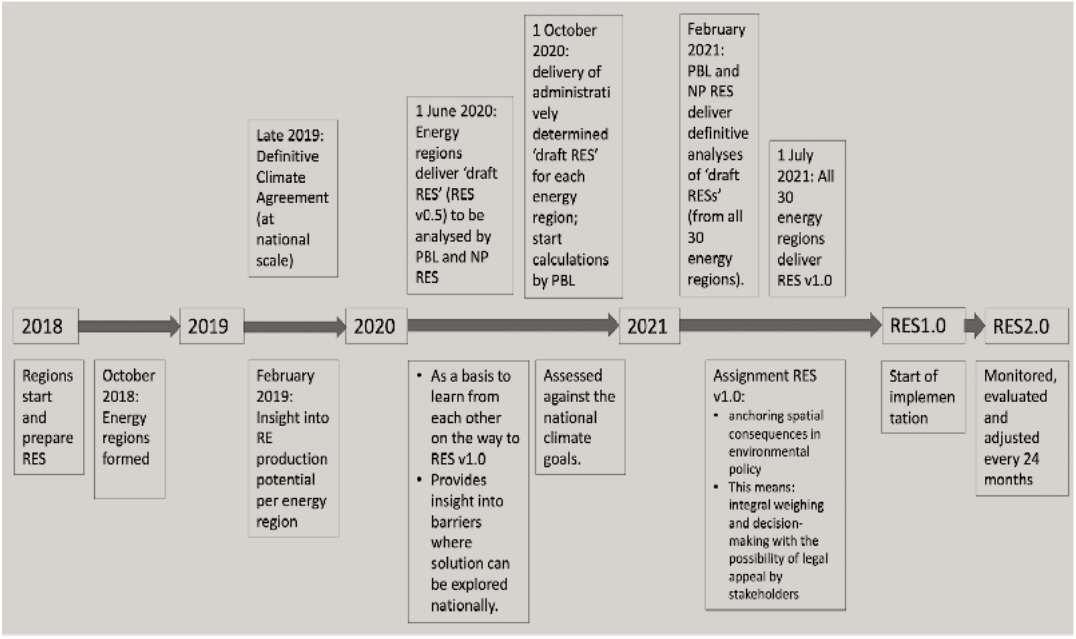
3.2.5. *Governance structure and phase-wise approach*

In each energy region, provincial and local governments (but also Water Boards), social partners, network operators, the business community and residents are expected to work out regional choices, pertaining to the generation of onshore wind and solar energy production, issues regarding the sustainable heating transition in the built environment, and the required storage and energy infrastructure that go along with these choices. Based on these choices each energy region is expected to formulate a regional 'offer' (i.e. quantitative electricity generation from wind and solar, and a CO_2 reduction bid). This requires a trade-off between four components: i) Quantity in terms of electricity and heat production; ii) Use of space (i.e., land); iii) Administrative and social support; and iv) Energy system efficiency (mostly related to electricity grids coping with increasing amounts of distributed generation) (Energiestrategie, 2019b). When reflecting on praxis in energy regions it can be argued that a fairly technocratic approach is taken. This includes looking for potential «search areas» to plan wind and solar parks, or where there are possible heat sources available, or possibilities for sun-on-roof installations, or where multiple use of space can take place. This process also takes legal obstacles into account (Participatiecoalitie, Natuur en Milieufederaties, RES, Klimaatbeweging & Koepel, 2020).

The RES process has a lead time until 2030. To support publicly legitimate decision-making, it is considered important that all public stakeholders (i.e., municipal councils, the provincial council and the general boards of the Water Boards) are properly included and prepared from the start of the process. For this, an administrative starting document (initial memorandum or similar document, yet without any legal implications) is drafted containing the goal(s), planning, organisation, and attention to address spatial and legitimacy issues. In the next step each energy region is expected to present a draft RES to the NP RES (on 1 June 2020). In the period up to the submission of this policy document, the decentralised authorities' branch organisations (e.g., VNG, IPO, UvW), together with the energy regions, started a process that would provide input for creating a regional «allocation system» (entitled

«Route 35»). This process ran (partly) parallel with the trajectory of the RESs with the aim to arrive at fair and equitable starting points. In the Summer of 2020 RES formation processes mostly included public and some semi-public and private sector players. The draft versions of the RES for all energy regions were then presented to PBL (the Netherlands Environmental Assessment Agency) (on 1 October 2020), with the latter assessing whether the RES plans formulated in all energy regions would add up to achieving the national goals. If not met, then energy regions would be given four months to arrive at new distribution with the presumption of jointly achieving the national goals. The energy regions then had until 1 July 2021 to determine the «definitive RES» (i.e. 'RES version 1.0').

Figure 2. **PHASE-WISE APPROACH TO RES**



Adapted from: (RES, 2020).

The majority of the RESs are expected to become incorporated into municipal and provincial spatial-environmental policies and plans by Mid-2021 (with legal mandates mostly with the municipalities). Afterwards, the RES is updated at least every two years. The 'RES version 2.0' (to be offered to the NP RES on March 1, 2023) entails a further elaboration and possible revision of its predecessor (i.e. the 'RES 1.0' version). In this version, new insights and developments with regard to heat sources and location choices for renewable generation are expected to be implemented. Decisions about new infrastructure and storage locations should also be included in the 'RES 2.0' version (Energiestrategie, 2019b). For both the 'draft RES' (2020), the RES1.0

version and further RES amendments public participation of regional stakeholders and citizens is foreseen. NP RES leaves it up to the energy regions to organise this regionally. An overview of the phase-wise approach to RES is presented in Figure 2.

To oversee performance and progress the Netherlands Environmental Assessment Agency (PBL) monitors and evaluates RES formulation and implementation processes (including incorporation into spatial-environmental policies and plans). However, to enable PBL to conduct this task it is important that the regional actors – like distributed system operators, housing associations and other relevant parties involved in RES organisation – provide the necessary data. Both in monitoring and development of RESs energy modelling is required to process the data and run analysis and scenarios that back decision-making. The possible use of models and of commercial agencies that advise on the further development of the RES on that basis is a choice of the energy regions themselves. Different energy models are available to support spatial and energy analysis (Matthijsen *et al.*, 2021). It should be noted here that two reservations apply. First, local and regional energy modelling is usually outsourced to commercial consultancy and engineering firms with little direct involvement of public officials (Henrich, Hoppe, Diran, & Lukszo, 2021). Second, data availability is complicated due to dispersed ownership and a lack of demand-side data (Diran, Hoppe, Ubacht, Slob, & Blok, 2020).

The financing of NP RES and the support of the regional processes until 2021 came from the Climate Budget of the central government. This was initially 15 million euro per year. But this turned out to be insufficient. Subsequently, a revised budget allocation key was made after negotiation with the energy regions.

3.2.6. *Organising citizen participation*

Citizen participation and social support for RESs are considered of great importance in the NP RES. Here, participation means different things: e.g., process participation, financial participation, or ownership participation. Financial bonds and an environmental fund can be seen as means that contribute to participation. In RES formation, participation entails the following goals: (i) realising social acceptance of the RES and the measures that come along with it; (ii) increasing informed decision-making by making use of the knowledge, experiences of residents, companies and social organisations; (iii) realising social support for making decisions that influence RES formation; and (iv) ensuring community ownership, so that residents, companies and social organisations feel that they become co-owners of the RES (Energiestrategie, 2019b). RES formation in energy regions can only be considered successful once residents and regional organisations are involved in just participatory processes. This means that they are involved from the outset, feel as if they are taken seriously, participate in a deliberative way, and are treated in a fair, just way (Wolsink, 2007). In the participation process, a number

of values are of key importance. These include that benefits of renewable energy projects should remain local as much as possible and be carefully integrated into the landscape, with a focus on people and nature. Moreover, this may bring the benefit of residents working together on energy transition themes and projects, eventually becoming energy transition ambassadors (Participatiecoalitie, Natuur en Milieufederaties *et al.*, 2020).

To support the energy regions, a collaborative civil society initiative was launched in 2019 under the name 'Participation Coalition', including the civic organisations HIER opgewekt, Energie Samen, Natuur en Milieufederaties, Buurkracht and LSA Residents, which represent among others community energy and renewable energy cooperatives (REScoops) in the Netherlands. Community energy refers to social communities engaging in action on energy-related issues. Community actions, for example, involve campaigns to save energy, neighbourhood solar installation schemes or community-owned wind turbines (Bomberg & McEwen, 2012). In the Netherlands, the Participation Coalition works on detailing participation in the energy transition, the spatial-environment section and neighborhood-oriented approaches, with the aim of developing RESs that can be considered socially legitimate. This includes a focus on participative planning, careful integration, establishing at least 50% local ownership of regional renewable energy projects, supporting citizen involvement in policy formulation and implementation processes, and fostering inclusiveness by also looking after low-income communities and assuring that their interests are also addressed in RES formation (Participatiecoalitie (Natuur en Milieufederaties *et al.*, 2020).

3.2.7. *Assessment of RES proposals presented by the energy regions*

After analysing the draft RESs submitted by 27 energy regions in June 2020, PBL published an interim analysis report in February 2021. This showed that a lot of work had been conducted by the energy regions in a relatively short amount of time, resulting in well-founded strategies containing information on the key performance fields. Most importantly, the calculated sum of the regional plans resulted in a total of 52.5 TWh, exceeding the initial 35 TWh goal. This was considered a good starting point for achieving the 2030 target, even though RES project plans were at the time mostly in the initial project phase and fundamental choices still had to be made. In addition it should be noted that approximately half of the cumulative wind and solar energy generation as proposed by the energy regions consisted of the production of renewable electricity from already existing and planned installations and from projects that may be realised in the short term (i.e. pipeline projects). The other half consists of production based on plans that were still hardly concrete it the time of writing and were considered 'ambitious' (Matthijsen *et al.,* 2021).

The analysis also revealed that there was a lot of uncertainty concerning a number of pressing issues. This pertained to removing and replacing old wind

turbines, the degree to which 'pipeline projects' are (to be) realised, the shaping of regional (spatial) plans, and uncertainties regarding the calculation method used (by PBL). The analysis also showed that substantial additional investments in the electricity network are required, and that a bottleneck was expected regarding the availability of sufficient workers that the capacities required to implement the energy projects (Matthijsen *et al.*, 2021). Oddly, these issues had not been addressed in the proposals by the energy regions, and were only revealed as problematic during and after the PBL assessment. Another insight from the analysis concerned the choice for renewably energy production technology in energy regions and the implications this would have. Most energy regions were found to be opting for solar panels on a large scale, favouring solar over wind energy (for spatial and socio-political reasons). Although this would offer social benefits, it has the disadvantage that the costs to society will be more than a billion euros higher in case the current plans are implemented (van Santen, 2020).

Next to the quantitative analysis of the energy proposals by the energy regions the Participation Coalition analysed participatory performance in the energy regions, using a survey among civic and community energy organisations in all thirty energy regions. The survey found that various draft plans showed broad support for local ownership of new large-scale solar and wind projects. Most energy regions had adopted the 50% local ownership target in their draft RESs. However, at the time there were little concrete actions nor plans drawn up to follow up. Summarising the survey results the Participation Coalition concluded that there is somewhat of a basis to embed participation in RESs, but «there is still a lot of homework to be done» (Participatiecoalitie, Natuur en Milienfederaties *et al.*, 2020). The largest concern pertained to the proper and timely involvement of residents in the RES. In summer 2020, RES formation processes often included public and some semi-public and private sector players, but only limited numbers of citizens or grassroots organisations. It was argued that RESs should open up much more to (unorganised) residents and social partners such as companies, farmers, residents' initiatives / REScoops and nature and environmental organisations, to become the truly social project they were intended to be» (Schwencke, 2021) (p.15). Civil society was simply not sufficiently involved at the time, it was argued. Moreover, although the importance of participation had become acknowledged by public officials in most energy regions participation did not take off quite well. This was related to problems with regard to a lack of know-how and organisational capacity available at decentralised governments to facilitate participatory processes. To support public organisations the Participation Coalition organised masterclasses in half of the energy regions to inform and train civil servants and officials on how to engage with citizens and grassroots organisation, and organise participatory processes (Participatiecoalitie, Natuur en Milieufederaties *et al.*, 2020).

4. PRESSING GOVERNANCE ISSUES

Since 2016 esperience has been gained in the Netherlands with the governing of regional energy transition leading to establishing a national approach to develop strategies in thirty energy regions accross the country. Although a lot has been done and accomplished over a five-year-period this also requires that a critical perspective is taken. This is done by focusing on a number of issues, i.e., trade-off between top-down and bottom-up governance; lack of transparency in costs and benefits; lack of governing capacity; fit with institutional frameworks; systemic problems; fair participation and the role of community energy. Other important governance issues like enforcement, funding and management of funds, non-compliance and penalties, conflict resolution, free riding, are addressed within the six issues below.

4.1. A trade-off between top-down and bottom-up governance?

Taking a public administration perspective RES was welcomed by a number of decentralised administrative bodies. The decentralised approach of the Climate Agreement – the division into thirty 'energy regions' – gave provinces and municipalities a fairly important yet responsible role; more than in many other societal domains. This is illustrated by Deputy De Bat, of the Provincial Executive of Zealand who expressed: «The provinces matter again» (Van der Walle, 2020). Although provincial administrations were handed a central role this should be considered with great care. 'Energy regions' and RES are, for example, not codified in current formal law. Energy regions – i.e. clusters of municipalities that must deliver an energy strategy – have no constitutional status and are not legally bound to achieve national goals.

Developing energy regions and leaving implementation to municipalities is in line with a recurring trend in national government structure, with national government setting goals and policy priorities, developing metagovernance, while leaving implementation (and related cost) to decentralised public bodies (*in casu* involved in formally non-existing energy regions). This process often starts voluntarily, but when municipal councils argue that the approach set by the national government will not work or needs change, then there will be pressure from the national government to get it done after all. In other words, coercion will follow. In the context of the NP RES this means that wind turbines and solar fields will be installed anyway, and probably on the terms of the national government (Rengers & Houtekamer, 2020) that will top-down determine where large-scale wind and solar parks will be planned and installed. This will most likely antagonise citizens who visited websites, participated in (serious) energy games, energy ateliers, consultation and participation evenings (Bekebrede, van Bueren, & Wenzler, 2018; Kempenaar *et al.*, 2020), and who duly believe that the (regional) energy transition comes from below and that everyone can participate. In doing so there is an inherent risk of endangering political legitimacy and trust in government once national government uses coercion to govern regional energy transition in its own

way, neglecting the preferences of regional citizens and stakeholders. Nonetheless, according to insiders the likelihood of central government using coercion is low. Although the issue was raised a lot at the beginning of the RES process no distribution was made on how to achieve the 35 TWh goal. It was not to be imposed on the energy regions from above. Subsequently, «Route 35» was developed from the bottom up by the energy regions. If the goal ultimately will not be achieved, the energy regions will consult with each other to arrive at a new distribution in order to achieve the target. In the last resort, central government can nevertheless still intervene. However, due to the favorable outcome of the PBL assessment in February 2021, Route 35 has been put on hold for the time being.

There is another issue that requires careful attention and concerns another recurring trend in the way the Netherlands is governed. Public (executive) bodies increasingly manage societal issues together, often with other stakeholders participating. This interaction offers flexibility and strength in tackling important problems but may also cause problems that can easily offset these advantages. The problem is that these administrations manage together (often at the regional level when policy domains are structured in such a way that are coordinated at that particular level), while democratic direction, control and accountability are limited to a single administration (e.g. often at the local level), which affects the functioning of municipal councils, provincial councils and other representative bodies. This issue is also highly relevant to RES development (Boogers, 2020), but comes with inherent risks to compliance to collective decisions made at the regional level in the RES.

In practice, there is not only friction between central and decentralised government but also between regional and local interests. After development of draft RESs at the regional level the municipal councils and boards are asked to adopt it. They are expected to commit themselves to the guiding regional principles and the principle of the assessment framework, taking a regional (and not a local) perspective. However, these will be examined locally, whether this is considered desirable, feasible or whether deviations are required (Jesse *et al.*, 2020).

When reflecting on the approach in which the RES process has been set up, there are basically two differing rationales: either technocratic or socio-political. In defining the RES approach, national government by means of NP RES develops metagovernance that applies a presumably depoliticised, yet managerial and technocratic approach into co-designing of RESs at the regional level. This gives a false impression. Energy transitions should not be considered merely a technological nor political affair. According to the Participation Coalition, it should be seen as primarily a social transition, in which social involvement is a requirement and must be supported by technology and politics (Participatiecoalitie (Natuur en Milieufederaties *et al.*, 2020). The two are inherently depending on each other. And technological and systemic choices will inevitable bear a highly sensitive political

impact, and vice versa. One way in which this manifests is the energy regions setting quantitative ambitions, which inherently depends on making technical choices supported by regional socio-cultural and economic interests. The PBL calculation of draft RES bids showed that energy regions favour solar over wind energy. From a spatial and social-legitimacy perspective this makes a lot of sense. However, preferring solar energy is more expensive in the end. Moreover, the yield from wind turbines on the one hand and solar parks on the other is out of proportion resulting in higher social costs (van Santen, 2020). Although this looks odd from the perspective of deployment of generation capacity as a liberalised activity in energy markets, which is assumed to be simply be carried out by agents according to market forces – this reflects a new practice in the Netherlands in which regional policy preferences in renewable energy generation work through in spatial policy, which inherently prefers local community values (in favour of solar parks) to economic gains by market parties and those only seeking utility or profit maximisation (in favour of wind parks).

4.2. **Lack of transparency in costs and benefits**

There is a contradiction in the current approach to regional energy transition. Whereas the Climate Agreement and the RES approach were conceived centrally, implementation and realisation will take place locally. For the energy regions, this means installing a substantial number of large-sized wind turbines and sacrificing (agricultural) land to construct solar power installations. Arguably, without the pressure from NP RES many of the current energy regions would not have considered formulating RESs.

It may be expected that the RESs provide insight into the costs and benefits and weigh the risks against reaching the intended goals. This could include inevitable burdens for citizens (in terms of costs induced by the installation of in particular wind turbines and to a lesser extent solar parks, like disturbed horizon esthetics, decreased crop yield for farmers due to shadow working, assumed detrimental impact on health, noise, and assumed decrease of property prices) in the energy regions should probably be compensated where possible. However, thus far little has been established on how to do this (Jesse *et al.*, 2020). In addition, according to assessment of some of the draft RESs by the 'Green Audit Office' costs and risks are hardly mentioned in the draft RES documents. For example, in the North-East Brabant region the draft RES did not estimate the costs involved. Neither did it indicate how security of supply of electricity will be guaranteed, what exactly the damage to the landscape is, the impact of the proposed installations on the living environment, nor the conflict between space-intensive energy and private property law. In summary, the draft RES did not give administrators the opportunity to assess, within the framework of the general principles of good governance, whether the task is feasible within a budget acceptable to the region (not assuming the costs market parties have to make for investment in re-

newable energy generating plants, nor DSOs making investments in adjusting regional electricity grids to cope with increased distributed generation) and whether the final situation will be acceptable to its citizens. In addition, the Green Audit Office argues that the tone used in the draft RES is excessively positive; it gives the impression of an advertising brochure (Jesse *et al.*, 2020). In summary, insight and transparency in current costs and benefits at the systems level of RET in energy regions is currently lacking.

4.3. **Lack of governing capacity**

In order to fulfill their role in the energy transition decentralised administrative bodies – in particular municipalities – need sufficient governing capacity (Vringer, de Vries, & Visser, 2021). This is hardly the case among those involved in RES processes. As RES formation is something new to them, energy regions did recently not exist, and knowledge is lacking, public officials are confronted with a great deal of novelties and unknowns. Moreover, this all takes place in difficult times with high demand on municipalities that are subject to budget cuts (in general regarding budgets necessary for local public service delivery; not related to renewable energy generation of some sort), and are suffering from limited capacity (van den Akker, Buitelaar, Diepenmaat, Heeger, & van Vliet, 2019). Currently, small and medium-sized municipalities suffer from a lack of experience in multiple ways, from being understaffed – with the environmental officials working part-time on RES assignments, to lacking knowledge in energy planning, lacking key competences like leadership, strategic orientation and situational awareness, conceptual ability, negotiation skills and flexibility. Extra capacity is needed, but given the tightness of the labor market, it is questionable whether this will be available in time (Participatiecoalitie Natuur en Milieufederaties *et al.*, 2020).

Capacity problems are not limited to public organisations, though (Van den Akker *et al.*, 2019). Social housing associations and REScoops have thus far only played a limited role, and have not released much capacity. And although distributed system operators (DSOs) have some capacity they still expect problems when RESs reach the implementation phase. A survey by the Platform 31 – a knowledge and network organisation addressing trends within cities and regions – identified inadequate workforce as a big problem (Van den Akker *et al.*, 2019). As a consequence to a lack of capacity among decentralised governments the RES tasks are outsourced to project organisations, staffed by civil servants and externally hired workers from consultancy agencies, who have to work with market parties and DSOs to find suitable and profitable locations for solar fields and wind farms (Rengers & Houtekamer, 2020). This might conflict with the ability of public organisations to learn from these experiences themselves, developing know-how among their staff members, and building capacities of their own. In a sense, it keeps them dependent on market parties.

4.4. **Fit with current institutional frameworks**

As RES can be considered a governance novelty, and an issue that covers multiple societal domains, it is insufficiently connected with existing institutional frameworks. A number of problems manifest when RES plans are drafted and are considered against current regulations and policies, with a number of legal and policy barriers occurring. This includes barriers encountered in the following regulatory domains: (i) the heating system legislation missing instruments to support the heat transition; (ii) the Energy Act too much limiting the role of DSOs; (iii) provincial and municipal policy opposing wind energy generation; (iv) nature preservation legislation ex Natura 2000; (v) regulation regarding radar and low flight routes; (vi) landscaping and heritage regulation, i.e. 'the New Dutch waterline' and Unesco areas; the Nature Conservation Act with regard to bats and protected bird species (Energiestrategie, 2019a).

Next to conflict with current regulations, there are many practical problems with the main economic incentive policy to those wanting to plan and operate wind and solar energy projects: i.e. the SDE++ subsidy (in English: Sustainable Energy Incentive Scheme; focusing on the generation of renewable energy and lowering of CO_2 emissions) from the Dutch Ministry of Economic Affairs and Climate Policy (which finances the scheme, not the energy regions themselves). The SDE++ incentive entails a subsidy and works as a Feed-in Tariff. The problem with SDE++ has to do with the fact that renewable energy (and low carbon) projects must be completed within three years (the many projects that take more time to realise are excluded), the subsidy system having flaws while being of little use to small energy consumers and farmers (Ibid.). Needless to say, these issues should be addressed to avoid hindering RES implementation over the next years. Anchoring a RES in a legitimate spatial legal framework is of key importance. Here, good timing of the processes for the legal anchoring of the RESs and coordination between municipalities, provinces and central government are of great importance. Another issue concerns the moment at which the (new) Environmental Act will enter into force (this Act also covers important spatial legal frameworks). This needs careful alignment with RES planning and implementation (Ibid.) although it does not cover energy regions themselves because they are formally not existing.

4.5. **Efficiency and optimisation problems with regional energy systems**

RES formation also encounters a number of problems that play out at the system level. For example, plans are developed that only focus on solar and wind energy generation but fail to address distribution and transmission, and energy system planning in general. A particular issue concerns limited net capacity. For example, this caused serious problems in the case of the RES in the Zealand energy region. The number of solar panels and wind turbines on the Schouwen-Duiveland and Tholen peninsulas had increased so much over recent years that the power grid in

North Zealand could not cope with it anymore. However, new large-scale solar and wind farms were already planned in the RES but would not be able to feed electricity back into the grid any more. According to the DSO's spokesman the power grid is almost at its limit. Solving this problem would require making an extra connection to the national high-voltage grid with construction. This would take seven to ten years approximately (Balkenende, 2020).

Other electricity system problems derive from focusing on optimising RESs within energy regions, while neglecting interconnectedness and interdependency between energy regions. More in general, RES formulation bears the risk of affording poor attention to efficiency and system optimisation (Matthijsen *et al.*, 2021), which is surprising because system integration and optimisation are becoming one of the key objectives in the EU energy and climate policy. «Only making the power system more sustainable does not work, certainly not within the boundaries of the energy regions. The RES process is a very good process, with bottom-up participation, but no thought has yet been given in terms of optimisation and system efficiency», according to a spokesperson of DSO Liander (van Santen, 2020).

Taking a systems perspective, the RES process approach can be criticised in four ways: First, the energy proposals from the energy regions (in the draft RES) largely consist of an «ambition» that has not yet been translated into concrete search areas. Although the ambition is generally high and considered realistic (by those involved from energy communities), it is not explicated where exactly the intended solar fields and wind farms are to be sited. Second, energy regions have paid a lot of attention to solar energy generation and have a preference for small solar parks and low wind turbines. This is because they have clear reservations against large scale wind parks and the negative impact they have locally. The combination of sun and wind is hardly ever made. This also means that many substations and cables will have to be installed, with additional effects on space and the landscape and on the wallets of citizens. Third, although there is sufficient ambition for the generation of sustainable energy, this is lacking for energy saving. Finally, there is hardly any coordination between the different energy regions. Moreover, what is (still) missing in many places is an elaboration of the spatial integration and how nature and landscape are included or weighed in this (Participatiecoalitie, Natuur en Milieufederaties *et al.*, 2020).

4.6. **Fair participation and the role of community energy**

In all energy regions REScoops have participated in the process toward developing a draft RES document. In a number of energy regions, the energy cooperatives have a place at the table, in a broader steering group or in the program council. If there is a regional REScoop branch organisation, then representation takes place organised under that flag, with the latter supporting local REScoops in their interaction with the municipalities and other stakeholders.

Table 1. **RESULTS OF THE GOVERNANCE ASSESSMENT ANALYSIS**

Governance dimension	Current situation with regard to governing RET
(i) Levels and scales	• All relevant tiers of government are involved - i.e. national, provincial, local. • A seemingly coherent metagovernance structure is implemented in the form of NP RES, with guidance of vertical and horizontal coordination and conflict resolution issues, yet in the absence of formal codification. • However, decentralised government bodies interact less coherent and with great variation. This applies to intensity, with national and provincial government and community energy showing fairly high intensity, but with variation among municipalities.
(ii) Actors and networks	• Actor involvement and interaction mostly concerns public sector organisations. • Semi-public actors like DSOs are involved as well, but involvement of business, citizens and community energy varies. • In many regions RES formulation and implementation is a one-sided affair; there is an over-representation of supply-side energy market actors, and under-representation of demand-side actors.
(iii) Problem perceptions and goal objectives	• RES goals and strategies give the impression that perceptions about RES objectives are shared among those actors involved. • Yet, this is misleading, as national government on the one side and regional actors on the other have diverging interests and view problems differently (including NIMBY-ism and a feeling that costs and benefits are not equally shared between central and decentralised actors).
(iv) Strategies and instruments	• In the 2016-2021 period congruence between goals and strategies, and alignment between strategies and instruments, as well as policy coherence have increased. The NP RES metagovernance structure was basically designed to support this. • In the meanwhile essential supportive incentive policies like the renewable energy supporting scheme (from SDE+ to SDE++) have been adjusted to support regional and cooperatively developed project in the near future. • Nonetheless, a lot is still unclear about the overall policy mix on how the State is going to support regional actors. This leads to uncertainty and standstill with regional actors taking a passive, waiting attitude. • Enforcement and accountability have hardly been arranged in a formal sense. Compliance is based on mutual trust developed during intergovernmental deliberation processes.
(v) Responsibilities and resources	• Responsibilities have been assigned among most actors, but those assigned to the energy region lack a formal legal position. With the dispersion of decentralised decision-making power and a lack of political and socio-economic priority in municipalities commitment to goals and compliance to joint regional strategies is not sure. • Moreover, governing capacity at most decentralised and executive bodies is below par. This basically also applies to civic and community energy organisations in participatory processes. • Critical resources appear unevenly distributed in favour of national government, commercial project developers, energy companies and DSOs.

Source: own elaboration.

In the translation into policy visions and frameworks of municipalities and provinces, attention is paid to the conditions for participation of the environment, and in particular, the pursuit of ownership of the local environment. In 2020 national government came up with a proposal for developing a new economic incentive to support collective renewable energy production, which is crucial to the REScoop movement (a new version to the so-called 'zip code rose' scheme (Kooij, Lagendijk, & Oteman, 2018). A renewed subsidy scheme starts in 2021 (with a new, simplified subsidy scheme based on performance / production (in kWh) (Schwencke, 2021).

Although citizens and REScoops participating in RES processes is of great social important value, one should not forget that this sometimes causes problems for REScoops, because they mostly rely on voluntary involvement of citizens. According to a REScoop spokesman, «There are too little (REScoop) volunteers involved in the process who constantly encounter paid employees from the municipality, province, DSOs and others. The enthusiasm to sit at the table unpaid is declining» (Schwencke, 2021) (p.17). However, participating in the RES process seems to have also benefitted REScoops. In the North-Holland province (covering multiple energy regions), «The position of the cooperatives has become much stronger during the RES period. The cooperatives are required to complete 50% local ownership. Municipalities and project developers engage with local REScoops. This is in their benefit as project developers do not receive a legal permit without active involvement of residents (i.e. REScoops). REScoops are having an impact and that is clearly noticeable behind the scenes. Their role is (institutionally) reinforced by the RESs.» (Schwencke, 2021) (p.18).

4.7. **Governance assessment**

Based on the information presented in this section the governance quality of the NP RES metagovernance was assessed using the Governance Assessment framework (Bressers *et al.*, 2016). The results reveal that although governance structures have increasingly developed since 2016 – in large part due to the formation and implementation of NP RES – a number of challenges remain. These include involvement of and compliance by municipalities (where essential decision-making takes place), lack of involvement of civic and business sector actors, a difference in problem perception and socio-technical solutions proposed between central and regional actors, lack of capacity among actors who are key in the implementation stage, and limited, uncertain policy instruments made available to support RES implementation. An overview of the results are presented in Table 1.

5. **CONCLUSION**

The present paper started with the following research questions: What insights can be taken from the governance of regional energy transition in the Netherlands between 2016 and 2021, as a country experimenting with innovation of governance at the regional scale?

First, RET can be considered a very complex issue, in terms of multi-actor involvement and interdependency, institutional fit, and because of its immerse socio-technical nature and inherent socio-political character. Second, to cope with this complexity and the transformational nature of the issue demonstration pilots were organised, taking an 'experimentation and learning' approach, using co-creative settings (somewhat in line with Transition Management (Kempenaar *et al.*, 2020; Loorbach, 2007; Loorbach & Rotmans, 2010). Third, the Dutch case revealed that metagovernance (Jessop, 2016) was applied to structure governance arrangement in a way to manage complexity, create focus, and develop a stepwise time plan that was to be followed by all regional partners in all thirty 'energy regions' in the nation, while using a policy 'blueprint' for RES formulation. Fourth, the case revealed that a number of pressing issues emerged that cannot be left untouched by policymakers if they want to avoid the RET process from derailing. These issues concern: making a trade-off between top-down and bottom-up governance; a lack of transparency in costs and benefits; a lack of governing capacity; fit with institutional frameworks; efficiency and optimisation problems of energy system; and assuring fair participation and the role of community energy.

To assess the overall quality of NP RES a governance assessment analysis was conducted. This showed that involvement and compliance of crucial administrative bodies can be considered a risk to the collective enterprise; that there is a lack of involvement of civic and business sector actors; that there are differences in problem perception and socio-technical solutions proposed between central and regional actors; that there is a lack of capacity among actors who are key in the implementation stage; and that limited, uncertain policy instruments have been made available by central government to support RES implementation.

Energy transitions should not be considered merely a technological nor political affair. According to the Participation Coalition it is primarily a social transition, in which social involvement is a requirement and must be supported by technology and politics. In sum, a lot has been done and has been achieved in the Netherlands (against many odds), but the future is far from sure, because many things have not been arranged formally, key decentralised authorities lack capacity to act, there is uncertainty about the resources made available by central government to incentivize market actors and community energy initiatives, there is civic unrest regarding the installation of large-scale wind parks, solar plants and heating infrastructures in the country. Moreover, these are only a few of the challenges ahead. Next to these issues are more criticisms to the RES approach. For example, there is little to no detail about the wind and solar installation sites, and there is a lack of inter-regional coordination. Several questions arise: Is the RES process realistic?; Is there a stable governance configuration or is it too loosely organised? How is the vertical coordination institutionalised, with sufficient regulations and policies to address emerging issues? And should the RES approach not be seen as merely a disguised approach for central government to gain

more vertical control over decentralised public authorities? And can the RES approach be perceived as a stable governance arrangement to support the RET and the ET of the country as a whole? Can it be expected to work without further institutionalisation? And how is the RES eventually enforced when regional partners do not comply anymore with agreements prior made on contribution to collective action?

The present study has limitations that need mentioning. First, the NP RES is an ongoing public program, and cannot be evaluated from a policy perspective because it has not finalised yet. Second, the present study mostly used secondary data. Third, no quantitative overview nor analysis was given, although overviews are available by now (see the following report by PBL: (Matthijsen *et al.*, 2021). Fourth, the present study focused on the general governance approach taken (i.e. metagovernance) and did focus on analysing a specific energy region in-depth (see for an example: (Hoppe & Miedema, 2020).

Based on the results of the present study, the following recommendations for future research into the governance of RET are given. Attention can be paid to: the role of public values in RET; i.e. inclusiveness, energy justice (energy poverty, energy democracy, distribution of costs and benefits) (Jenkins, McCauley, Heffron, Stephan, & Rehner, 2016); the ways citizen engagement and co-creation are used (Breukers, 2007; Itten, Sherry-Brennan, Hoppe, Sundaram, & Devine-Wright, 2021; Wolsink, 2007); the ways processes are managed (De Bruijn, 2010; van der Steen *et al.*, 2020); the role of social innovation (Hoppe & de Vries, 2019; Wittmayer *et al.*, 2020); the use of participatory and multi-modelling approaches to explore RES impact and scenarios (Cuppen, Nikolic, Kwakkel, & Quist, 2020); transition ateliers and regional transition labs (Kempenaar *et al.*, 2020; Loorbach & Rotmans, 2010); and compliance and enforcement.

Finally, based on the results of the analysis a few suggestions to policymakers can be made. This is not to suggest that energy regions – without any formal legal status – should be conceived and implemented in countries outside the Netherlands. Nonetheless some positive lessons can also be drawn from the RES approach taken. First, it is advised that policymakers consider an approach to energy transition with onshore wind and solar parks that is not only organised at the central level but also at the regional level. It is recommended to actively, pursue public participation of citizens and regional stakeholders in decision-making processes. Once wind or solar parks are constructed solid societal acceptance is a must. Here it is also advised to work with civil society movements and organisations, in particular REScoops seeking partial ownership in wind and solar parks. Second, before running a regional governance approach to energy transitions it is advised to hold regional experiments, and test participatory approaches and incentives to RET. It is important that all relevant stakeholders from the (selected) energy system are involved, and not only supply side actors. Moreover, processes in these experiments are advised to be properly managed by experienced, external process

managers. Building inter-actor trust (also between central and decentralised authorities) is of eminent importance. Third, when considering a RET governance approach covering multiple energy regions in a given country it is important to develop a proper metagovernance structure, which contains the goals and frameworks that have consent from all central and decentral authorities involved. This process necessitates the involvement of experienced professionals and public officials. Lessons can also be taken from domains in which other regional governance arrangements are used. A structure that only merits central government's preferences is not to be appreciated, and will not work locally. Policymakers of decentralised authorities should also avoid that the structure is used by central government to gain more vertical control. The metagovernance structure should also comply with national and EU rules and laws. At the national level it should comply with other key policy domains that are of indispensable nature to energy transitions, like spatial policy. Fourth, the metagovernance structure should also deal with the capacities problem. Where capacities are limited capacity building efforts are required. Fifth, rules about management, (non-)compliance, distribution of effort and calculation method, monitoring, evaluation and enforcement should be made, and shared among those actors involved. A network organisation can be established to communicate and coordinate with RES actors per region.

REFERENCES

AKERBOOM, S. (2018): *Between public participation and energy transition: The case of wind farms.* (PhD), Universiteit van Amsterdam, Amsterdam.

ALIGICA, P.D.; TARKO, V. (2012): Polycentricity: from Polanyi to Ostrom, and beyond. *Governance, 25*(2), 237-262.

ARENTSEN, M.J. (2009): The Netherlands: muddling through in the Dutch delta. In R. Lafferty. W., A. (Ed.), *Promoting Sustainable Electricity in Europe: Challenging the Path Dependence of Dominant Energy Systems* (pp. 45-72). Cheltenham, UK and Northampton, MA, USA: Edward Elgar Publishing.

BALKENENDE, F. (2020, 07-09-2020): Vol stroomnet vertraagt opmars zonne- en windparken op Schouwen-Duiveland en Tholen. *PZC.* Retrieved from https://www.pzc.nl/zeeuws-nieuws/vol-stroomnet-vertraagt-opmars-zonne-en-windparken-op-schouwen-duiveland-en-tholen~a9a82472/?referrer=https%3A%2F%2Fwww.google.com%2F

BEKEBREDE, G.; VAN BUEREN, E.; WENZLER, I. (2018): Towards a Joint Local Energy Transition Process in Urban Districts: The GO2Zero Simulation Game. *Sustainability, 10*(8), 2602.

BEMELMANS-VIDEC, M.-L.; RIST, R.C.; VEDUNG, E.O. (2011): *Carrots, sticks, and sermons: Policy instruments and their evaluation* (Vol. 1). Piscataway, N.J.: Transaction Publishers.

BOMBERG, E.; MCEWEN, N. (2012): Mobilizing community energy. *Energy Policy, 51*, 435-444. doi:DOI 10.1016/j.enpol.2012.08.045

BOOGERS, M. (2020): Energie en democratie: democratische invloed op regionale energiestrategieën en andere complexe besluitvormingsprocessen. *B en M: tijdschrift voor beleid, politiek en maatschappij, 47*(2), 210-215.

BOOGERS, M.; KLOK, P.J.; DENTERS, S.A.; SANDERS, M.; LINNENBANK, M. (2016): *Effecten van regionaal bestuur voor gemeenten: bestuursstructuur, samenwerkingsrelaties, democratische kwaliteit en bestuurlijke effectiviteit*. Retrieved from Enschede: https://research.utwente.nl/en/publications/effecten-van-regionaal-bestuur-voor-gemeenten-bestuursstructuur-s

BOVENS, M.; HART, P.T'; TWIST, M. VAN; BERG, C. VAN DEN; STEEN, M. VAN DER; TUMMERS, L. (2017): *Openbaar Bestuur; Beleid, organisatie en politiek* (Ninth edition ed.). Alphen aan den Rijn: Wolters Kluwer.

BRESSERS, H.; BRESSERS, N.; KUKS, S.; LARRUE, C. (2016): The Governance Assessment Tool and Its Use. In *Governance for Drought Resilience* (pp. 45-65): Springer.

BRESSERS, H.; KLOK, P.J. (1988): Fundamentals for a theory of policy instruments. *International journal of social economics, 15*(3/4), 22-41.

BRESSERS, H.; O'TOOLE JR, L. (1998): The selection of policy instruments: A network-based perspective. *Journal of public policy, 18*(3), 213-239.

BREUKERS, S.; WOLSINK, M. (2007): Wind power implementation in changing institutional landscapes: An international comparison. *Energy Policy, 35*(5), 2737-2750. doi:DOI 10.1016/j.enpol.2006.12.004

BULKELEY H., B.M. (2005): Rethinking Sustainable Cities: Multilevel Governance and the 'Urban' Politics of Climate Change. *Environmental Politics, 14*(1), 42-63.

COENEN, F. (1999): Probing the essence of LA21 as a value-added approach to sustainable development and local democracy; the case of the Netherlands. In W. Lafferty (Ed.), *Implementing LA21 in Europe: new initiatives for sustainable communities*. London: Earthscan.

CUPPEN, E.; NIKOLIC, I.; KWAKKEL, J.; QUIST, J. (2020): Participatory multi-modelling as the creation of a boundary object ecology: the case of future energy infrastructures in the Rotterdam Port Industrial Cluster. *Sustainability Science*, 1-18. doi:https://doi.org/10.1007/s11625-020-00873-z

DE BOER, C.; BRESSERS, H. (2011): *New strategies for implementing locally integrated stream restoration projects.* Paper presented at the Science and Policy Conference: Resilience, Innovation and Sustainability: navigating the Complexities of Global Change, Temple, Arizona.

DE BRUIJN, H.; TEN HEUVELHOF, E. (2010): *Process management: why project management fails in complex decision making processes.* Berlin: Springer Science & Business Media.

DE LEEUW, L.; GROENLEER, M. (2018): The Regional Governance of Energy-Neutral Housing:

Toward a Framework for Analysis. *Sustainability, 10*(10), 3726.

Diran, D.; Hoppe, T.; Ubacht, J.; Slob, A.; Blok, K. (2020): A data ecosystem for data-driven thermal energy transition: Reflection on current practice and suggestions for re-design. *Energies, 13*(2), 444.

Elzinga, D.; Lunsing, J. (2020): *Regionale energiestrategie zonder wettelijke basis; Verplicht-vrijwillige samenwerking met risico's*. Retrieved from Kommerzijl: https://www.deinl.nl/downloads/regionale%20energiestrategie%20zonder%20wettelijke%20basis%20prof.%20Elzinga.pdf

Energiestrategie, N.P.R. (2019a): Foto december 2019. In (pp. 1-28). The Hague.

— (2019b): *Handreiking 1.1 voor regio's ten behoeve van het opstellen van een Regionale Energiestrategie*. The Hague Retrieved from https://www.regionale-energiestrategie.nl/ondersteuning/handreiking/default.aspx

Feiock, R.C. (2007): Rational choice and regional governance. *Journal of urban affairs, 29*(1), 47-63.

Fürst, D. (2004): Regional governance. In A. Benz (Ed.), *Governance—Regieren in komplexen Regelsystemen* (pp. 45-64). Wiesbaden: VS Verlag für Sozialwissenschaften | Springer Fachmedien Wiesbaden GmbH.

Geels, F. (2002): Technological transitions as evolutionary reconfiguration processes: a multi-level perspective and a case-study. *Research Policy, 31*(8), 1257–1274.

Grin, J.; Rotmans, J.; Schot, J. (2010): *Transitions to Sustainable Development: New Directions in the Study of Long Term Transformative Change*. New York: Routledge.

Grübler, A. (1991): Diffusion: long-term patterns and discontinuities. *Technological forecasting and social change, 39*(1-2), 159-180.

Henrich, B.A.; Hoppe, T.; Diran, D.; Lukszo, Z. (2021): The Use of Energy Models in Local Heating Transition Decision Making: Insights from Ten Municipalities in The Netherlands. *Energies, 14*(2), 423.

Holm Olsen, K. (2014): *Sustainable Development Impacts of Nationally Appropriate Mitigation Actions: An integrated approach to assessment of co-benefits based on experience with the Clean Development Mechanism.* . Paper presented at the Forum on Development and Mitigation', Breakwater Lodge, Graduate School of Business, Cape Town.

Hooghe L.; Marks, G. (2001): *Multi-level governance and European integration*. Blue Ridge Summit: Rowman & Littlefield.

Hoppe, R. (2010): *Governance of problems; puzzling, power and participation.* Bristol: Policy Press.

Hoppe, T.; Coenen, F. (2011): Creating an analytical framework for local sustainability performance: a Dutch Case Study. *Local Environment : The International Journal of Justice and Sustainability, 16*(3), 229-250.

Hoppe, T.; De Vries, G. (2019): Social Innovation and the Energy Transition. *Sustainability, 11*(1), 141.

Hoppe, T.; Kooijman-Van Dijk, A.; Arentsen, M. (2011, 19-21 October 2011): *Governance of bioenergy: The case of Overijssel.* Paper presented at the Resilient Societies Conference, IGS, University of Twente, Enschede, Netherlands.

Hoppe, T.; Miedema, M. (2020): A Governance Approach to Regional Energy Transition: Meaning, Conceptualization and Practice. *Sustainability, 12*(3), 915. doi:https://doi.org/10.3390/su12030915

Itten, A.; Sherry-Brennan, F.; Hoppe, T.; Sundaram, A.; Devine-Wright, P. (2021): Co-creation as a social process for unlocking sustainable heating transitions in Europe. *Energy Research and Social Science, 74*, 101956.

Jenkins, K.; Mccauley, D.; Heffron, R.; Stephan, H.; Rehner, R. (2016): Energy justice: a conceptual review. *Energy Research and Social Science, 11*, 174-182.

Jesse, E.; Koekkoek, V.; Udo, F.; Wentzel, C.; Zijlstra, R. (2020): *Noordoost Brabant; Beoordeling regionale energiestrategie; Eerste bevindingen*. Retrieved from The Hague: https://groene-rekenkamer.nl/wp-content/uploads/2020/10/Beoordeling-RES-NOB-versie-1-1.pdf

Jessop, B. (2002): Governance and meta-governance in the face of complexity: On the roles of requisite variety, reflexive observation, and romantic irony in participatory governance. In *Participatory governance in multi-level context* (pp. 33-58): Springer.

— (2016): Territory, politics, governance and multispatial metagovernance. *Territory, politics, governance, 4*(1), 8-32.

Kemp, R. (2011): The Dutch energy transition approach. In R. Bleischwitz, P. J. J. Welfens, & Z. Zhang (Eds.), *International economics of resource efficiency* (pp. 187-213). Dordrecht: Springer.

KEMP, R.; ROTMANS, J.; LOORBACH, D. (2007): Assessing the Dutch Energy Transition Policy: How Does it Deal with Dilemmas of Managing Transitions? *Journal of Environmental Policy & Planning, 9*(3-4), 315–331.

KEMPENAAR, A.; PUERARI, E.; PLEIJTE, M.; VAN BUUREN, M. (2020): Regional design ateliers on 'energy and space': systemic transition arenas in energy transition processes. *European Planning Studies*, 1-17. doi:https://doi.org/10.1080/09654313.2020.1781792

KERN, F.; HOWLETT, M. (2009): Implementing transition management as policy reforms: a case study of the Dutch energy sector. *Policy Sciences, 42*(4), 391-408.

KERN, F.; ROGGE, K.S.; HOWLETT, M. (2019): Policy mixes for sustainability transitions: New approaches and insights through bridging innovation and policy studies. *Research Policy, 48*(10), 103832.

KLIJN, E.-H. (2008): Governance and governance networks in Europe: An assessment of ten years of research on the theme. *J Public management review, 10*(4), 505-525.

KLOK, P.J.; DENTERS, B.; BOOGERS, M.; SANDERS, M. (2018): Intermunicipal Cooperation in the Netherlands: The Costs and the Effectiveness of Polycentric Regional Governance. *Public administration review*. Volume 48, Issue 4, pages 527-536.

KOOIJ, H.-J.; LAGENDIJK, A.; OTEMAN, M. (2018): Who Beats the Dutch Tax Department? Tracing 20 Years of Niche–Regime Interactions on Collective Solar PV Production in The Netherlands. *Sustainability, 10*(8), 2807.

LOORBACH, D. (2007): *Transition Management: New Mode of Governance for Sustainable Development*. Utrecht: International Books.

LOORBACH, D.; ROTMANS, J. (2010): The practice of transition management: Examples and lessons from four distinct cases. *Futures, 42*(3), 237-246.

LUTZ, L.M.; FISCHER, L.-B.; NEWIG, J.; LANG, D.J. (2017): Driving factors for the regional implementation of renewable energy A multiple case study on the German energy transition. *Energy Policy, 105*, 136-147.

MATTES, J.; HUBER, A.; KOEHRSEN, J. (2015): Energy transitions in small-scale regions–What we can learn from a regional innovation systems perspective. *Energy Policy, 78*, 255-264.

MATTHIJSEN, J.; CHRANIOTI, A.; DIGNUM, M.; EERENS, H.; ELZENGA, H.; VAN HOORN, A., UYTERLINDE, M. *et al.* (2021): *Monitor concept-RES; Een analyse van de Regionale Energie Strategieën.* Retrieved from The Hague: https://www.pbl.nl/publicaties/monitor-concept-res

NP RES (2021): De 30 RES Regio. Utrecht. URL: https://www.lcnk.nl/bibliotheek+rieuw/toolbox+voor+regionale++energiestrategie/res-kaart/default.aspx. Accesed at 1 AprIl, 2021.

OSTROM, V. (1999): Polycentricity (part 1). In M. Michael (Ed.), *Polycentricity and local public economies: Reading from the Workshop in Political Theory and Policy Analysis.* (pp. 52-74). Ann Arbor: The University of Michigan Press.

PARKS, R.B.; BAKER, P.C.; KISER, L.; OAKERSON, R.; OSTROM, E.; OSTROM, V., WILSON, R. *et al.* (1981): Consumers as coproducers of public services: Some economic and institutional considerations. *Policy studies journal, 9*(7), 1001-1011.

PARTICIPATIECOALITIE (NATUUR EN MILIEUFEDERATIES, E. S., HIER, BUURKRACHT, LSA); RES, J.; KLIMAATBEWEGING, D.J.; KOEPEL, D.K.E.E. (2020): *Analyse en aanbevelingen concept-RES; Basis ligt er, nog veel huiswerk te doen in de regio's*. Retrieved from Utrecht https://www.hieropgewekt.nl/nieuws/regionale-energiestrategieen-basis-ligt-er-nog-veel-huiswerk-te-doen

PUPPIM DE OLIVEIRA, J.A. (2013): Learning how to align climate, environmental and development objectives in cities: lessons from the implementation of climate co-benefits initiatives in urban Asia. *Journal of Cleaner Production, 58*, 7-14.

RENGERS, M.; HOUTEKAMER, C. (2020, 25-09-2020): Maakt u zich geen zorgen. Maar er komen wel windmolens achter uw huis. *NRC Handelsblad*. Retrieved from https://www.nrc.nl/nieuws/2020/09/25/maakt-u-zich-geen-zorgen-maar-er-komen-wel-windmolens-achter-uw-huis-a4013443

RES, N.P. (Producer) (2020): Nationale opgave en de RES. Retrieved from https://www.regionale-energiestrategie.nl/ondersteuning/handreiking/nationale+opgave+en+de+res/default.aspx

SCHUURS, R.; SCHWENCKE, A.M. (2017): *Slim schakelen; Lessen voor een regionale energietransitie*. Retrieved from The Hague: https://vng.nl/onderwerpenindex/milieu-en-mobiliteit/energie-en-klimaat/publicaties/lessen-voor-een-regionale-energiestrategie-slim-schakelen

SCHWENCKE, A.M. (2021): *Lokale Energie Monitor 2020*. Retrieved from The Hague: https://www.hieropgewekt.nl/lokale-energie-monitor

SER (2018): *Klimaatakkoord*. The Hague.

VAN DEN AKKER, D.; BUITELAAR, S.; DIEPENMAAT, H.; HEEGER, A.; VAN VLIET, W. (2019): *Regionale Energie Strategieën (RES) als motor van de energietransitie Een verkenning naar cruciale competenties voor maatschappelijke innovatie*. Retrieved from The Hague: https://www.platform31.nl/publicaties/regionale-energie-strategieen-res-als-motor-van-de-energietransitie

VAN DER STEEN, M.; OPHOFF, P.; VAN POPERING-VERKERK, J.; KOOPMANS, B. (2020): *Taal voor Transitie; een reflectie op de sturing van het RES-proces*. Retrieved from The Hague: https://regionale-energiestrategie.nl/bibliotheek/bestuurlijke+vernieuwing/1681315.aspx

VAN DER WALLE, E. (2020, 09-02-2020): 'In Zeeland gaat niemand verplicht van het gas af'. *NRC Handelsblad*. Retrieved from https://www.nrc.nl/nieuws/2020/03/09/in-zeeland-gaat-niemand-verplicht-van-het-gas-af-a3993195

VAN ENGELENBURG, B.; MAAS, N. (2018): Regional Energy Transition (RET): how to improve the connection of praxis and theory? *J TECHNE-Journal of Technology for Architecture Environment and behavior, 1*, 62-67.

VAN SANTEN, H. (2020, 14-06-2020): Windmolenparken? Dan veel liever zonnepanelen. *NRC*. Retrieved from https://www.nrc.nl/nieuws/2020/06/14/windmolenparken-dan-veel-liever-zonnepanelen-a4002783

VRINGER, K.; DE VRIES, R.; VISSER, H. (2021): Measuring governing capacity for the energy transition of Dutch municipalities. *Energy Policy, 149*, 112002. doi:https://doi.org/10.1016/j.enpol.2020.112002

WÄCKERLIN, N.; HOPPE, T.; WARNIER, M.; DE JONG, W.M. (2019): Comparing city image and brand identity in polycentric regions using network analysis. *Place Branding and Public Diplomacy, In Press.*, 1-17.

WARBROEK, B.; HOPPE, T. (2017): Modes of governing and policy of local and regional governments supporting local low-carbon energy initiatives; exploring the cases of the Dutch regions of Overijssel and Fryslân. *Sustainability, 9*(1), 75.

WITTMAYER, J.M.; DE GEUS, T.; PEL, B.; AVELINO, F.; HIELSCHER, S.; HOPPE, T.; HARTWIG, A. *et al.* (2020): Beyond instrumentalism: Broadening the understanding of social innovation in socio-technical energy systems. *Energy Research and Social Science, 70*, 101689.

WOLSINK, M. (1996): Dutch wind power policy: Stagnating implementation of renewables. . *Energy Policy, 24*(12), 1079–1088.

— (2007): Planning of renewables schemes: Deliberative and fair decision-making on landscape issues instead of reproachful accusations of non-cooperation. . *Energy Policy, 35*(5), 2692–2704. doi:10.1016/j.enpol.2006.12.002

YIN, R. (2003): *Case Study Research; Design and Methods* (T. edition Ed.). Thousand Oaks, London, New Delhi: Sage Publications.

APPENDIX
ENERGY REGIONS IN THE NETHERLANDS

Source: NP RES (2021): De 30 RES Regio – https://www.regionale-energiestrategie.nl/documenten/handlerdownloadfiles.ashx?idnv=1333848