Analysis

Exploring the links between community-based governance and sustainable energy use: Quantitative evidence from Flanders

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A B S T R A C T

Community-based energy organizations have been said to influence their members' energy-related behavior by activating social norms and by providing trustworthy information about sustainable energy investments and behaviors. However, little is known yet about members' actual energy use and how it differs from that of individuals who do not participate in such projects. In particular, selection effects are likely to arise, i.e. community-based energy projects may attract people that are different from the underlying population in terms of energy use. This article empirically addresses the question of the selection into community-based energy projects in terms of energy use, focusing on the case of renewable energy cooperatives. Based on quantitative data from an original survey conducted with one renewable energy cooperative in Flanders and using probit regression analyses, it contrasts a sample of cooperative members with an appropriate comparison group in terms of electricity usage. The results show that electricity consumption is positively related with cooperative membership, suggesting that high use consumers have greater incentives to join a community-based organization which provides assistance and advice on the adoption of green technologies and energy efficiency measures. These findings contribute to an understanding of the relationship between community-based governance and sustainable energy practices.

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1. Introduction

Climate change associated with the emission of greenhouse gases (GHGs) is among the most crucial challenges of the twenty-first century. Averting massive climate change is a global public good, because everyone benefits from reduced GHG emissions even if they do not contribute any effort themselves, and therefore requires collective action (Sandler, 2004). To tackle this issue, many analysts call for an institutional solution at the global level, because global threats such as climate change are believed to require 'global solutions' negotiated internationally (Nordhaus, 1994; Stavins, 1997; Stern, 2007; Wiener, 2007). However, a binding and enforced agreement including all principal emitters and targeting an ambitious decrease in global GHG emissions will take long to develop (Ostrom, 2010), despite promising commitments at the 21st Conference of the Parties held in Paris in Dec. 2015. Most governments' reluctance to engage in coordinated international policies bears out the conventional theory of collective action according to which rational agents pursuing their own interest will not participate in collective efforts because they have incentives to free-ride on the constructive behavior of others (Hardin, 1968; Olson, 1965).

More recently, various authors, spearheaded by Nobel Prize co-winner Elinor Ostrom, have challenged this 'zero contribution thesis' (Ostrom, 2000). They show that, under certain conditions, agents involved in a collective-action problem have self-organizational capabilities and are able to implement institutional arrangements in order to solve it in the absence of external interventions (Ostrom, 1990). In particular, collective-action problems faced by large groups, such as climate change mitigation, are often decomposable into dilemmas at a smaller scale, some of which are typically surmountable given the existence of social norms and, especially, of pre-existing trust networks (e.g. Carattini et al., 2015; Cole, 2015). Given the lack of progress in global climate change negotiations, an increasing number of scholars have proposed that a global policy is not the only strategy needed but that actions are required at multiple, smaller scales to start the process of climate change mitigation (Bulkeley and Betsill, 2005; Bulkeley and Kern, 2006; Ostrom, 2012). Accordingly, several studies have argued that
community-based energy (CBE) organizations facilitate collective action for climate change mitigation by fostering individual behavioral change toward more sustainable energy practices (Heiskanen et al., 2010; Middelmiss, 2011, 2008; Seyfang, 2010). CBE projects refer to formal or informal citizen-led initiatives which propose collaborative solutions, typically on a local basis, to facilitate the development of sustainable energy technologies and practices (Bauwens et al., 2016; Walker and Devine-Wright, 2007). In line with the contributions of Elinor Ostrom and other institutional scholars, CBE initiatives are said to influence their members’ energy-related behavior by activating social norms and by providing trustworthy information about sustainable energy investments and behaviors. Fruitful as these lines of inquiry are, they have mainly relied on qualitative descriptions of the ways through which CBE projects can influence their members’ behaviors. Little is known yet about their actual energy use and how it differs from that of individuals who do not participate in such projects. In particular, these studies do not deal with the selection effects that are likely to arise, i.e. CBE projects may attract people that are different from the underlying population in terms of energy use.

The present article seeks to contribute to fill this gap and addresses the question of the selection into CBE projects by empirically analyzing the electricity consumption of members of renewable energy cooperatives and contrasting it with that of an appropriate comparison group. More precisely, the research question addressed can be formulated as follows: are members of community-based energy projects different from the underlying population in terms of energy use and, if so, how? Note that we do not analyze how joining CBE organizations affects energy use, due to the observational nature of our data.

Our paper uses the case of renewable energy (RE) cooperatives, which constitute a specific type of CBE initiatives. The quantitative analysis performed is based on an original survey conducted among the members of one RE cooperative, Ecopower, located in Flanders, in the northern part of Belgium. In addition, this sample of cooperative members is contrasted with a sample of individuals sharing socio-demographic characteristics but not belonging to any RE cooperative. A probit regression model is used to examine the effect of electricity usage on the likelihood to join a RE cooperative. Following Brounen et al. (2012) and Ohler and Billger (2014), the model controls for socio-demographic (gender, education, employment status, age, income), household characteristics (homeownership, household size) and dwelling characteristics (type of home, primary heating fuel, presence of specific electric appliances, type of electricity meter). In addition, it controls for relevant socio-psychological variables (pro-environmental orientation, interpersonal trust and feelings of justice).

The results show that electricity consumption is positively related with cooperative membership, suggesting that the cooperative attracts people with a higher electricity use, on average. The magnitude of this effect decreases when controlling for the presence of PV panels, although it remains statistically significant. We argue that this can be explained by a selection process: high use consumers are more likely to install PV panels, hence approach organizations such as cooperatives, which provide active support for installing such technologies and implementing energy efficiency measures.

The following sections of this article present the theoretical considerations motivating this investigation (Section 2), the methodology used (Section 3), the empirical analysis (Section 4), the discussion of the results and some recommendations (Section 5) for future research.

2. Related Work

The standard theory of collective action assumes that economic agents are self-regarding, i.e. merely caring about their own consumption of public goods (Bowles, 2006). Without coercive measures, this would result in a generalized free-riding behavior and a systematic underprovision of public goods. In the context of electricity use, this assumption leads to the view that ‘individuals will fail to reduce electricity use to the socially efficient level because the costs are paid by the individual but the social benefits of energy reduction accrue to everyone’ (Ohler and Billger, 2014: 1). Behavioral economics provides an alternative approach as to why and when individuals make private provision of public goods. In this vision, individuals also appear to have ‘social’ preferences (Fehr and Fischbacher, 2002), which can be ‘other-regarding’ or ‘process-regarding’ (Ben-Ner and Puttermann, 1999). That is to say, rather than strictly about their own, people care about the contribution and consumption of others (other-regarding preferences), and about the ways in which they or others attain outcomes of interest (process-regarding preferences). These other- and process-regarding components explain why individuals accept to follow norms of behavior backed up by emotions such as pride, guilt, shame and anger (Bowles and Gintis, 2009). Social norms are ‘customary rules of behavior that coordinate our interactions with others. Once a particular way of doing things becomes established as a rule, it continues in force because we prefer to conform to the rule given the expectation that others are going to conform’ (Young, 2008, p. 647). Accordingly, not everyone behaves as a selfish free rider. Instead, many people are better described as ‘conditional cooperators’, i.e. they will contribute to the public good provided they are sure that others will act likewise and possibly punish defectors. In this perspective, several attempts have been made to formalize the roles of social approval (Rege, 2004) and the maintenance of a satisfactory moral image for others and for self (Brekke et al., 2003; Nyborg et al., 2006) as motivations to adopt cooperative behavior in general and pro-environmental behavior in particular.

Having said this, the extent to which norms are created and enforced is mediated by the specific institutional settings in which social interactions take place. Generally defined, institutions refer to ‘the prescriptions that humans use to organize all forms of repetitive and structured interactions including those within families, neighborhoods, markets, firms, sports leagues, churches, private associations, and governments at all scales’ (Ostrom, 2005: 3). They constrain the strategies adopted by individuals, the information they access, the benefits they receive or are excluded from and how they reason about the situation. From an institutional viewpoint, a ‘community’ is characterized by high entry and exit costs and personal relationships among members (Bowles and Gintis, 1998, 2002). In addition, interactions among community members are more frequent and enduring than interactions with non-members. These structural characteristics of interactions differ from those of other institutions, such as markets, at least where they approximate the ideal complete-contracting of standard economic models. Market interactions are typically ephemeral and anonymous, and characterized by low entry and exit costs. ‘In contrast to markets, by facilitating direct personal interactions, communities effectively encourage the formation of norms, such as interpersonal trust, social identification, solidarity, reciprocity, reputation, personal pride, vengeance, etc.’ (Bauwens, 2016: 280).

Relying on these structural characteristics of communities, different qualitative studies suggest that some communities encourage low-carbon lifestyles by stressing the associated social rewards for climate actions (Middelmiss, 2008) or by turning the social dilemma they represent into assurance games where members can be assured that others will participate (Heiskanen et al., 2010). Moreover, CBE initiatives are said to lower information costs related with energy-efficiency technologies and conservation behaviors and therefore contribute to overcome some of the informational and behavioral barriers to energy efficiency constituting the so-called ‘energy efficiency gap’ (Gillingham and Palmer, 2014). Indeed, CBE projects may raise their members’ awareness about sustainable energy practices through communication channels and information provision. Again, norms are likely to play a role in this respect as the trustworthiness of the sources of information can positively affect the effectiveness of a message (Laskey 2

The energy efficiency gap describes the existence of unexploited ‘profitable’ investment options in energy saving technologies and practices.
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