



# Explaining the diversity of motivations behind community renewable energy



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## HIGHLIGHTS

- Community-based energy projects are important actors in the low-carbon transition.
- The diversity of motivations and level of engagement among members is analysed.
- Several segments of members with different characteristics are distinguished.
- Institutional, spatial and innovation diffusion dimensions explain this diversity.
- This heterogeneity among investors should be taken into account in policy-making.

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## ABSTRACT

Community-based renewable energy initiatives may be important actors in the transition toward low-carbon energy systems. In turn, stimulating investments in renewable energy production at the community level requires a better understanding of investors' motives. This paper aims to study the heterogeneity of motivations that drive individuals to participate in community renewable energy projects and the underlying explanatory factors behind this, as well as the implications for their level of engagement in initiatives. Based on quantitative data from an original survey conducted with two renewable energy cooperatives in Flanders, the statistical analysis shows that cooperative members should not be considered as one homogeneous group. Several categories of members with different motives and levels of engagement can be distinguished. This heterogeneity is explained by contrasts in terms of institutional settings, spatial patterns and attitudes to the diffusion of institutional innovations. Regarding policy implications, the findings suggest that this heterogeneity should be taken into account in designing more effective supporting policies to stimulate investments at the community level. The activation of social norms is also shown to be a promising mechanism for triggering investment decisions, although the implications of its interplay with economic incentives should be further explored.

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## 1. Introduction

The limits faced by energy systems with respect to the depletion of fossil fuels and climate change are today widely recognised and make a transition from fossil resources to a low-carbon society necessary. Aside from other measures such as efficiency improvements, this transition will most likely require the displacement of fossil fuels by various renewable energy (RE) sources (Smil, 2010), all the more since several countries have announced decisions to abandon nuclear power following the 2011 Fukushima Daiichi disaster in Japan (Schneider et al., 2011).

The challenges ahead are enormous. The Intergovernmental Panel on Climate Change estimates that the global cumulative RE

investments needed to achieve atmospheric greenhouse gas concentration stabilisation will range from 2850 to 12,280 billion USD (valued in 2005 prices) for the period 2011–2030<sup>1</sup> (IPCC, 2011). Governments alone are unable to achieve investments of this magnitude (Wüstenhagen and Menichetti, 2012). The support of other RE investors and producers is necessary, including business organisations, households and civil society actors, and therefore a better understanding of these are needed. In this perspective, community renewable energy (CRE) initiatives seem promising. The concept of 'community energy' describes formal or informal citizen-led initiatives which propose collaborative solutions on a

<sup>1</sup> The lower values refer to the International Energy Agency's World Energy Outlook 2009 Reference Scenario and the higher values to a scenario that seeks to stabilise atmospheric CO<sub>2</sub> concentrations at 450 ppm.

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local basis to facilitate the development of sustainable energy technologies and practices (Bauwens et al., 2016; Seyfang et al., 2013; Walker and Devine-Wright, 2008). Gaining a better insight on the motivations of RE investors at the community level can help decision makers design more effective supporting policies to address these communities.

Recent research has explored the factors that influence participation in CRE projects (Bamberg et al., 2015; Dóci and Vasileiadou, 2015; Kalkbrenner and Roosen, 2016), but without significant or systematic investigation of the reasons why different types of members may have distinct motivations to join these initiatives. The analysis of actual members' level of engagement has also been neglected in previous studies.

In response to these research gaps, the objective of this paper is to empirically investigate the potential heterogeneity among members of CRE initiatives in terms of their motivations, and the underlying explanatory factors behind this. Further, it analyses the influence of this heterogeneity on members' level of engagement in projects. Following recent research on the heterogeneity of RE investors (Bergek et al., 2013; Mignon and Bergek, 2016), this paper specifically looks at institutional and innovation diffusion dimensions to explain why investors may have heterogeneous motives at the community level. It also examines the roles of spatial patterns as an additional explanatory factor. The influences of these factors have never been studied jointly.

Drawing upon the comparative analysis of two RE cooperatives, BeauVent and Ecopower, located in Flanders, the paper uses data from an original survey conducted among the members of these two organisations. Correlation analyses and statistical tests are performed to study cooperative members' motivations and level of engagement. Despite common features, the two cooperatives studied differ in a crucial way: in addition to producing RE, Ecopower also supplies electricity, while BeauVent is a production cooperative only and does not undertake any supply activities. Due to these different positions in the energy value chain, the two organisations present distinct institutional characteristics which, in turn, shape different incentive structures for potential and existing cooperative members. As a result, the analysis reveals clear differences among cooperative members in terms of motivations, both within and across organisations. This heterogeneity is also reflected in their level of engagement. In addition to institutional aspects, the spatial localisation of the groups of members and their attitudes to the diffusion of institutional innovations (Rogers, 1995) are shown to reinforce the differences among them.

By providing a fine-grained analysis of the factors that influence the heterogeneity of participants in CRE initiatives, the results can inform policy-makers and CRE managers for the development of effective strategies to encourage active participation and financial investments at the community level.

The article is structured as follows. Section 2 provides the theoretical framework on which the empirical work is grounded. Section 3 presents the methodology used and Section 4 analyses the collected data. Then, Section 5 discusses the findings, while Section 6 concludes and suggests some implications for policy-makers and for future research.

## 2. Theoretical framework

### 2.1. The roles of community-based initiatives in speeding up the diffusion of RE technologies

CRE initiatives are typically characterised by a high degree of community involvement in the ownership, management and benefits of projects (Walker and Devine-Wright, 2008). RE cooperatives, as a specific form of CRE schemes, enable citizens to collectively own

and manage RE projects at the local level. Through this model, citizens produce, invest in and, in some cases, consume RE. The following cooperative principles, adopted by the International Co-operative Alliance (ICA, 1995), are common to all types of cooperatives around the world: a voluntary and open membership, democratic member control (e.g. a 'one person-one vote' rule), economic participation by members, autonomy and independence, education, training and information, cooperation among cooperatives, and concern for the community. In addition, only a limited remuneration of the capital subscribed is permitted in cooperatives, which suggests that profit maximisation is not the main objective.

CRE initiatives in general and RE cooperatives in particular are increasingly perceived as potential key actors in the transition toward low-carbon energy systems (e.g. Boon and Dieperink, 2014; Yalçın-Riollet et al., 2014). Indeed, it has been argued that the participation of citizens in benefits and decision-making processes of RE projects may increase levels of societal acceptability of renewables, especially in the case of onshore (Bauwens, 2015; Maruyama et al., 2007) and offshore wind farms (Walker et al., 2014). Comparative research has shown that a high degree of citizen involvement in wind energy projects is positively correlated with high deployment rates (Bauwens et al., 2016; Toke et al., 2008). In the same perspective, while Mumford and Gray (2010) show evidence of a lack of trust from the public in conventional energy actors as far as the deployment of alternative energy in the UK is concerned, the implementation of decentralised RE installations need to be steered by trustworthy individuals and organisations rooted in local communities (Eyre, 2013; Walker et al., 2010).

Community participation in RE deployment is also an important condition for success in financing the transformation of energy systems. CRE initiatives have substantially contributed to RE deployment in several countries. In Denmark, over 150,000 households contributed to wind power financing as members of wind power cooperatives in 2002, and more than 80% of the installed wind turbines were owned by wind power cooperatives and single owners (Bauwens et al., 2016). Similarly, 47% of the total installed RE capacity in Germany in 2012 was owned by individuals, farmers or CRE initiatives (trend:research Gmb and Leuphana Universität; Yildiz, 2014).

### 2.2. Motivations to join and engage with CRE initiatives

Two types of decisions are considered in this section: on the one hand, members' decisions to join CRE initiatives in the first place, and, on the other hand, their level of engagement. Engagement is defined in terms of the volume of financial investment made and the degree of participation in the governance of organisations. It is argued hereafter that both types of decision are influenced by two broad categories of motivation: 'self-regarding' motives and social or moral norms.

Research into households' investments in RE production from a standard economic perspective commonly shares the assumption that individuals are purely 'self-regarding', i.e. they only care about their own material payoff. It follows that households will invest in RE microgeneration systems if the expected return of the investment, in the form of avoided electricity imports and therefore reduced electricity bills, balances or exceeds its upfront capital cost (Bergman and Eyre, 2011; Sauter and Watson, 2007).

Socio-psychological research and behavioural approaches in economics have contested this simplistic vision of individuals. In general, people are not purely self-regarding, but also follow social or moral norms<sup>2</sup> of behaviour backed up by emotions such as

<sup>2</sup> It is difficult to draw the line between socially- and morally-driven behaviours, both empirically and conceptually, because norms are never completely

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