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Challenging obduracy: How local communities transform the energy system

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ABSTRACT

The transformation from the current energy system to a decentralized renewable energy system requires the transformation of communities into energy neutral or even energy producing communities. Increasingly, citizens become 'prosumers' and pool their resources to start a local energy initiative. In this paper we present an in-depth study of networks that recently developed, which challenge the established way of centralized decision-making on energy resources.

Many local communities are eager to promote sustainable energy production, to use local financial resources for the local community and to employ democratic governance of energy production and supply. Furthermore, we study how these co-operations are linked to local, regional and national networks for community energy.

We use both Actor-Network Theory (ANT) and Social Movement Theory (SMT) to investigate the initiatives, as this allows a dynamic analysis of collective strategies.

We discuss the obduracy of the energy system and how this system is challenged by new connections between communities and global networks and by new types of energy providers that are rooted in social networks. Furthermore, we draw attention to the way community energy networks provide a social innovation while realizing a decentralized and decarbonized energy system.

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1. Introduction

The transition to a sustainable energy system entails the mobilisation of local communities and local production of renewable energy. This is a technical challenge, but also, and in particular, requires new social, economic, financial, cultural and political arrangements [1]. Many cities, towns and villages have already put together ambitious visions about how to become 'energy neutral', 'zero-emission' or 'low carbon'. In several European countries, such as the Netherlands, Germany and the UK, we observe a rapidly growing number of local citizens groups that aim to stimulate local energy production capacity on an individual as well as cooperative basis [2,3]. On top of this ambition, many citizens try to organize the governance of energy production on a more democratic basis; they contend that the future energy system should not only be sustainable, but also decentralized and democratically governed. Citizens

want to have democratic control over energy investment decisions, in order to ensure that these investments are made into renewable energy production. According to some observers, this signals a trend contrary to developments in the past few decades, where governance of energy production has gone in the opposite direction, from the hands of local and regional governing bodies to international companies [4]. This combination of developments raises questions about how local initiatives are able to connect vis-à-vis the countervailing forces of established parties and arrangements.

In a European perspective the Netherlands is very much in the rear-guard with only 4% of electricity production coming from renewable sources.¹ Domestic heating is primarily based on the use of natural gas from the Groningen field, in the North of the Netherlands. However, this field is likely to be empty within about two decades and the extraction of gas increasingly leads to

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¹ http://ec.europa.eu/eurostat/statistics-explained/index.php/File:Share_of_renewables_in_gross_final_energy_consumption_2012_and_2020_%28%25%29_YB14.png.

earthquakes in the region, necessitating the quest for alternatives. Hence, especially the Dutch energy system will have to face a substantial transformation.

In this paper we investigate the recent attempts of local Dutch communities to challenge the present energy system and to find new ways of organising and governing energy production. Recent developments in the Netherlands show signs that local initiatives are forming new regional clusters, which could contribute to the scaling up of local attempts and thus to mainstreaming renewable energy. In this process they have to overcome economical, technological, political and physical constraints or 'obdurances', and these are what we want to explore in this paper.

We build on recent claims that local energy cooperatives provide an alternative model for the governance of energy resources [5,6]. We argue that the described new regional networks are an understudied, yet crucial element to organize the production and distribution of energy in a democratic and sustainable way, and as such contribute to the wider process of grassroots innovation, as defined by Hargreaves et al., [5]. Our theoretical contribution is the combination of Social Movement Theory (SMT) and Actor Network Theory (ANT) in the analysis of recent attempts to decentralize and decarbonize the energy system. In this way, we also contribute to the existing literature on local energy initiatives as well as to the critical reflections regarding the conventional energy system.

The remainder of this paper is organized as follows. First, we discuss the studies of local energy initiatives (Section 2). The theoretical Section 3 will introduce the concepts from ANT and SMT and present the theoretical backbone of our approach. In Section 4 we introduce our research design and methodology, and describe our case, especially the background, formation and goals of the newly formed regional energy co-operations. Furthermore, we investigate the linkages of local initiatives to existing regional and national networks, including environmental movement organisations and village support organisations. In Section 5, we analyse the new intermediary energy networks, and their relation to local and global networks. In Section 6 we discuss the findings of our case study and relate them to the literature.

2. Studies of energy communities

Increasingly the varying roles of citizens regarding energy consumption and production have caught the attention of researchers [3,7–12,67]. Basically, these roles range from passive consumers to active creators of new energy systems. Here, we give a short overview of preceding research into this spectrum of roles.

The literature shows that citizens are often framed according to their acceptance of or resistance to renewable energy [3,13,14]. It especially investigates whether citizens are willing to take part in government programmes for energy efficiency, to install new equipment in or on their houses, or to choose renewable energy when their provider offers this option [15]. Stern argues that citizens can influence government policies through acceptance, acquiescence, or resistance of changes in the energy system. Furthermore, he calls for more research into households as energy producers [16]. Resistance to sustainable energy, i.e. in the case of the siting of windmills is another widely studied phenomenon, where concepts such as procedural justice [11,15] and NIMBY are being discussed [17].

Some studies contend that in the current energy system the possible roles of consumer-citizens are extended [2]. Already in 2007, Walker and Cass presented ten roles, where the role of the traditional passive consumer is only one of the options engaged citizens can choose. Active consumers can select their own provider and choose their preferred energy source, such as fossil or renewable. With the installation of PV-panels they become co-producers or

'prosumers' of energy, as well as user-innovators of energy technology [18]. In general, prosumers appear to share a pro-environment attitude [19,20]. The German Energiewende increasingly shows the enormous social changes brought about by a large number of individual and small PV installations, in a relatively short period of time [21]. Furthermore, small biomass installations, heat pumps and solar thermal installations are appropriate technologies for the individual prosumer who wants to become more independent from centralized energy supply. Not surprisingly, the existing power companies are reacting on this development in several ways; in order to influence policies according to their interests, as argued by Kungl [22,23] and Hirschmüller et al., [24]. Kungl's analysis of the actions of four leading energy companies in Germany in the first years of the Energiewende shows that these incumbents engage in activities to limit the effects of the EEC to their own advantage. Hirschmüller et al. show that the 'big four' spend ample resources to lobby for their interests, and conclude that lobbying fosters the status quo. In addition, Geels [25] points to the resistance to change of the incumbent fossil fuel industries.

Another new role for citizens is to set up or become a participant of a community energy initiative. Such bottom-up activities show that citizens have started to take control of the production and distribution of energy. Araujo points to the relevance of researching bottom-up change in the area of (energy) policy and governance, so as to expand on studies after market-based and regulatory approaches [26]. Seyfang, Walker and others have researched community energy for the UK [1–28]. In Germany more than 700 cooperative companies were registered in 2012 [29]. These cooperatives are embedded in communities, and are active traders in renewable electricity. Sagebiel et al., [30], who carried out an online Choice Experiment in Germany, report that transparency, share of renewable energy and (to a lesser extent) democratic control are important aspects for consumers, who on the whole exhibit a considerable Willingness-to-Pay for renewable energy. Since 2010 a wave of energy initiatives has emerged in the Netherlands, following examples in Germany and the UK. In 2014, 500 of such initiatives have been counted in the Netherlands, according to an inventory by the provincial 'Federations for Nature and Environment'.² These initiatives are actively engaged in promoting decentralized sustainable production [7,12,31]. It is the view of Arentsen [7] that, although these initiatives form a 'seedbed of innovations', they are fated to a niche existence. Comparative case studies have been performed by Oteman et. al., and Bauwens et. al, who draw attention to the constraining or enabling influence of institutional arrangements in for the success of community energy initiatives¹⁰ [65] North investigates climate activism in the UK [32], analysing demonstrations as well as grassroots activities to highlight the social conflicts inherent to such forms of activism. What transpires from this literature is the abundance of local initiatives that organize and explore new forms of sustainable energy provision at the local level. A key question in this regard seems to be whether such local initiatives will (and should) be able to scale and contribute to a wider transition towards an energy efficient society.

To support each other, local initiatives increasingly unite in networks on varying geographical scales. For example, in Germany there are several countrywide networks on community energy, such as "100% Nachhaltige Energie Regionen" [21,33]. Regional networks and middle actors in the energy system in the UK are discussed by Parag et al. and Parag & Janda, while Moss reports on the role of intermediaries in Germany [34–36]. Parag et al. [34] investigate how local initiatives support each other in various ways

² www.hieropgewekt.nl.

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