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THE RESILIENCE CITY / THE FRAGILE CITY.
METHODS, TOOLS AND BEST PRACTICES.

THE RESILIENCE CITY/THE FRAGILE CITY. METHODS, TOOLS AND BEST PRACTICES

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THE RESILIENCE CITY/THE FRAGILE CITY. METHODS, TOOLS AND BEST PRACTICES

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Contents

271 EDITORIAL PREFACE
Rocco Papa

FOCUS

273 Land use conflicts in the energy transition: dutch dilemmas
Mark Koelman, Thomas Hartmann, Tejo Spit

285 A methodology for urban sustainability indicator design
Ricardo Alvira Baeza

LAND USE, MOBILITY AND ENVIRONMENT

305 Limit condition for the intermunicipal emergency
Luana di Lodovico, Donato di Ludovico

323 Cyclability in Lahore, Pakistan. Looking into Potential for Greener Urban Traveling
S. Atif Bilal Aslam, Houshmand E. Masoumi, Muhammad Asim, Izza Anwer Minhas

345 Water footprint indicators for urban planning
Rosanna Varriale

361 REVIEW PAGES

Gennaro Angiello, Gerardo Carpentieri, Rosa Morosini,
Maria Rosa Tremiterra, Andrea Tulisi

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LAND USE CONFLICTS IN THE ENERGY TRANSITION: DUTCH DILEMMAS

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ABSTRACT

The transition from fossil to renewable energy requires changes in land use. The development of renewable energy sources introduces extra and sometimes new externalities, such as shadows, noise, and changes to the landscape. Several governments are experiencing difficulties when developing renewable energy sources, especially when existing land owners (and others) start anticipating externalities. Therefore, land use conflicts have become a major issue for governments in meeting renewable energy policy objectives. This paper explores how three dilemmas—tiers of government, mode of governance, and norm-setting—are approached by public authorities, using policy document reviews, interviews, literature research, and examples of the Dutch energy transition.

KEYWORDS:

Energy Transition; Land Use Change; Externalities; The Netherlands

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能源转型的土地利用冲突 荷兰困境

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摘要

从化石向可再生能源转型需要改变土地利用。可再生能源的发展带来了额外的、有时是新的外部因素，如阴影、噪音和地形变化。一些国家政府在开发可再生能源方面遇到困难，特别是当现有的土地所有者(和其他人)开始预测外部因素时。因此，土地利用冲突已成为各国政府实现可再生能源政策目标的一个重大问题。本文通过政策文件审查、访谈、文献研究和荷兰能源转型的实例，探讨了政府当局如何处理三重困境-政府、治理模式和规范制定-的问题。

关键词:

能源转型; 土地利用变化; 外部因素; 荷兰

1 INTRODUCTION

Energy transitions change how land is used. Renewable energy sources need land to be built on and sources such as wind turbines, solar plants, and biomass produce externalities (Wüstenhagen et al., 2007). These externalities include noise, shadows, air pollution, or changed landscapes. The development of renewable energy sources therefore interferes with existing land use and land use plans. This interference is increasing because renewable energy systems require more land to produce the same amount of energy as fossil fuels do (Boyle, 2004). For example, a traditional gas or coal plant can generate over 400 MW of electric energy a year while a single wind turbine can generate up to 7 MW of electric energy a year while using almost the same amount of land. Consequently, land use for energy transition increasingly interferes with current land use, resulting in land use conflicts.

Public authorities experience difficulties coping with land use conflicts because existing land use plans and land owners anticipate renewable energy source interference with their land use (Deppisch & Dittmer, 2015). There is a tendency to solve these land use conflicts on the local level, however most land use issues are complex and encompass a wide variety of stakeholders (Foley et al., 2005). This level of complexity makes it challenging for local governments to cope with land use conflicts and develop renewable energy sources within their municipality borders. To cope with land use conflicts, local governments could consider changing their land use plans. This is traditionally the work of local authorities. But it is not clear if land use conflicts from energy transition are any different in comparison to traditional land use issues. We argue that land use conflicts from energy transition are more complex, due to three reasons: differentiation, fragmentation, and level of urgency.

- Differentiation of renewable energy sources encompasses a variety of sources such as wind turbines, solar panels, biomass, and so on. Within traditional planning, such differentiation plays a role in what functions can be planned near each other. Just like residential, industrial, and recreation areas, renewable energy sources also impact their surroundings. However, the technical issues (enough wind and sun in the area), safety issues (wind turbines cannot be placed near residential and infrastructural areas), and personal issues (people tend to dislike renewable energy sources nearby) increases the complexity of building renewable energy sources in comparison to more traditional land uses;
- Renewable energy sources are built as single objects, multiple objects, or in large numbers. This variety makes governmental instruments such as land use plans inefficient. The effect that renewable energy sources have on the surroundings depend on the number being built. Consequently, a single wind turbine or a large wind turbine park needs different planning instruments with different time spans. This fragmentation is a major issue for implementing instruments to change land use;
- Governments all over the world have agreed upon the urgency to become fossil free before 2050. The energy transition is therefore one of the most urgent global issues today. Traditional land use planning doesn't have such urgent planning issues with such a large impact on all kinds of land uses. Most land use issues, such as housing shortages, are local or at large regional.

Traditional land use planning deals with all three of the issues as described above. Land use planning is used to change the use of land. However, the scale and urgency of the energy transition is tremendous and therefore more complex in comparison to other land use issues. Another factor linked with differentiation, fragmentation, and urgency is the number of end users that play a role in the energy transition, most of whom are local actors. Renewable energy sources can be built by local, regional, and national governments, or by companies and citizens. Due to the link between different actors and their responsibilities, when building renewable energy sources, current energy policies and coherent traditional planning approaches aren't effective enough (Verbong & Loorbach, 2012). Whenever a citizen, farmer, company, or local government wants to build one or more renewable energy source(s), there are land use plans to be recognized, but also local and regional policies which require environmental and building permits. The current approach towards

development of renewable energy sources limits the number being developed, nearby cities but also in rural areas (Papa et al., 2015; Wolsink, 2007). Therefore, the quest to find solutions for energy transition land use issues is rather interesting. Before the solution can be found, understanding the complexity and underlying difficulties is of high importance.

The complexity of mobilizing land use change is increased by three dilemmas: the tier of government, mode of governance, and norm-setting. These dilemmas exist out of choice issues such as a top-down or bottom-up approach, local (regional) or national decision-making, and short- or long-term solutions. All these options have advantages and disadvantages and are therefore defined as dilemmas. Consequently, it is important to not only govern land use conflicts through changes in land use but also by working through the underlying dilemmas. Change of land for energy transition (considering externalities, assigning land use, and acquiring land for renewable energy developments) are urgent but at the same time difficult to govern, which puts pressure on governmental renewable energy objectives. The central question for this contribution is therefore: how can governments cope with the dilemmas underlying the land use conflicts of renewable energy development? By using Dutch examples, these dilemmas will be further examined. The Dutch energy transition is characterized by complex land use change because every inch of land already has a certain function assigned to it through land use plans. Finally, by exploring the underlying dilemmas of land use conflicts, the complexity of governing land use conflicts will be revealed, and a land use management approach will be discussed as promising.

2 METHODOLOGICAL APPROACH: EXPLORATIVE RESEARCH OF DUTCH GOVERNMENTAL ENERGY POLICIES

The research methods used in this contribution are mainly explorative. As such, multiple case study analyses on energy policy implementation, semi-structured interviews with government officials, and private actors and literature research gather the information for these contributions. In this contribution, the governmental energy policies of different tiers in the Netherlands are a starting point. The Dutch cases are chosen because the Netherlands is a dense country, in the sense that every piece of land has one or even multiple uses attached to it. Due to the land use claims of renewable energy sources, the issues with building renewable energy sources are very clear within the Netherlands. The policy analysis, interviews and literature review are therefore exemplary for other (European) countries experiencing land use conflicts with energy transition.

The cases which are the subject of the governmental policy analysis vary from the national government project 'Wind op land' (3500 MW of wind energy scattered on land over 12 provinces) and municipal projects in regional areas of Noord-Holland and Groningen. The case study analysis allowed examination of the role of spatial planning in general energy policies as well as those specific to the energy transition. Both these research methods show indications of three dilemmas: the tier of government, mode of governance, and norm-setting. These dilemmas underpinned the existing difficulties described by government officials that they face when using land for renewable energy. Based on empirical findings we found that regional policy is both obstructing and supporting local developments in different ways, thus creating a dilemma of tiers of governments. We also came across the mode of governance dilemma where some tiers of governments applied a top-down steering policy while other tiers of government applied a more bottom-up approach, both showing successes and failures. The norm-setting dilemma was found in competing policies of tiers of government and further explored during interviews with government officials. This analysis is complemented by secondary data from other studies and an extensive literature review. Semi-structured interviews were selected as research methods because they are well suited for the exploration of the perceptions and opinions of government officials and private actors and at the same time allow further exploration of sensitive issues (Louise Barriball & While, 1994).

As can be concluded from chosen research methods and material, this study does not pretend to be all-encompassing. However, we think this study provides a new perspective on three dilemmas (tier of government, mode of governance, and norm-setting) and the underlying difficulties of implementing policies for renewable energy development.

3 DILEMMAS OF COPING WITH LAND USE CONFLICTS

Recent events have increased the discussion about the need for a different perspective on governing the energy transition (section 1). Governments all over the world are increasingly acknowledging that the transition to a renewable based, more bottom-up, and decentralized energy system, is a complex one, due to the impact of renewable energy developments on its surroundings (Breukers, 2010; Devine-Wright, 2014; Larsson, 2014). During our literature research, three dilemmas were found underlying land use conflicts rising from renewable energy development. In this section the underlying differences between tiers of government are explored by introducing three dilemmas: the tier of government, the mode of governance, and norm-setting.

3.1 FIRST DILEMMA: TIERS OF GOVERNMENT

To change renewable based energy systems, participation of different tiers of government is needed to “*redesign infrastructure, buildings and equipment*” (Bridge et al., 2013). The traditional way of governing the energy system is top down. National governments are active on the international level for formulating energy objectives and national policies but decide that lower tier governments are responsible for meeting national objectives. The dilemma here is the question of which tier of government should be responsible for renewable energy development? There are two issues that impact this dilemma.

First, more land is needed. Generating the same amount of energy that fossil energy generates with renewable energy sources requires much more land. As described in the introduction, the energy density of renewable sources is lower than fossil energy alternatives (Smil, 2010). Thus, land use conflicts arise from the multiple locations needed for energy generation. This generation takes place through wind turbines, solar parks, and other renewable energy sources. The land needed for such developments has other potential uses or already-existing uses that compete. Through land use plans, local tier governments can cope with competing uses. However, depending on the size of renewable energy projects, local tier governments don't have the means (financial or instrumental) or authority (plans exceeding municipal borders) to cope with the conflicts that arise. Second, with the new responsibility and difficulties faced, lower level governments are increasingly relying on developments led by private parties for meeting energy policy objectives (Upreti & van der Horst, 2004; Westerink et al., 2016). This has led to a certain attitude where local concerns and interests concerning renewables have been brushed aside by private parties (Breukers, 2010; Westerink et al., 2016). In turn, this attitude has increased local opposition towards renewable energy developments (Ellis, 2004; Gross, 2007; Wolsink, 2000). Therefore, local governments are struggling to make suitable land for renewable energy production available, whereas higher tiers of governments are holding tight onto existing approaches, such as coping with local opposition by using traditional instruments such as buying land voluntarily or compulsorily. By using these traditional (top-down) instruments for enabling renewable energy developments, lower governments must change existing land use plans, which can take up to six months or longer depending on the nature of the change (Rijkswaterstaat, 2018). These two examples show two major difficulties found in interactions between different levels of government. While on the one hand, local governments are given the responsibility to meet objectives for local issues, they are not given the right means or support to cope with such complex issues. The performance-based approaches of national government and the more condition-based approach of the regional tier compete both with each other and also with the local approach which addresses concerns of renewable energy developments. As such, the competing approaches between tiers of government results in delayed or cancelled projects.

3.2 SECOND DILEMMA: MODE OF GOVERNMENT

The top-down steering by tiers of governments on implementing energy policy is also present in the next dilemma, the sectoral approach towards the energy transition. The energy transition is still being approached as a top-down sectoral issue instead of as an integral (planning) issue (Verbong & Geels, 2007; Verbong & Loorbach, 2012). Governments and private parties work together in vertical (top-down and bottom-up) and horizontal ways (sharing responsibilities) modes of governance. The governmental policy approach defines the mode of governance in which the development of renewable energy sources take place. Driessen et al. (2012) wrote about how to cope with different modes of governance and discusses that the mode of governance “refers to the means by which society determines and acts on goals related to the management of (...). It includes instruments, rules and processes that lead to decisions and implementation”. The mode of governance dilemma is found in the current sectoral approach and integral alternative approach of how governments and private parties cope with land use conflicts.

Major actors like utility companies, infrastructural companies, and regulators still have a large influence on the management of the current energy system. Therefore, economic, social, and energy issues are being addressed separately, which have a major impact on the effectiveness of executing energy policies. This approach has increased competition between different governmental departments (housing, retail, industry, leisure, etc.) in acquiring land for their own objectives. The current Dutch situation is in some cases closely related to the one Runhaar et al. (2009) studied. Runhaar et al. (2009) argue that the absence of environmental planning in urban and regional developments has led to missed opportunities to improve environmental quality, “because the incorporation of environmental aspects often only occurred in a later stage of the planning process”.

The mode of governance dilemma which different tiers of government are facing is mainly created by the lack of a successful approach for coping with land use conflicts with renewable energy developments. Although new policies are still based on the already-existing centralized mode of governance and our society is still heavily relying on fossil fuels, a successful integral approach has yet to be found (Verbong & Loorbach, 2012). A new mode of governance is needed with a focus on ‘how do we cope with land use conflicts surrounding renewable energy developments’ and settle the differences between a sectoral and integral mode of governance. Such an integral alternative approach could help governments internalize externalities of renewable energy developments, but also other complex issues such as mitigation of climate change effects (Papa et al., 2014). This internalization of externalities gives governments the ability to use other instruments (economic and social focused) and means to cope with the impact of renewable energy developments. A possible issue with applying an integral approach is that it becomes increasingly complex. Creating a solution for a sectoral issue is already complex. Finding a solution which includes several other sectors only makes the issue more complex because of increasing and conflicting interests. This makes choosing the ‘right’ mode of governance a real dilemma.

3.3 THIRD DILEMMA: NORM - SETTING

The norm-setting dilemma is about weighing renewable development objectives against other urgent issues, such as local health department reforms, resettling of refugees, or protection of landscape. Another characteristic is that changing and developing land use or zoning plans are time consuming issues and smaller municipalities deal with a lack of means, without a clear path of how to address the challenges. Therefore, local governments aren’t always capable of integrating renewable energy initiatives in their main land use management policies (Wegener, 2012). Because of the high costs and time needed for developing land use plans, lower governments are more interested in a facilitating role, which can be a risk because private parties are mainly focused on making profits. In certain situations, the change to a facilitating role has led to the interests of local citizens being left out in planning and decision making, igniting local opposition as result

(Breukers, 2010). Due to such land use conflicts, renewable alternatives (especially wind projects) have increasingly been confronted by negativity, which in turn, have led to delays and cancellation of projects (Krohn, & Damborg, 1999; Wolsink, 1996). To influence the role of governments and the market in the energy transition, persistence and continuity of energy policy is needed (Grubler, 2012). In Grubler's (2012) view, long term policies are consistent and therefore attracting investors and companies wanting to finance or develop renewable energy projects. Additionally, approaches to renewable energy development should be free from contradictions by aligning land use and energy policies to promote shared norms between all stakeholders.

Another issue of the norm-setting dilemma is the short time cycle for appointing government officials. The opportunity for officials to be re-elected is therefore an important factor in norm-setting on the local level. For example, Healy and Lenz (2014) argue that voters assign higher weight to the conditions of the election-year economy. Sitting officials can therefore be incentivized to *"...take action to inflate election-year growth even at the cost of larger long-term economic damage"* (Healy & Lenz, 2014). This implies that for government officials in short-term positions, meeting short-term objectives does have a more positive effect for re-election than working on long-term issues, such as local opposition towards renewable energy developments. So next to the urgency challenges, it is possible that the political agenda of government officials also influences the way norm-setting takes place between tiers of government.

4 LAND USE CONFLICTS IN THE NETHERLANDS

The Netherlands are known for its traditional windmills, which were built to use wind power for grinding grain to flour and manage drainage of the so called 'polders'. These windmills aren't used for this work anymore, but they are still a welcome sight in traditional Dutch landscapes. In contrast to these traditional windmills, modern wind turbines aren't seen as welcome sights, especially not near living areas. While in the 70s the Netherlands was one of the pioneers of building these wind turbines and making use of this sustainable energy source, in the 20th century this has completely changed. Dutch governments have experienced difficulties, resulting in a second to last place on generating renewable energy in Europe (Eurostat, 2016). This section will elaborate on why the Dutch government is having these problems by examining and discussing the three dilemmas. The Dutch government has agreed on the need for a transition from the current fossil-based energy system to a renewable based energy system. The challenges and associated coping strategies with making this energy transition happen in the Netherlands are documented in an agreement called the 'Energieakkoord'. This 'Energieakkoord' is an agreement between the Dutch government and forty organisations, including employers and employee organisations, nature and environmental organisations, civil organisations, and financial institutions. The main goal of this agreement is to strengthen the economic structure by making investments in our society with a focus on energy challenges of today and those of the future (S.E.R., 2013). This agreement should have ignited a new incentive for renewable energy projects to be developed. Despite the effort to successfully execute the agreement, in 2014, the Netherlands was still 8,5 percent removed from its national objective to reach 14 percent of renewable energy as part of all energy generated by 2020, which is less than the 16 percent objective (Eurostat, 2016).

Tier of government dilemma

In the Netherlands, all tiers of government can have a renewable energy policy, however regional policies overrule local, and national policies in turn overrule regional policies. Existing policies and laws can also overrule local policies and development plans. The tier of government dilemma becomes visible in the province of Friesland where so-called small wind turbines may only be replaced by wind turbines that are of the same height. Even though municipalities want to build new or replace old wind turbines, the coalition accord of the province of Friesland obstructs such developments due to protection of the landscape (Province of Friesland, 2015). In Groningen, a province next to Friesland, these smaller wind turbines are allowed and encouraged

by the province and are a success with more than 50 being built in 2017 already. Different levels of government have their own energy objectives which compete with other policy objectives. Based on empirical findings from interviews with government officials, choices are made between meeting renewable energy objectives and other policy objectives. For example, the province of Friesland and Groningen both have the same dilemma with developing solar fields. Municipalities in both provinces want to develop such fields as far away from residential areas as possible while provincial policy terms state that, to protect cultural agricultural land, these solar fields need to be built near residential areas. This is also a norm-setting dilemma where choices must be made between different and often competing policy objectives.

The recent 2016 energy report (Ministry of Economic Affairs, 2016), states that a reversal in transport and generation of (fossil fueled) energy can only happen when new developments are integrated in and accepted by its surroundings (Ministry of Economic Affairs, 2016). However, in the Netherlands, the traditional top-down sectoral approach of the national energy policy doesn't seem to cope with land use conflicts of renewable energy developments, resulting in delayed and cancelled projects. The land needed for renewable energy sources isn't always available due to opposition towards these developments (Breukers, 2010) and existing land use plans (Ministry of Economic Affairs, 2016). Besides, as the Amsterdam harbour cases shows, even when there is land available and local support for development plans, higher level governments can still prevent development of renewable energy sources through extra-legal policies.

Mode of governance dilemma

The importance of an integral approach instead of a sectoral approach can be discussed through the ambitious, mainly private paid, project 'Wind op Land' as an example. This project intended to develop 3500 (MW) of wind energy scattered on land, is stalled because the impact on its surroundings weren't included in the cost-benefit analyses (CPB, 2016). The same happened with the IJsselmeer project which has been stalled because of the impact on surrounding land uses (Gemeente Súdwest-Fryslân, 2014). Due to local resistance, the government stopped the project for further research on this subject. For both these projects, problems of externalities and issuing land were enough to postpone the project after a sectoral approach during the first stages of development. The land needed to develop two to twenty-eight thousand wind turbines on land and sea, and more than one-hundred-thousand sun boilers and panels and other renewable energy sources is a lot more than the fossil-based energy system requires (PBL, 2013; Verbong & Loorbach, 2012). The energy transition can no longer be seen as a sectoral technical challenge.

As sustainable energy initiatives are left out of planning policies (section 3.2), their land claims are competing with already-existing interests (Runhaar et al., 2009). This top-down approach steering can be found in the Amsterdam harbour case where the regional government implements top-down policy to prevent local development. However, based on empirical findings of the interviews with government officials, smaller and local private parties are together developing more renewable energy plans and are accomplishing these plans without the major traditional private parties. As one government official said, "large private parties such as NUON, a large energy company in the Netherlands, do not have a large role in the development of wind turbines in our province". This suggests that new smaller parties also successfully invest in wind turbines.

Norm-setting dilemma and tier of government

Based on empirical findings from interviews with Dutch government officials and private actors, the norm-setting dilemma makes relations between different actors more complex, creating conflicts between governmental norms and ambitions. The subsidiarity principle within the Netherlands has left lower level governments responsible for policy that was traditionally a national government subject. Youth healthcare, the housing of refugees, and other policy subjects have increased the workload of municipalities. The responsibility for renewable energy developments is therefore seen as an issue for the long term and less politically important in comparison with other policy subjects. How does this norm-setting impact renewable energy sources developments? Norm-setting is the weighing of the spatial consequences of developing renewable energy sources against other functions and public interests like health, safety, defence, and water management. As

such, difficulties of acquiring and assigning land suitable for renewable energy sources governments are visible in the Dutch energy transition.

This dilemma can be found in the development plans of the municipality of Amsterdam and private led initiatives and several municipalities in the province of Friesland. These initiatives gained high amounts of support in the region, however the provinces of Noord-Holland and Friesland have denied most of the building permits because of different objectives on preservation of landscapes (NOS, 2016). Both the Province of Friesland and Noord-Holland appointed certain areas for wind turbines to be build, to gain control over the sprawling, and at the same time protect certain historical landscape sights, which have social-cultural and economic worth (Wolsink, 2007). However, renewable energy development of nearby cities is needed to supply cities with enough energy (Barresi & Pultrone, 2013).

These examples of policy implementation and renewable energy development in the Netherlands raise questions about why land use conflicts aren't addressed well enough in (national) energy policy. In some cases lower governments do not have the means to effectively cope with these concerns. However, the examples also show that when lower governments do have the right means, higher governments can obstruct local development of renewable energy sources. The other two dilemmas, the sectoral mode of governance and norm-setting, are also found in the Dutch cases.

5 CONCLUSION

To overcome the dilemmas, a different approach is needed. In our analysis we found successes and failures of certain approaches and accompanying policies. In some cases, a certain policy approach can be useful to accomplish a project while in another case it will only obstruct the development of renewable energy sources. Existing literature about the spatial impact of the energy transition lacks the spatial perspective on how governments approach renewable energy developments. Increasing land use claims, created through development of renewable energy sources close to land users and owners, result increasingly in 'hard conflicts' between different land claims. Governments, such as the Netherlands, are failing to cope with these conflicts, putting pressure on meeting renewable energy objectives. The differentiation, fragmentation, and urgency addressed in the introduction shows that traditional land use planning cannot deal with all land use issues. This paper adds knowledge to the existing body of literature about land use conflicts, dilemmas of tier of government, mode of governance, and norm-setting, and identifies future research questions on these subjects.

Based on our empirical findings, we conclude that land use conflicts and the underlying dilemmas make development of renewable energy sources a complex issue. We have discussed the level of government, the mode of governance, and norm-setting. The way these dilemmas are intertwined with and mutually dependent on each other increases the complexity for governments to implement energy policy to meet renewable energy objectives. The interviews with government officials confirmed the existence of these dilemmas and that addressing only one of these will only partly solve the real problem. The dilemmas are substantiating why a gap between (inter)national decision-making and local implementation exists. Local governments aren't always capable of meeting (inter)national objectives and try to transfer their responsibility to the market. The issue is that the government is responsible for energy security and availability, while the market is more focused on the financial aspect of renewable energy developments. This mode of governance doesn't seem to be effective for coping with opposition and is also maintained because of the differences in norm-setting. The norm-setting dilemma asks for a long-term approach. Although governments are sensing the urgency to build renewable energy sources, the energy transition is a long-term challenge. Because of this long-term character, local governments tend to cope with more urgent issues and leave the implementation of renewable energy policy to the market.

Based on our analysis we conclude that differences exist in various tiers of government in the Netherlands and therefore a new way is needed to overcome land use conflicts. There are multiple problem owners that need different instruments to solve their problems. Who are these problem owners and what are their interests in the energy transition? Governments that apply one single instrument to change land use are likely to fail because of the number of actors and the limited ability to include the actors in the direct surroundings of owners that are affected by development plans. The local character of the energy transition asks for a more (but not exclusively) bottom-up integral decentralized approach to cope with or prevent hard conflicts created by new and existing land claims.

A solution to some of these issues can be found in land use management. The role of land use management in governing land use conflicts has been significant, even though it is less applied by solving local issues surrounding the development of renewable energy sources (Breukers, 2010; Verbong & Loorbach, 2012). An integral land use management approach is therefore relevant because of two important aspects. The first aspect is that thousands of wind turbines on land (and sea), solar panels, sun boilers, thermal systems, and so on, have to be built and need a certain amount of often privately-owned land to be developed. Secondly these developments have a major impact on their surroundings. This impact consists of noise, shade, sight-blocking, and so on and affect the lives of citizens and other stakeholders (rights) living nearby renewable energy developments. Both these aspects relate to how land is used. An integral approach concerns the internalization of externalities, and because land use conflicts are mainly about externalities created by certain land uses on other land uses, such an approach is assumed to be promising to introduce solutions for land use conflicts surrounding renewable energy developments. Now that we have added these insights to the existing body of literature, for future research we can ask: how can a land management approach include local interests, overcoming dilemmas, and successfully meet energy transition objectives?

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