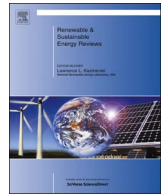




Contents lists available at ScienceDirect

Renewable and Sustainable Energy Reviews

journal homepage: www.elsevier.com/locate/rser

Preparing the ground: Regulatory challenges in siting small-scale wind turbines in urban areas

Na'ama Teschner^{a,*}, Rachele Alterman^b^a The Center for Urban and Regional Studies, The Faculty of Architecture and Town Planning, Technion - Israel Institute for Technology, Haifa 32000, Israel^b The Center for Urban and Regional Studies, The Faculty of Architecture and Town Planning, Technion - IIT, Haifa 32000, Israel

ARTICLE INFO

Keywords:

Wind energy
Small-scale wind turbines
Land-use regulations
Urban planning
Built environment
Comparative analysis

ABSTRACT

Countries worldwide have set national targets for energy production from renewable sources. Yet, while many governments are committed to more renewable energy, obtaining permission to site installations is becoming increasingly difficult. With large tracts of land for renewables becoming intensely contested, countries seeking to meet their renewables targets are directing attention also towards tapping the potential in the urban environment through smaller-scale facilities. These entail other challenges, and countries are seeking ways to overcome them.

The focus of this paper is on one, still evolving, type of renewable energy technology: small-scale wind turbines (SSWT). The paper presents a review of current but limited international academic knowledge on the land-regulation aspects of siting SSWT in countries that already have experience with such installations, including the USA, UK and New Zealand. The paper also reports on a comparative analysis of the land-related regulations and practices in two selected Mediterranean jurisdictions – Spain (Catalonia) and Israel. The approach of this study is exploratory, relying on analysis of legal and policy documents complemented by field work through in-depth interviews with key-stakeholders in both jurisdictions. The overall aim of this study is to examine different approaches of planning systems to new technologies.

The findings show that despite their shared objective factors, the two jurisdictions have adopted almost opposite approach to regulating SSWTs. The findings, therefore, suggest that the incorporation of an unknown technology within the city requires a change of mindset both among the officials and among the city residents. A more effective regulatory framework might therefore entails a combination of strategic thinking, an experimental approach and the capacity to learn from cross-national comparative experiences.

1. Introduction

Countries worldwide have set national targets of energy production from renewable sources, primarily involving hydropower, solar, wind, bioenergy and geothermal power. In January 2014, the EU countries agreed on the target of 27% share of renewable energy consumption by 2030 as part of their policy framework for climate and energy. The much-acclaimed December 2015 Paris Agreement hosted by the United Nations has set new global targets for emission reduction, thus entailing further national commitments for renewable energies.

Yet, while many governments are committed to more renewable energy, the voices against siting of facilities are becoming louder, and with rising impact. Obtaining permission to site installations is becoming more difficult. To date, objections to renewables have been directed to large-scale installations of solar, wind or biomass facilities. These contestations are usually intertwined with the land

and building regulation system of each country and are spatial in essence [1–3].

With large tracts of land for renewables becoming more intensely contested, countries seeking to meet their renewables targets will likely direct increasing attention towards tapping the potential in their built environment by means of smaller-scale facilities. According to studies, decentralized and small scale facilities may therefore have the potential to bypass the lock-in situation and to substitute to some extent for large-scale renewables [37]. The focus of this paper is on one specific type of renewable energy technology: small-scale wind turbines (SSWT), up to 10 kW (see definition in Section 3.1). Such applications are not yet widely installed in built areas but are continuously maturing from a technical perspective. While technological innovations draw much financial investments and academic research (see for example [4] in this journal), the regulatory contexts for the actual siting of these technologies has received much less consideration. Speaking generally,

* Corresponding author.

E-mail addresses: naamate@technion.ac.il (N. Teschner), alterman@technion.ac.il (R. Alterman).<http://dx.doi.org/10.1016/j.rser.2017.05.256>Received 15 August 2016; Received in revised form 9 May 2017; Accepted 29 May 2017
1364-0321/ © 2017 Elsevier Ltd. All rights reserved.

[18] warn that a “non-transparent regulatory framework with respect to planning and building laws” could be a deterrent to the uptake of SSWTs (p.347). [21] make an important point, noting that regulators should beware that the cost of obtaining planning approval for SSWT installations should not be disproportionately high, considering their small production scale.

There are, therefore, two objectives to this paper. First, to present a thorough review of current international academic knowledge on land-regulation aspects of siting SSWT; Second, to report on the findings about the land-related regulations and practices in two selected jurisdictions – Spain (Catalonia) and Israel. The overall aim is to review and analyze similarities and differences in land policy and planning approaches to new, potential, technologies in the built environment and how such approaches might constrain or promote future technological uptake.

1.1. The challenge of designing appropriate land-related regulations

By “land-related regulations” we seek to encompass the various laws, regulations and practices concerning land or buildings. Such regulations can be divided into two major categories: Those related to land-use planning and control of development, and those relating to land ownership or other types of property rights or tenure. Other aspects of regulation, including capacity for grid connection or independence, financial incentives, or taxation, may of course indirectly influence decisions about siting, but they are outside this paper's scope.

Land-use regulation (also called spatial or territorial regulation) is part of public law and thus depends on public institutions and administration. Land-use decisions often entail long and costly procedures, and some reach a “no go” impasse. Wind turbines are a totally new item within the traditional urban-planning horizon. They are more susceptible to opposition based on real or perceived nuisances than well-entrenched land uses with equivalent or higher generation of noise or visibility. There are many regulatory questions that decision makers in each country would have to consider, once this technology would become economically viable. The overarching question facing the land-regulation institutions, is whether the siting of SSWT should be permitted, considering their negative externalities, and if so, should they receive some priority in order to streamline the permitting process. This question will require a more detailed discussion, for example, on whether or not such installations should be exempt from building permits, as for example, are micro-cellular antennas in some countries? Under what procedures should their environmental impacts be assessed? Should neighbors or NGOs be granted the same objection or hearing rights as regular land use decisions, or should these rights be reduced (or maybe increased?) with the rationale that renewables are an essential public objective?

The following review concerns some of these questions. The rest of the paper is divided into five sections. The next section introduces the research method. Section 3 presents a brief introduction to the literature on the “non-technical” aspects of SSWT, depicting the economic challenge of SSWTs and the various barriers to faster uptake. It continues with a review of the rather limited literature on our direct topic - the land-related regulatory aspects. The legal-empirical research about two case-studies is presented in Section 4. The discussion Section (5) weaves together the literature review and the case-studies, and points to preliminary lessons that researchers and decision makers may embrace.

2. Research methods

The motivation for this study is anchored in the assumption that the multifaceted transition facing current energy regimes requires diverse tools and cross-national policy and regulatory learning. There is no “one size fits all” solution for appropriate land-based regulation. The comparative regulatory approach provides an integrative viewpoint on

local contexts, including laws, regulations, policies, land-use planning and implementation. The analysis of each jurisdiction is carried out against the backdrop of its social and institutional contexts of energy policy. Comparison across countries provides scale - absent if one remains within the “silo” of a single jurisdiction or location. A comparative approach may also contribute to local public debates on the topic.

Given the exploratory nature of this study, we focused on only two countries. In selecting our two case studies for the comparative research we looked for jurisdictions with enough in common to enable analysis of the differences in laws and policies.¹ In order to identify and gauge the detailed, sometimes subtle differences in land regulation, a comparative researcher in this field should have prior familiarity with the broader legal and institutional context of the planning and land systems in the selected country. With this in mind, we selected Spain's Autonomous Community of Catalonia and the State of Israel. These jurisdictions share important background factors, yet display divergent implementation capabilities of renewable energy projects. We did not have prior knowledge about the specific regulations that pertain to renewable energy. By adopting an exploratory approach to the comparative analysis, (for relevant examples of comparative studies in planning see [54,55]), it became possible to gain an in-depth factual and critical perspective on each jurisdiction's approach to the land regulatory aspects of SSWTs. These two case studies already opened a previously unknown span of approaches and practices related to the siting of SSWTs.

Our study is, therefore, based on a combination of methods: a review of current knowledge about the legal frameworks concerning land-based regulation of renewables; legal and field research in two national case-studies; and comparative analysis of the findings. We reviewed the relevant literature published in peer-reviewed journal in English, Spanish, Catalan and Hebrew, as well as policy and governmental official documents. The study also reviewed the specialized legal literature in each of the local languages.

The empirical data was gathered through document analysis and semi-structured interviews. Selection of interviewees was based on prior consultations with academics and practitioners in the field, and followed by a “snowballing” approach. The set of fifteen interviewees in total included government officials and planners on the municipal and national levels, renewable energy professionals, and academic in both Catalonia and Israel.

3. Literature review

Back in 2004, a short article in *Nature* raised the question whether city dwellers are ready for wind power [6,7]. More than a decade later, the answer is that there have been technological improvements, but there are still many barriers. This section presents a brief review of SSWT in general. Sections 3.3.1 and 3.3.2 focus on the crux of the literature review - existing knowledge about land-related laws and regulations pertaining specifically to SSWT.

3.1. The mainstreaming of SSWT technology

[8] estimated that in 2012, approximately 900,000 small wind turbines (of less than 100 kW) with an estimated capacity of 850 MW were already in use globally. According to the World Wind Energy Association, China accounts for 41% of the global installed capacity, the USA for 30% and UK for 15% [9]. However, the share of renewables is still tiny. For comparison, another small-scale technology - rooftop photovoltaic systems – currently produces a much larger share of

¹ The Autonomous Community of Catalonia is legally independent, to a large extent, regarding matters of land use planning. Where relevant, we shall refer to Spanish national laws and policies as well.

Download English Version:

<https://daneshyari.com/en/article/8112123>

Download Persian Version:

<https://daneshyari.com/article/8112123>

[Daneshyari.com](https://daneshyari.com)