Community energy; it's coming up roses!

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Introduction

Far from being negligible in quantity, decentralized energy production delivers a considerable part of the renewable energy production in the Netherlands. Decentralized production takes place by individual households, companies as well as citizen groups. Grassroots initiatives have sprung up in the Netherlands in the last 5 years, in a recent inventory 313 formally instituted local energy cooperatives were found. Cooperatives' aims are sustainability, strengthening local economy and promoting a democratic governance structure for energy production.
The energy industry in the Netherlands has traditionally been dominated by large energy companies, and the Groningen gas field has resulted in a very high dependency on natural gas for both consumer and business households. The climate for grassroots initiatives has improved since the so-called Energy Covenant in 2013. This covenant pertains to an agreement between government, industry representatives, labor unions and non-governmental organizations to arrive at a substantial reduction of energy use, ambitious increase in the production of renewable energy, and new jobs in the renewable energy sector.
The covenant also announced new policies to stimulate community energy activities, such as the Zip-code-rose policy [1]. The governmental interest in new forms of energy transition, is also demonstrated by the 'Experiments Electricity Law' facility, which gives local business and community initiatives an opportunity to experiment with a local energy system. This policy is meant as a 'learning facility'; experiences are expected to lead to adaptations in Dutch electricity law and regulation.

According to the Dutch Energy-agenda (Ministerie van Economische Zaken, 2016), which covers energy policies for the period until 2050, these policies are primarily motivated by the belief that local energy initiatives stimulate acceptance of renewables by the public. We argue that this position underestimates both the actual role and potential of decentralized production.
Furthermore, we argue that local energy production leads to higher levels of energy innovation, including social innovation. For example, the Zip-code-rose policy leads to many new forms of cooperation of grassroots initiatives with small and medium sized companies, schools, municipalities, housing corporations, and water boards. Moreover, local initiatives

[1] Members of an energy cooperation, living in the same or adjoining zip code as the production installation (mostly solar PV), get an energy tax reduction. The zip codes together resemble a flower; hence the name *zip code rose* (In Dutch: postcoderoos).

are investigating the potential of new technologies, for example for energy storage. This innovative atmosphere contrasts markedly with the inertia in the traditional energy sector, where investments in R&D are traditionally very low and their technology to generate and distribute energy has not changed much since the 1960s.

In this paper, we define community energy as renewable energy produced by citizens or citizens' initiatives. Small and medium-sized local companies increasingly join such cooperatives. Recent years have seen an impressive increase of community energy initiatives. In the Netherlands two earlier waves of wind cooperatives are identified. In the 80s the first pioneers came up, primarily organized by environmental activists, which however remained a small niche phenomenon. In the 90s, a wave of 'Frisian windmill cooperatives' emerged, which capitalized on a combination of community and sustainability goals and were supported by municipalities and provincial government (Oteman, Kooij, & Wiering, 2017). Ten years ago, the first energy initiatives 'new style' emerged, which adopted a new organisation model and deployed a larger variety of activities, such as resale of renewable energy and collective purchase of PV panels. This was the start of the community energy movement, which now includes hundreds of local initiatives, gradually taking on a more stable organisation form. In 2009 there were 40 initiatives, in 2013 Boon found 155 initiatives, while Schwencke counted 360 in 2015 (Boon, 2015; Oteman et al., 2017; Schwencke, 2016). Community energy is an international phenomenon, citizens' energy initiatives can also be found in Germany, UK, Spain, Italy and Denmark.
In our perspective, these grassroots initiatives constitute a social movement that challenges the present governance of the energy sector. Therefore, for our analysis we depart from a social movement perspective on community energy. Social Movement Theory (SMT) allows a dynamic analysis of collective strategies. We employ SMT to study the development of community energy activities, which we interpret as a quest for citizen governance of energy resources. We combine the SMT-perspective with an assessment of the economic potential of decentralized energy production. Using SMT, we discuss three examples of recent Dutch policies aimed at community energy activities: Zip-Code Rose policy, Electricity Netting (Dutch: salderen), and the Experiments Facility.
This paper draws on a combination of statistical information, government reports and documents, and fieldwork. For the economic background, we rely on statistics published by the Dutch Statistical Agency, CBS. Empirically we investigated the experiences of several local cooperatives with the Zip-code-rose policy, using qualitative interviews and focus groups.
We first introduce Social Movements Theory. Secondly, we provide a background to the debate about community energy in the Netherlands and explain the three policies. Next is that we apply the SMT framework to analyze these policies. We end with a brief conclusion.

Social Movements Theory

The energy transition is a normative project; actors express clear goals and opinions about the desired future governance of energy resources. They want a better energy system than the present fossil fuel based one, with all its related ills such as climate change and air pollution. Moreover, they face considerable social conflicts when they struggle to establish their vision of sustainable energy provision in the context of an already existing wider infrastructure with its associated vested interests. With Social Movement Theory (SMT), we are able to include collective action and social conflict over the governance of energy

resources in our analysis. Social Movement Theory sheds light on how such social conflicts play out in the fight for control about dominant patterns of actions in societal domains. Touraine maintained that the study of social action rather than the study of society should be the main subject for sociology; therefore, the concept of social movement should in his view have central importance. This concept acts as a "bridge between the observation of new technologies and the ideas of new forms of political life". Touraine defines a social movement as a special type of social conflict, which presupposes a clear definition of competing actors and of the resources they are fighting for or negotiating to take control of. Furthermore, he refers to conflicts around "the social control of main cultural patterns, (..) through which our relationships with the environment are normatively organized." (Ruggiero & Montagna, 2008) (p. 213)

Regarding network dynamics Melucci emphasises that a social movement is a 'field of social relationships' where a collective identity is structured. In these fields, individuals are linked together, forming 'solidarity networks'. (Ruggiero & Montagna, 2008)(p 224). The community energy movement can be fruitfully analyzed as an emergent social movement and highlights the underlying conflict about normative orientations towards energy provision.

To reveal the complex nature of new social conflicts, Touraine analyzed the actions against nuclear energy, i.e., against "decision makers who have the power to shape national life for a longer period of time in a 'technocratic' way. This action tries to foster a grass-roots democracy." (Ruggiero & Montagna, 2008) p. 217. This resembles recent work on grassroots innovation, where these innovations are conceptualized and analyzed as "bottom-up civil society-led solutions for sustainability" (Seyfang & Longhurst, 2013). Melucci argues that "Conflicts are carried forward by temporary actors who bring to light the crucial dilemmas of a society. These (..) processes generate both new forms of power and new forms of opposition" (Ruggiero & Montagna, 2008) p. 219). Drawing on Touraine and Melucci, we argue that local energy initiatives can be understood as such temporary actors that reveal a fundamental dilemma of our society: the normative organisation of the production and appropriation of energy resources. SMT positions conflicts about such a normative organisation as the kernel for a wider transition towards new normative and cultural patterns. That is, we contend that local energy initiatives, and their activities, represent a social conflict about the production and appropriation of energy resources, with the potential to eventually foster new forms of organisation and governance of sustainable energy production. Ultimately, this conflict represents a struggle about how modern societies should provide energy in a sustainable way.

Following main SMT theorists like Touraine and Melucci, we argue that local energy initiatives are social movements. They actively aim to replace the current system of energy governance, demonstrated by their attempts to play a role in the Energy Covenant and their insistence that energy cooperatives need more instruments to play a meaningful role on the local level. These national lobbying activities resulted in the instruments discussed in this paper. We will use SMT to explain how local actors use opportunities provided by these policies to reorganize their local energy system.

Moreover, we propose to use SMT to better understand the dynamics of the community energy movement as a socio-technical movement, thus extending earlier notions of social movements to include technological aspects.

Community Energy in the Netherlands

The rise of community energy initiatives is grounded both in political changes and individual motives of participants (Van Der Schoor & Scholtens, 2015). The liberalization of the energy sector allowed consumers to choose their energy provider, instead of being chained to the provider in their region. Furthermore, in the Netherlands many consumers chose to buy green electricity. The new energy cooperatives have ambitious energy goals and aim to stimulate the production of renewable energy. However, the fossil energy sector proved to be extremely reluctant to change their business model to include more sustainable energy. The Netherlands is therefore one of the worst countries in Europe regarding renewable energy production. Moreover, they allow no influence of consumers on the organisation, place and technological choices of energy production.

The community energy initiatives strongly adhere to a democratic, cooperative organisation model, to give their customers the opportunity to influence place and type of energy production. Moreover, there is a strong element of localism, cooperatives aim to stimulate local economic development and employment, they involve locally based firms and reinvest profits in local sustainable projects. Obviously, to attract enough customers it is important to develop a profitable business case. Citizens who are less ideologically driven primarily see community energy as a sensible investment. New cooperatives increasingly become the owners of large(r) scale assets, such as windmills, solar PV parks, or biomass installations, because the new business model provides them with more financial means than before. However, both character and strength of community energy depend highly on national energy policies, argues Oteman (Oteman et al., 2017; Oteman, Wiering, & Helderman, 2014). In the Netherlands, the Energy Agenda (2016) appreciates local energy initiatives primarily because they stimulate climate consciousness and acceptance of renewables by the public. We argue that the potential contribution is much more far-reaching than psychological factors, it can deliver a large part of energy production for domestic use and utilities, comprising 40% of Dutch energy consumption (CBS, 2015). However, this is often ignored or contested.

The Advisory Board for Science, Technology and Innovation completely ignores the phenomenon in their advice to the Dutch government regarding energy innovation (AWTI, 2016). They seem to have missed this development altogether. Arentsen & Bellekom, although they highlight the innovativeness of community energy, also maintain that it will never grow out of a niche existence (Arentsen & Bellekom, 2014). More assertively, Mulder contests the usefulness of local energy production, indeed, he argues that it is counterproductive, because it makes the energy transition more complex and therefore more expensive (Mulder, 2017).

Instead, our view is that local community energy by citizens is an economic activity, and that cooperatives are economic actors that are influenced by policies, economic opportunities and market developments (Werner & Scholtens, 2017). It is not realistic to expect citizens' cooperatives to provide 100% of the electricity production, however they can provide for the domestic and small utilities market to a large extent. This potential will increase with new technologies, such as smart grids, electric vehicles etcetera. The claim that small producers should be exclude because they threaten the business model of the incumbents is both immoral and unrealistic. Since the liberalization of the energy market in the Netherlands, in 2004, the number of energy providers has grown fivefold. There is no reason to come to the aid of fossil fuel incumbents, who stand out by their inertia.

The skepticism regarding decentralized energy underestimates the role community energy as well as other decentralized energy sources have both potentially and in practice. CBS reports for 2014 show that the main part of solar power in the Netherlands is generated by households, (549 mln kWh on a total of 785 kWh). In Germany, locally produced energy amounts to more than half the total produced renewable energy (Werner & Scholtens, 2017). Since 2010, local energy production has grown steeply, in tandem with the ambitions and professionalization of community energy cooperatives (Schwencke, 2016). The largest cooperative solar projects boast an impressive number of PV-panels, 6.900 (Breda); 7.777 (Groningen); 23.000 (Ameland) and 27.000 (Garyp).
At the same time, new instruments for balancing decentralized grids promise to allay worries about the stability of networks (Bao, Bao Nguyen, A Scherpen, Member, & Bliek, 2017). Renewable energy in general is a highly innovative economic sector (Arentsen & Bellekom, 2014).
This is not restricted to technological innovations, but extends to new roles for the former passive end-users. Cooperatives could for example become active as aggregator, a new function in the electricity market to aggregate flexibility and bring this to the market at the appropriate moment. Neighbourhood batteries can help to bridge day-night or seasonal gaps in renewable production.
It is important to acknowledge that decentralised energy production is not restricted to community energy. Combined heat and power (CHP) or cogeneration has been an important source of heat for several decades. However, this is outside the scope of this article.

New policy instruments for citizen energy production

Zip code rose

In the Energy Covenant (2013) a new policy was introduced, meant to support local energy cooperatives. This Reduced Tariff policy, better known as Zip-Code Rose Policy (further: ZCR-policy), exempts citizens from paying energy tax on cooperatively produced renewable electricity. This policy permits citizen cooperatives to produce electricity on a roof nearby or with a cooperative windmill, allowing renters, owners of listed buildings or apartments to produce their own energy. Associations of house-owners (VVE) can organize a ZCR-project for their members. A ZCR-cooperative can also accommodate small enterprises, up to 20%. Furthermore, local companies can make their roof available to such a cooperative. The name of the policy is derived from the local region that is permitted to take part in a ZCR-cooperative. The zip-code where the project is located is the heart; the neighbouring zip-codes form the petals, together the region resembles a rose. The target group for local production of sustainable energy thus is considerably enlarged with this policy.
However, the development of a successful ZCR-project is a demanding task that takes a heavy toll on the organisation capacities and specialized knowledge of local cooperatives. Furthermore, a considerable amount of voluntary work is required. The development of ZCR-projects encounters problems comparable with other small businesses or NGOs, such as organizational tensions, dependence on a small number of lead-persons, fast turnover of employees/ volunteers, lack of acceptance in the direct environment. Furthermore, specific frictions with the implementation have emerged. For example, tax inspectors in different areas seemingly come to different decisions on projects put to them. Secondly, not all energy companies are willing to execute the tax exemptions for their customers, obliging clients to choose another energy provider (Energeia, 2017).

Lastly, we mention that financial institutions are often found hesitant to give consent to building-owners who want to offer their roof as a location for a ZCR-project. Such consent is necessary if the owner has a mortgage.) Mid 2017 there are 76 cooperatives holding all necessary permits for a ZCR-project, many more ZCR-projects are in preparation (Financien, 2017).
Perhaps not surprisingly, large bureaucracies such as the tax authorities, fossil energy companies and banks, are rather slow in adapting to the new energy production model.

Electricity Netting

The influence of national energy policies on local energy production is also apparent in the Feed In Tariff (FIT) policy. Especially consumers enjoy a much shorter payback period thanks to this 'netting policy', which allows consumers to offset their production and consumption of electricity. According to recent evaluation studies, FIT has stimulated the growth of solar panels and is widely supported by citizens. The present FIT-policy is extended to 2020 (PWC, 2016). The new government has now announced that the Electricity netting policy will be replaced by a 'Feed In Subsidy'. Apparently, the prime minister frames the current netting policy as 'a very heavy subsidy'. The reputation of The Netherlands regarding subsidy is rather dreadful, so this move does not bode well.
Of course, we recognize that it is relevant to scrutinize fiscal facilities for energy production, but this should be seen in the light of the climate problems that have to be solved and the billions that are spent on subsidies for fossil energy (Coady, Parry, Sears, & Shang, 2015).
In the Netherlands, subsidies for solar panels have been terminated in 2012, but EU-regulations stipulate that direct taxes (VAT) should be reimbursed to buyers of solar panels, because they are considered energy producers – and thus count as companies. VAT-reimbursement turns out to be a much more stable and trustworthy source of remuneration when compared to the often short-lived subsidy policies in the Netherlands.

Experiments Facility

The energy transition will lead to changes, that are at present unknown and largely unpredictable. There appears to be governmental interest in new forms of energy transition, as is demonstrated by the 'Experiments Electricity Law' facility, which gives local initiatives the opportunity to experiment with a local energy system. This policy is meant as a 'learning facility'; experiences are expected to lead to adaptations to Electricity law. The facility recognizes two types of projects: large experiments (up to 10.000 customers) and 'project-nets', up to 500 customers sharing one connection. The goals of this facility are to investigate if experiments succeed in ramping up the production of local and CHP electricity and lead to a more efficient use of the existing infrastructure. Furthermore, the experiments should engender more involvement of users with the provision of energy.
One of the local cooperatives that are experimenting can be found in Heeten, where Endona develops a large experiment delivering renewable energy in the whole region. In this project Endona envisages a solar park of 7.200 panels, supplemented by individual panels, a biomass installation and an energy storage facility.
Other projects are much smaller, for example covering the energy needs of an apartment building that is recently refurbished to a net-zero energy condition. Collegepark Zwijsen is an example of this category, the installations for electricity production and distribution are included in the price of the 115 apartments. The owners' cooperative can also buy and sell electricity.

Discussion

In this section, we analyze Electricity Netting, the ZCR-policy and the Experiments Facility from the perspective of the community energy movement. Here, we rely on SMT to identify the meanings and dynamics of energy policies and social action. We treat the policies in order of complexity.

We start by acknowledging that the fact that these policies even exist is proof of the stamina and effectiveness of the community energy movement, that continuously has lobbied the Dutch government to come forward with more stimulating policies to involve citizens in renewable energy production.

Electricity netting is in fact an individual relation of the prosumer with the energy provider (and the state, who signs for the FIT-regime). It is a very successful policy, giving many citizens the means to contribute to the energy transition.

The ZCR-policy already has seen a series of changes in its short lifetime, primarily to improve the business case of ZCR-projects. This is important for community cooperatives, because in its first form, ZCR-projects were not economically feasible. It is a very complicated endeavor to design and execute a successful project.

ZCR-projects generates considerable sympathy from governance agencies, such as provincial governments. For example, in the Province of Groningen, a special subsidy is available to help projects with their preparations, to pay for the costs of setting up a formal cooperation, etc. elaborate. Several regional organizations, such as the regional energy umbrellas and environmental organizations, assist new ZCR-starters with advice (Van Der Schoor, Van Lente, Scholtens, & Peine, 2016).

ZCR-projects form laboratories for energy learning, as the cooperative often is also a discussion and learning platform. On a small scale, citizens get the chance to govern their own energy project. On a regional level, many knowledge exchange activities are organized by formal or informal organizations ((Van Der Schoor, Van Lente, Scholtens, & Peine, 2016).

The Experiments Facility is the least well-known of the three policies discussed in this paper. It has a very limited remit, with a maximum of ten permits that can be issued each year. In the first two years, only nine projects have gained permission. Furthermore, the Experiments Facility is also the most complex policy of the three, in effect it is only attainable for the ‘premier league’ of energy cooperatives.

This policy gives the opportunity to take the role of community energy one step further, that is to provide locally produced energy to local customers. It creates a wholly new playing field, breaking up the monopoly of the grid operator or TSO. Although the reactions or TSOs have been mixed, some are very cooperative.

Conclusions

In the Netherlands, international energy providers dominate a system of centralized electricity production and distribution. Electricity prices and tax tariffs are regressive; small users pay much more per kWh than large-scale users. The new policies and opportunities we discussed in this paper are only the first step on the road to a transformation of the energy system. New policies and changes in the energy law hopefully will develop after the planned evaluation of these policies. We argue that community energy production and distribution can grow further, and could eventually provide in the energy needs of households, small businesses, services, and agriculture, together representing more than 40% of national energy consumption.

Our study shows that the community energy movement challenges the present logic of governance of energy resources, providing a grassroots innovation of the energy system. ZCR-projects, Electricity Law Experiments, they constitute 'laboratories of learning'. Not only for the community energy cooperatives themselves, but also for civil servants and politicians working on or interested in the energy transition. However, for local energy initiatives, the successful development of ZCR-projects takes a heavy toll on voluntary labor, knowledge and organisation capacities. With the ZCR-policy and the 'Experiments' facility, the community energy movement has gained a foothold in the energy sector. However, in order to take full advantage of the new opportunities, the community energy movement needs to invest heavily in acquiring specialized knowledge, especially in energy technology, ICT, and energy markets. This also means that professionalization of the movement is necessary, while maintaining values of sustainability, localism and democracy.
Furthermore, vested interests often succeed in hindering such new players. Recent developments in Germany show that this can lead to a considerable set-back. Therefore, appropriate political activities on the national level are essential, to continually inform politicians and ministries of the needs of local energy cooperatives.

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