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Exploring the transition potential of renewable energy communities



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ABSTRACT

Renewable energy communities are grassroots initiatives that invest in ‘clean energy’ in order to meet consumption needs and environmental goals and thereby – often unwittingly – conduce to the spread of renewables. Our aim in the present study is to explore the potential of renewable energy communities in the Netherlands, as social niches, to contribute to transitions in the energy system. To do so, we propose three proxies for measuring the transition potential of social niches, based on proxies for technological innovations derived from the literature. In addition, we reinterpret the notion of niches and the way transition occurs by arguing that niches are complex systems in which both technological and social innovations develop simultaneously and that during a transition entire niches link up with the regime. Furthermore, we make a distinction between internally and externally oriented niches based on their orientation and application focus. We use a comparative case study analysis complemented by a systematic literature and documentary review to show that these communities are already changing the Dutch energy system, by connecting to regime actors. Their further advancement depends on strengthening their links to established actors, but also on providing a favorable regulatory framework.

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1. Introduction

Transitions, that is, large scale transformations of a societal subsystem, offer a specific way to conceptualize futures: as long-term processes which involve radical shifts to novel configurations, and mobilise multiple actors (Verbong & Loorbach, 2012). In transition studies, these processes are typically assumed to have an explicitly normative orientation, focusing on the elusive concept of sustainability: for instance energy transitions have been advocated to address multiple challenges that the energy system faces, such as rapid depletion of resources, air pollution, greenhouse gas emissions, energy poverty and nuclear risks (Markard, Raven, & Truffer, 2012). The literature is less clear about the agents of this energy transition, and the concrete activities that can lead to transitions, even though several methods are advocated, such as strategic niche management (Schot & Geels, 2008) and transition management (Loorbach & Rotmans, 2010), which both build on the multi-level perspective (MLP). However, these transition theories have been criticized for, among other reasons, neglecting agency

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(Geels & Schot, 2007; Hoffman, 2013; Smith, Stirling, & Berkhout, 2005; Vasileiadou & Safarzyńska, 2010) and putting too much emphasis on technological niches (Berkhout, Smith, & Stirling, 2004; Geels, 2005), even though some more recent work has tried to address both challenges (Neuvonen et al., 2014). In addition, grassroots initiatives have been somewhat neglected as potential niches (Seyfang, Hielscher, Hargreaves, Martiskainen, & Smith, 2014) in which both technological and social innovations can develop (Seyfang & Smith, 2007).

In this article we introduce a special type of grassroots initiative, namely renewable energy communities (RECs), which can be drivers of energy transitions. Such communities produce or invest in the production of renewable energy to cover their own energy needs, and they have become quite numerous over the last decade in many western countries^{*}. Exploring the transition potential of such communities enables us to also take a new perspective on sustainability transitions into account, focusing not on the technological aspects, but on social aspects and the agents behind sustainability transitions. As such, we view niche activity as fundamental in bringing about such transitions.

The question we address in this paper is to what extent renewable energy communities, as social niches, have the potential to scale up and contribute to energy transitions. To answer this question, we introduce three proxies for measuring the transition potential of social innovations, based on Geels and Schot's (2007) four proxies for measuring the transition potential of technological innovations, and we examine some of these communities. For our analysis, we use the results of a comparative case study, which focuses on four different cases in the Netherlands. We provide an overview of the state of RECs in the Netherlands, from both demand side and supply side perspectives, examining all the services, as well as legislation and policies in force that are related to them. In addition, through our cases we illustrate the heterogeneity of communities with regard to their locations, size, technologies and motivations.

Thereby we contribute to transition studies, by focusing on elements that are rarely taken into account, namely: demand side factors as well as the role of civil society in transitions. We further elaborate the notion of niches, in order to provide a comprehensive answer on how social innovations evolve and transform the incumbent energy system. Thus, besides studying the state of renewable energy initiatives in the Netherlands from the transitions perspective, we also contribute to a better understanding of sustainability transitions.

2. Theoretical framework

2.1. Multi-level perspective

To study the transition potential of renewable energy communities we use the framework of the multi-level perspective (MLP), which helps us gain a better understanding of socio-technical (ST) transitions, how innovations emerge and how they shift the incumbent regime toward sustainability. The MLP distinguishes between three interdependent system levels through which transition occurs: the landscape, the regime and the niche levels. The three socio-technical levels are forming a nested hierarchy and their co-evolution is necessary for transition. According to the traditional or niche-driven typology of transitions (Quitza, Jensen, Elle, & Hoffmann, 2013), the regime is in favor of incremental changes, which reinforce the dominance of current actors and technologies; therefore only radical changes can induce transition (Elzen & Wiczorek, 2005). When mismatches occur at landscape level or within the regime 'windows of opportunity' arise, where radical innovations (innovations that are fundamentally different from solutions used by the incumbent regime and that consist in a high degree of new knowledge (Dewar & Dutton, 1986)) can break through and enter the meso-level of the ST system.

Accordingly, sometime after new radical technologies have emerged in niches, they can leave these protected spaces, take over from the incumbents and, together with wider changes, form a new regime (Geels, 2004). This process takes place step by step, when changes in one element of the regime (e.g. the emergence of a new technology) induce changes in other elements, thereby reconfiguring the entire system. Consequently, new regimes may grow out of old ones (van den Ende & Kemp, 1999).

2.1.1. Landscape

The macro or landscape level represents external processes and factors that influence the regime, and it is beyond the control of the meso-level's actors. A distinction can be made between slow changes (such as macro-economic or macro-political developments, cultural or demographic changes, climate change) and relatively rapid developments that can create an external shock to the regime (such as wars, oil or economic crises, floods, extreme droughts, etc.) (Geels, 2005). Changes at the landscape level either reinforce the incumbent trajectories or put pressure on the regime. This pressure destabilizes the regime's structure and creates windows of opportunity, where radical innovations can break through (Geels, 2002).

^{*} <http://www.rescoop.eu/rescoop-map>

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