What motivates members of renewable energy cooperatives? An econometric analysis

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Abstract

The objective of this paper is to empirically investigate the motivations that drive individuals to engage in renewable energy cooperatives, which enable consumers themselves to co-own and invest in renewable energy generation units. The purchase of cooperative shares is conceptualized as contributions to impure public goods and a distinction is made between extrinsic and intrinsic motivations. Using data from an original survey conducted in two cooperatives located in Flanders, Northern part of Belgium, and a control group, we study the determinants of two decisions: the propensity to join the cooperatives and the level of contributions, i.e. the number of shares purchased. The results show that the different monetary incentives do not play the same role for both cooperatives. In addition, intrinsic motivations are indeed essential drivers, but they are not necessarily the same for the two decisions studied.

Keywords

Renewable energy, cooperative, public good, intrinsic motivation, social identification, fairness, pro-environmental behavior.

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1. Introduction

According to the conventional theory of public goods, rational individuals pursuing their personal interests will not contribute to collective efforts, unless external devices ensuring coordination are implemented. However, extensive empirical evidence from laboratory experiments and the field shows that people may well place value on social goods and make more voluntary contributions to public goods than implied by standard theory (Ostrom 1998). The result of universal non-cooperation predicted by models of pure self-interest does not hold. While many cases of free riding are observed, a surprisingly large number of individuals confronted with collective action problems do cooperate. These findings have led economists to update the standard theory and to develop superior alternatives.

The objective of this paper is to empirically investigate the motivations that drive people to contribute to a specific form of public good provision, namely renewable energy cooperatives. The latter are organizations that enable consumers themselves to co-own and invest in renewable energy generation units, such as wind turbines, photovoltaics, hydropower or biomass installations. These organizations are peculiar, because they offer an example of community-based management of a public good. Community-based management of natural resources usually refers to the management of common-pool resources (e.g. Bouma et al. 2008, Cavalcanti et al. 2013). The latter share with pure public goods a high degree of non-excludability (i.e. it is difficult to exclude individuals who have not paid for the good from its consumption) but, unlike public goods, common-pool resources face problems of congestion or overuse, because they are subtractable. In turn, while renewable energy cooperatives are community-based governance schemes, renewable energy is commonly associated with the production of a public good rather than a common-pool resource (Kotchen and Moore 2007, Litvine and Wüstenhagen 2011). Consequently, this paper builds on two strands in the economics literature, the first of which focuses on community-based management of natural resources. The second strand is the literature on the private provision of public goods. This article is the first of its kind to study the motivations of members of such type of organizations.

This paper uses data from an original survey conducted in two renewable energy cooperatives located in Flanders, Northern part of Belgium. Interestingly, these two organizations differ substantially in the incentive scheme that they offer as well as in the size and the geographical distribution of their membership. This makes it possible to analyze the effects of these factors on individuals' engagement in these organizations.

The object of this study consist in the determinants of two different decisions: the propensity to participate in such organizations, i.e. the decision to purchase at least one share and, once entered in the organization, the level of contributions, i.e. the number of shares purchased. Regarding the first research question, a probit model is used to regress a dummy variable

indicating whether or not individuals are members of a cooperative on our explanatory variables of interest. The second question is addressed by performing an ordered probit regression, using an ordinal categorical variable indicating the number of shares purchased as a dependent variable.

2. Background information

2.1. The relevance of community-based schemes in the management of renewable energy technologies

An increasing number of scholars have emphasized the need for more deliberative and inclusive participation of consumers in the energy production process (Devine-Wright and Devine-Wright 2004, Schweizer-Ries 2008). These case studies indicate various social, economic and political benefits of community energy projects, such as increased public support and capital investments for renewable energy projects, generation of local jobs and financial benefits for members and the local community, reduction of information asymmetry in the energy market and limitation of excessive market concentration (Huybrechts and Mertens 2014), lower energy costs and reliable supply as well as enhanced environmental awareness and commitment of members (Heiskanen et al. 2010). Nobel-prize winner Elinor Ostrom also supported the idea that actions taken at the local level are required to start the process of climate change mitigation (Ostrom 2010, 2012).

Various countries have actively engaged in promoting community-based management of renewable energy technologies. For instance, the UK has actively sought to promote community-based actions in favor of renewable energy for some time, through several policy initiatives, such as the Scottish Community and Householder Renewables Initiative in Scotland, the Assembly's Community Scale Renewable Energy Programme in Wales or the Community Energy Strategy launched in January 2014 by the Department of Energy and Climate Change (DECC 2014). Another example is Denmark, which presents the strongest cooperative energy sector in Europe. Indeed, this country favored the development of a decentralized model of electricity generation, considerably shaped by cooperative firms. The creation of cooperative firms benefited from institutional support, as the Danish legislator promulgated a series of laws that limit ownership of shares in windmill projects to residents' municipalities. Such ownership form considerably contributed to the high level of public support of wind turbine development among the Danish population at the national and local levels.

2.2. The cooperative model

According to the traditional theory of the firm, the ownership structure of an organization is defined by the allocation of two formal rights: the rights on residual decision-making power and

the rights on residual surplus (Hansmann 1996). The beneficiaries of these two rights are respectively called the dominant category and the beneficiary category. These criteria make it possible to derive one crucial distinction between cooperatives and traditional for-profit firms: contrary to the latter, the dominant and beneficiary categories of cooperative firms are constituted by their users. In addition, their ownership rights take a very specific configuration. On the one hand, net earnings are usually divided pro rata among the members according to the volume of transactions they have realized with the firm. Moreover, this distribution is constrained in various ways, the limitation of profit redistribution being, indeed, one of the cooperative firm's principles (Levi 2005). On the other hand, they present a democratic governance, implying equal individual voting rights and the absence of barriers to entry for new members. As to renewable energy cooperatives, they are "consumer" cooperatives. This means that energy users, i.e. regular citizens, constitute the dominant and beneficiary categories.

3. Theoretical framework

3.1. The participation to renewable energy cooperatives as contributions to an impure public good

Following Kotchen (2005)'s and Kotchen and Moore (2007)'s analyses of privately provided environmental public goods, the purchase of shares in renewable energy cooperatives is best conceptualized as the contribution to an impure public good that generates private and public goods as a joint product. Indeed, these shares produce private benefits and public characteristics. The former include, as we will see below, returns on investment under the form of dividends and green electricity at lower price. The latter are, for instance, expanded generation capacity of green electricity and reduced greenhouse-gas emissions of conventional power generation, contribution to job creation in the renewable energy industry and reduction of resource import dependence. According to standard theory, renewable energy generation assets may, like any public goods, be subject to underprovision compared to social optimum due to the free-rider problem: rational individuals pursuing their own interest have incentives to free-ride on the constructive behavior of others. They are thus characterized by a social dilemma.

3.2. Strategic and motivational solutions to social dilemma

Two main types of solutions to social dilemma have been explored in the literature: "strategic" and "motivational". Strategic solutions entail a change in the incentive structure, such that personal and collective incentives become more closely aligned (Simpson 2006). The aforementioned private benefits of investing in renewable energy cooperatives

correspond to such strategic solutions. In this perspective, Cornes and Sandler (1984) showed that when the joint products are complements, the presence of jointly produced private benefits may mitigate the free-rider problem, acting like property rights that motivate action.

Research on strategic solutions seeks to understand how cooperation between egoists may occur. It is, however, only part of the whole story. Motivational approaches, on the other hand, relax the assumption of self-interest to address the conditions under which extra-egoistic incentives guide behavior in social dilemmas. These two approaches hence focus on two different classes of motivations: strategic solutions focus on *extrinsic motivations*, i.e. motivating factors coming from outside the individual, such as money or grades, while motivational solutions focus on *intrinsic motivations*, i.e. the doing of an activity for its inherent satisfactions rather than for some external reward (Frey 1997).

Research on intrinsic and extrinsic motivations has shown that under particular conditions monetary (external) rewards can undermine non-monetary motivations (Frey 1997, Deci et al. 1999). In the case of renewable energy cooperatives, it is likely that the presence of monetary private benefits under the form of dividends or electricity prices does not completely crowd out other types of motivations. First, as mentioned before, profit redistribution is generally constrained in cooperative firms and cooperative shares may thus not be the most interesting investment for individuals who are purely motivated by the maximization of their monetary gains. Second, contributions to impure public goods also depend on individuals' heterogeneous tastes. Kotchen and Moore (2007), for instance, show that the purchase of green electricity is influenced by heterogeneous preferences in terms of altruistic and environmental orientation. While it will be shown below that private monetary benefits play an important role in the decision to participate in renewable energy cooperatives, other non-monetary motivations are essential as well. Thus, crowding out is usually incomplete, as predicted by models of "warm glow" giving (Andreoni 1990). Using insights from social psychology and behavioral economics, motivations hidden behind this "warm glow" are now explored in more detail. The intrinsic motivations investigated are social identification, environmental orientation and perceptions of fairness.

3.3. Intrinsic motivations

3.3.1. Social identification

The level of cohesion in a social network plays an important role for cooperation in community-based management of natural resources (Bouma et al. 2008, Cavalcanti et al. 2013). One crucial aspect of group cohesion is social identification, i.e. "the degree to which people cognitively

merge their sense of self and the group, i.e. think of themselves and the group in similar terms or define themselves in terms of their group membership" (Tyler and Blader 2001: 210). The socio-psychological literature on collective action shows that a strong social identification to the group fosters cooperative behaviors and collective action. "When people are identified as such with their group, they will be more willing to act cooperatively toward the group–investing their time and energy in working to see the group succeed" (Tyler and Blader 2001: 210). Goette et al. (2006) found from a laboratory experiment that group membership increases willingness to reinforce norms of cooperation among group members. In the same perspective, Stürmer and Kampmeier (2003) highlight the importance of group identification as a determinant of community volunteerism and local participation. Social identification is not a relevant factor to explain the decision to participate in renewable energy cooperatives, since one has to be a member of a group before being able to identify oneself to the latter. However, it is likely to positively affect the level of contributions.

3.3.2. Interpersonal trust

A second factor of interest is interpersonal trust. Much of the literature on community-based management of natural resources argues that trust is an essential ingredient for building highly cohesive and cooperative communities (Ostrom 2003). In particular, community energy projects are typically characterized by a high degree of interpersonal trust (Walker et al. 2010). Many laboratory experiments show that communication on a face-to-face basis substantially increases the level of cooperation (e.g. Isaac and Walker 1988, Ostrom et al. 1991). One reason for this is that face-to-face communications increases mutual trust and thus affects expectations of others' behavior. "Building trust appears to be a key link in the communication-cooperation connection (Ostrom 2003: 34). Geographical aspects are likely to play a role here. Indeed, by facilitating direct social interactions and face-to-face communication, spatial closeness between members enhances the level of trust in a group. Interpersonal trust is expected to positively affect the decision to join the cooperative and the level of contributions.

3.3.3. Environmental orientation

Individuals' environmental orientation is also likely to play a role in the decision to join renewable energy cooperatives. Indeed, personal values and beliefs imply that individuals may act on a sense of personal obligation and invest in what they believe in. In this perspective, various scholars assert that pro-environmental attitudes and behaviors are influenced by underlying general values and beliefs (Stern et al. 1995, Steg et al. 2005). For instance, Nyborg et al. (2006) show that the decision to purchase green products partly depends on the perception that buying this type of goods is an individual responsibility, which is based on internalized

moral norms. Environmental orientation is expected to positively affect the decision to join the cooperative and the level of contributions.

3.3.4. Fairness

Finally, it is well-known in the socio-psychological literature that perceived injustice can be a powerful motivation for collective action. So-called Relative Deprivation Theory proposes that feelings of unjust disadvantages based on social comparisons may propel collective action in an attempt to rectify the state of unfair deprivation (van Zomeren et al. 2008). In the same perspective, several attempts have been made by economists to incorporate fairness into individual utility functions, departing from the implausible hypothesis of purely self-interested economic agents (Fehr and Schmidt 1999).

Two notions of justice are discussed here: procedural justice and distributive justice. Procedural justice concerns the subjectively perceived fairness and transparency of the processes by which decisions are made, while distributive justice concerns how rewards and costs are distributed across a group. In this article, a specific approach to these notions is used, namely the Belief in a Just World (BJW) Theory. According to the latter, most individuals need to believe in a world that is fair and just place, in the sense that people generally get what they deserve and deserves what they get. However, not all people react in the same way. There exists strong evidence that the strength of BJW varies across individuals (Rubin and Peplau 1975). For example, Bénabou and Tirole (2010) argue that weak beliefs in a just world increase the demand for redistribution. Fong (2001) empirically shows that people who prefer more redistribution also think that poverty is caused by circumstances beyond individuals' control. In line with this idea, it is assumed here that people participating in renewable energy cooperatives have *weaker* beliefs in a just world and, by engaging in such projects, they seek to take action in favor of a fairer state of the world as far as energy is concerned. The distinction between procedural and distributive justice mentioned above is perfectly compatible with BJW measures, as Lucas et al. (2007) and Lucas et al. (2013) have shown.

4. Methodology

4.1. Field setting

This paper reports on two case studies of renewable energy cooperatives, Ecopower and BeauVent, located in Flanders, Northern part of Belgium. Both organizations face the same institutional, economic, cultural and political context, which facilitates the comparability of the cases. Both cooperatives set up and develop renewable energy projects, mostly from wind power, but also solar and, in the case of Ecopower, biomass and wood pellets. However, the

cases differ across several important dimensions. First of all, Ecopower is electricity supplier, while BeauVent is not. When Ecopower started supplying electricity when the Belgian electricity market was liberalized in 2003, its membership started increasing steadily, because individuals had to become cooperative members to be supplied with green electricity. Hence, a second important difference is the size: as a result of its activity of electricity supply, Ecopower has been growing steadily and is now much larger than BeauVent. In 2014, while the latter counted about 2400 members, Ecopower counted over 47,400 members and was thus almost twenty times larger. Ecopower is also ten times larger in terms of total capital (see table 1).

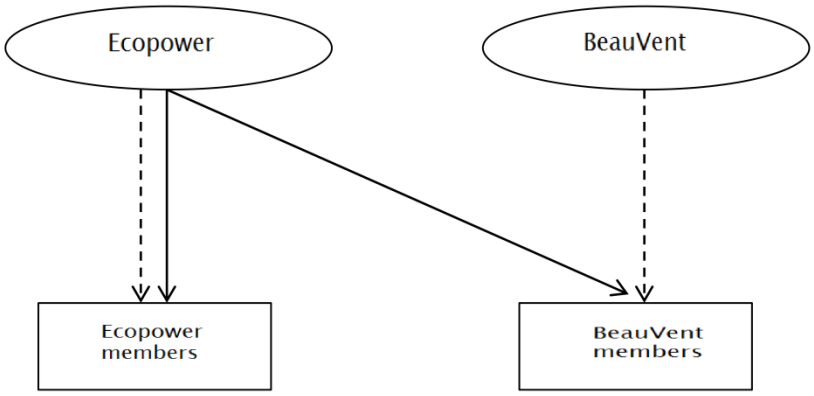
Table 1 around here.

In addition, BeauVent is much more localized. Figures A1 and A2 in the appendix present the maps of the density of members in the different Flemish municipalities for the two cooperatives. While Ecopower members are distributed relatively equally across all Flanders–with some more densely populated areas in cities–, BeauVent members are much more concentrated in the West of the region, where the different projects run by the cooperative are located. Hence, the data collected enables to analyze and compare not only cooperative members versus non-cooperative members, but also cooperatives with membership of different sizes and different geographical distributions. These two cases were deliberately included in order to understand how people's motivations vary according to these different organizational characteristics.

There are three types of monetary incentives–or strategic solutions–attached to the participation to the cooperatives studied. A first incentive is the return on investment under the form of dividends, which are limited to 6% in both organizations. A second incentive is the possibility to be supplied with electricity at a lower price. A third incentive is that Ecopower does not charge any fixed fee for electricity connection and only charges what is actually consumed. This means that a member who does not consume anything does not pay anything. This is a strong incentive for people who have installed solar panels and produce their own electricity. Only Ecopower supplies green electricity, but, according to an agreement between cooperatives, BeauVent members can be supplied with electricity by Ecopower, even if they are not formally members of the latter. Hence, in theory, members of both cooperatives have access to each of these three types of monetary incentives. As a result, from the standard economic standpoint, they should be indifferent between choosing Ecopower or BeauVent and members' motivations to join associated with monetary private benefits should be the same for

both organizations. Figure 1 depicts a schematized representation of the two sources of monetary private benefits.

Figure 1. The three sources of monetary private benefits.



Source: created by author. Dashed arrows represent dividends and solid arrows represent the incentives associated with electricity supply–lower electricity price and the absence of fixed fees.

4.2. Data collection

Household data was collected through an online questionnaire survey on cooperative members and individuals who do not belong to a cooperative, but who share a very similar socio-demographic profile. The questionnaire was designed to collect data on a number of socio-demographic variables and indicators of the variables of interest, namely interpersonal trust, environmental orientation, procedural and distributive BJW, and social identification.

The cooperatives provided the members' email addresses. 37,491 emails have been sent to cooperative members. In addition, a paper version of the questionnaire was handed out during the General Assembly of both organizations, with the objective of reaching a profile of people who otherwise would not have been reached by the online questionnaire. Indeed, the participants to the General Assemblies are typically an older public who, presumably, may have a lower usage of the Internet. 238 paper versions of the questionnaire were handed out during the general assemblies of both organizations. Thus, 37,729 versions of the questionnaire were distributed in total. After some data cleaning, a final sample of 4,061 respondents was used in the analysis, which represents a response rate of 10.8%, which is comparable to response rates obtained in similar surveys (e.g. Litvine and Wüstenhagen 2011). Moreover, the cooperatives provided the data for the geographical location, the

number of shares/member and the membership period for the whole population of their members. The distribution of these three variables could thus be computed. Weights were then assigned to the individuals with the view of reproducing the distributions of the aforementioned variables in the collected sample, in order to improve the representativeness of the latter.

Finally, data (n=501) was also collected for individuals who do not belong to a cooperative, to be able to confront the results for the different groups. The data collection for this control group was outsourced to the survey institute IPSOS. This institute has at its disposal a respondent panel representative of the Flemish population. Quotas were imposed so that the control group had the same characteristics in terms of sex, geographical location and education level as the reference group. The idea was to get a control group that differs from the group of cooperative members only by not belonging to a renewable energy cooperative.

4.3. Variables

The dependent variable for the decision to join a cooperative is a dummy that takes the value 1 if individual *i* belongs to a cooperative and 0 otherwise. Regarding the level of contributions, respondents were not asked to report the exact number of shares they had bought, which is an information many people may not know, but only the category in which this number falls: between 1 and 9, 10 and 19 and so on, with the view of maximizing the response rate to this question. The dependent variable *number of shares* is thus an ordinal categorical variable that takes 6 different values according to the number of cooperative shares owned by members. The values from 1 to 6 correspond respectively to 1 to 9 shares, 10 to 19 shares, 20 to 29 shares, 30 to 39 shares, 40 to 49 shares and more than 50 shares.

Indicators of the different intrinsic motivations studied are measured by different indexes which are based on a series of items. These items ask respondents to indicate on a five-point scale (seven points in the case of interpersonal trust) the extent to which they agree or disagree with different statements. The scales were then aggregated into single indexes. Interpersonal trust was measured by using three items adapted from the World Value Survey. To measure individuals' procedural and distributive beliefs in a just world, we adapted items used in organizational psychology (Colquitt 2001) and in a survey about representations of social justice (Jacquemain 1995). Individuals' environmental orientation was captured through two dimensions: pro-environmental self-identity and daily behaviors. In order to measure the degree of pro-environmental self-identity, six items of different existing questionnaires were taken and adapted (Castro et al. 2009, Fielding et al. 2008, Whitmarsh and O'Neill 2010). These items measure to what extent the respondent perceives

herself as a person concerned with environmental issues. Respondents' environmental engagement in terms of daily behaviors was measured relying on the test of ecological footprint edited by the World Wild Fund. Respondents had to indicate the frequency at which they adopted each behavior during the last 15 days. Finally, social identification was measured by five items adapted from existing studies (Stürmer and Kampmeier 2003, Tyler and Blader 2001). Table A1 in appendix reports the specific statements for all the intrinsic motivations, along with statistics to test for internal consistency (item-total correlations and Cronbach's alpha). The results indicate good internal consistency and support combining the items into summated scales. All the indicators of intrinsic motivations were transformed into dummy variables to facilitate the interpretation of the regression coefficients.

In addition, different variables were used in order to assess the motivating role of the different monetary incentives. First, as regards the possibility of being supplied with electricity at lower price, the relative electricity price of Ecopower was computed by taking the ratio of the electricity prices offered by Ecopower to the one of the market leader (the former Belgian power monopoly). This is possible because the prices of the market leader vary across the different distribution network operator (DNO)'s regions, due to the differences in network costs invoiced by the latter, whereas Ecopower offers a fixed price for all Flanders, independently of network costs. The difference between both prices varies across individuals who are located in different DNO's regions. The coefficient for this variable is expected to be negative, since the higher the ratio, the higher the relative price offered by Ecopower and that this variable does not play any role for BeauVent members, for the reasons explained above. Second, the presence of solar panels was used as a proxy for the absence of fixed fees. Regarding the importance of returns of investments, it was impossible to measure it for individuals in the control group. However, it was assessed for the group of cooperative members on a five-point Likert scale. This variable is used in the analysis of the level of contributions.

Finally, data were also collected for a series of individual- and household-level characteristics: gender, education, age, income, household size and geographical location. Respondents were also asked whether there lived close to a wind turbine (in a radius of 2 km from their home). Indeed, individuals living close to a windmill are more likely to join the cooperative, since they are directly affected by the costs related to such an installation. Table 2 reports the descriptive statistics of the explanatory variables used in the analysis for Ecopower members, BeauVent members and the control group.

Table 2 around here.

4.4. Econometric models

4.4.1. The decision to join the cooperative

A probit model was used, since the ordinary least squares estimator is not efficient in the case of a binary dependent variable. Parameters are estimated by maximum likelihood. The specification used is:

$$Prob(C_i = 1|\, X_i, M_i) \;=\; \Phi\,(\beta_1 X_i + \;\beta_2 M_i) \tag{1}$$

where C_i is the dummy indicating whether individual *i* belongs to a cooperative and X_i is a vector of individual- and household-level characteristics. The vector M_i includes monetary incentives and intrinsic motivations that shape the decision to join the cooperative. The cumulative distribution function, Φ, is distributed standard normal.

4.4.2. The level of contributions

An ordered probit model was used to estimate the level of contributions, since the dependent variable is an ordinal categorical variable. The ordered probit model can be derived from a latent variable model (Wooldridge 2002). That is, it assumes that the utility, U_i, that individual *i* obtains from buying cooperative shares is unobservable (is a latent variable) but can be defined by a deterministic component (V_i) that is observable and a stochastic error term (ε_i) that is not observable:

$$U_i \;=\; V_i + \varepsilon_i. \tag{2}$$

Assume that V_i can be represented by the following additive linear function:

$$V_i = \beta_1 X_i + \;\beta_2 M_i \tag{3}$$

where, like in previous section, X_i is a vector of individual- and household-level characteristics and M_i is a vector of monetary incentives and intrinsic motivations The ordered probit model assumes that the level of contributions equals *n* if the individual's utility derived from buying shares crosses an unknown threshold:

$$Level\ of\ contributions(i) = n\ if\ \propto_{n-1} < U_i \leq \propto_n. \tag{4}$$

where $\propto_{n-1}<\propto_n$ are unknown threshold parameters. As U_i crosses increasing threshold levels (from $\propto_0 = -\infty$ to $\propto_N = \infty$), the level of contributions moves up the scale (1-6). The probability that individual *i* will belong the level *n*=1,...,6 is given by

$$P_{in} = \text{Prob}(\propto_{n-1} < V_i + \varepsilon_i \leq \propto_n) = \text{Prob}(\propto_{n-1} - V_i < \varepsilon_i \leq \propto_n - V_i) \quad (5)$$

Using equation 3,

$$P_{in} = \Phi(\propto_n - \beta_1 X_i - \beta_2 M_i) - \Phi(\propto_n - \beta_1 X_i - \beta_2 M_i) \quad (6)$$

where $\Phi(.)$ is the cumulative density function for standard normally distributed errors.

5. Results

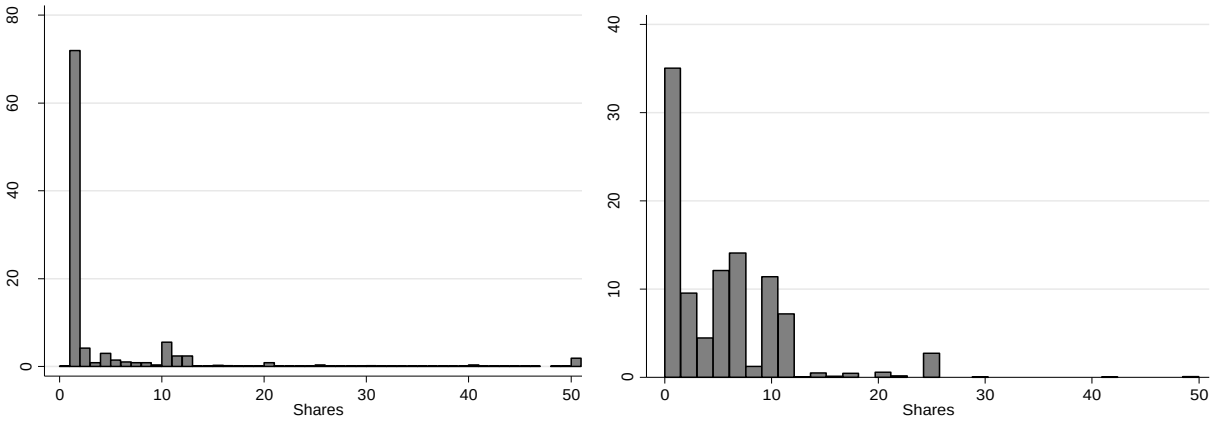
This section presents the results of the analysis conducted. Before presenting the findings of the econometric analysis, section 5.1. shows that the different monetary incentives do not play the same for the two cooperatives, relying on an analysis of descriptive statistics.

5.1. The roles of monetary private benefits

In section 4.1, we stated that, in theory, monetary incentives are the same for both cooperatives. However, this is not what is observed in practice. This is shown in two steps. First, it is demonstrated that dividends are important for BeauVent members, but much less for Ecopower members. Second, it is shown that the incentives linked to electricity supply–low electricity price and the absence of fixed fees–are essential for Ecopower members, but not for BeauVent members.

As regards the first claim, i.e. dividends are more important for BeauVent members than for Ecopower members, figures 2 and 3 show the distributions of shares/member for Ecopower and BeauVent respectively. As it can be seen, the large majority of members buy one or, at most, a very limited number of shares: 74% of members own only one share. Since one share costs 250€ and dividends are limited to 6%, the maximum return on investments that one can get by buying one share only is 15€, which is a negligible amount in a household budget. This suggests that dividends play a limited motivating role for Ecopower members compared to the possibility of being supplied with green electricity. In contrast, BeauVent members tend to purchase more shares, as the distribution of shares/member in figure 3 and the average value in table 1 show. This suggests that the return on investments is more substantial and thus should be a more important factor in explaining the decision to join the cooperative.

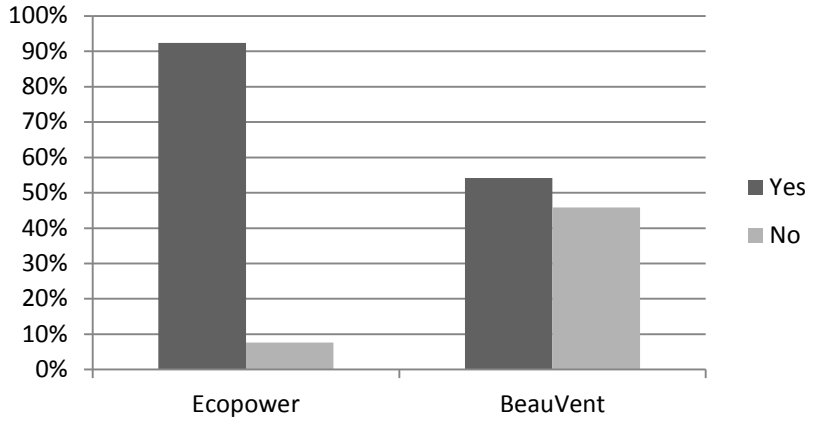
Figure 2. Distributions of the number of shares/cooperative member. Left Panel shows the distribution for Ecopower and right panel for BeauVent.



Source: created by author based on 2013 data provided by the cooperatives.

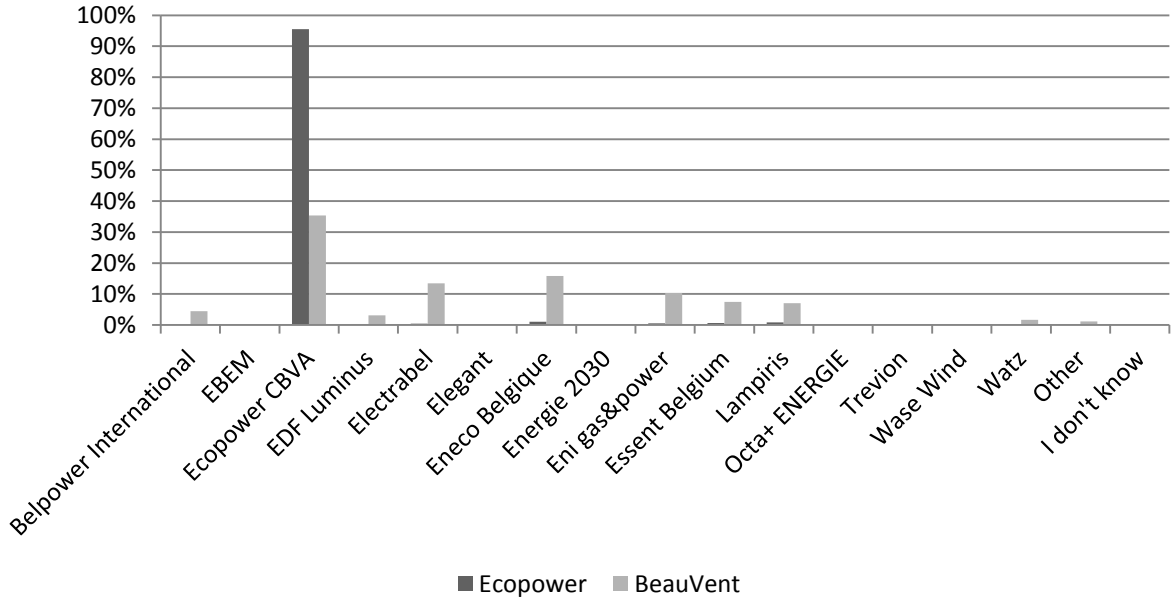
Regarding the second claim, respondents were asked whether they switched electricity supplier when they joined the cooperative and who their current electricity supplier was. Figure 6 and 7 present the results. As it can be seen, the proportion of Ecopower members having switched electricity supplier is much higher than for BeauVent members. In addition, figure 7 shows that Ecopower is the electricity supplier of more than 95% of Ecopower members and only 35% of BeauVent members. The combination of these two facts shows that the possibility to be supplied with green electricity at a lower price is very important for Ecopower members, but less so for BeauVent members.

Figure 6. Percentage of members having switched electricity supplier when joining the cooperative.



Source: survey (2014).

Figure 7. Current electricity suppliers of Ecopower and BeauVent members



Source: survey (2014).

Finally, cooperative members were also asked to indicate on a five-item Likert scale the extent to which the different monetary incentives had played a role in their decision to join the cooperative. The analysis of this data, conducted with the help of Kruskal-Wallis and Dunn's multiple comparison tests, is presented in another article (Bauwens 2015) and shows that returns on investments are indeed more important for BeauVent members than for Ecopower members. On the other hand, monetary incentives related with electricity supply–the electricity price and the absence of fixed fees–are the main motivation for Ecopower members. Overall, it can be concluded from this analysis that the three monetary private benefits do not have the

same motivating role for both cooperatives. Incentives related to electricity supply are important drivers for Ecopower members, but less so for their BeauVent counterparts. The contrary holds for return on investments: it plays a more important role for BeauVent members, but is marginal for Ecopower members.

5.2. Econometric analysis

5.2.1. The decision to join the cooperative

Table 3 around here.

Table 3 presents the estimation results for the decision to join the cooperative. Consistently with the assumption that factors may have different effects for both cooperatives, regressions in columns 1 and 2 are run while considering Ecopower members only and models 3 and 4 are run while considering BeauVent members only. Columns 1 and 3 include our explanatory variables of interest only, while control variables are added in columns 2 and 4. In column 4, the dummy for the province of Flemish Brabant was not included, due to collinearity problems. The reported regression coefficients represent the marginal effects of the explanatory variables, which can thus directly be interpreted in terms of change in the probability $Pr(C_i{=}1|X_i, M_i)$. The coefficient for the relative electricity price offered by Ecopower is significant for BeauVent, but not for Ecopower in the models without controls. However, the reverse is observed when control variables are included, i.e. this variable becomes significant for Ecopower, but not for BeauVent. In addition, it has a relatively large negative effect in the regression in column 2. This is consistent with what was expected: the fact that BeauVent members can be supplied with electricity by Ecopower without being a member of the latter has little effect on the decision to join the cooperative, whereas electricity price is an important driver for Ecopower members. The coefficient for the presence of PV panels is strongly significant and positive for both cooperatives, which suggests that the absence of fixed fees is an important motivating factor to join the cooperatives. Now, the fact that this coefficient is also significant for BeauVent seems to contradict what was said before, i.e. that monetary incentives associated with electricity supply, including the absence of fixed fees, are less important for BeauVent members. However, this positive relationship is likely to be correlational rather than purely causal. Indeed, both cooperatives actively encourage their members to install PV installations on their rooftop through financial or technical assistance. *Trust* and *environmental orientation* are significant and positive for both cooperatives. This confirms our assumptions: the higher individuals' propensity to trust and environmental orientation, the higher the propensity to participate. *Distributive* and *procedural BJW* are significant and negatively associated with the propensity to

join the cooperatives, in line with our expectations. All intrinsic motivations are robust to the inclusion of controls, even though their effects are relatively small compared to the coefficients of monetary incentives.

5.2.2. The level of contributions

Let us now turn to the level of contributions made to the organizations, i.e. the number of shares purchased. The sample was restricted to cooperative members only. Table 4 presents the results. Since it is much more difficult to interpret the value of coefficients for an ordered probit model, only their significance and their sign are interpreted. Different specifications were estimated. In column 1, the same explanatory variables as before were included except the presence of PV panels (*relative electricity price, trust, distributive BJW, procedural BJW, environmental orientation*), and the variable *social identification* was added. One single regression including both Ecopower and BeauVent members was run, contrary to the first decision, because too few observations would have been used to make a regression analysis for BeauVent members only. However, a dummy variable, *BeauVent*, was included, taking the value 1 (0) if individuals belong to BeauVent (Ecopower).

Table 4 around here.

Column 2 includes the same controls as before. In column 3, one dummy variable was added, which indicates whether individuals reported a high score on the measure of the importance of return of investment in their decision to join the cooperative. In column 4, a dummy which takes the value 1 (0) if individuals attend general assemblies often or always (sometimes or never) is also inserted. This can be considered a proxy for members' active engagement in their organization. The descriptive statistics of these additional control variables are presented in table 5.

Table 5 around here.

The relative electricity price offered by Ecopower is no longer significant, regardless of the specification. This confirms that the electricity price plays a role to join the cooperative, but is irrelevant as far as the amount of contributions is concerned. The coefficient for social identification is significant and positive in column 1, 2 and 3, but is not robust to the inclusion of the frequency of attendance to general assemblies. This indicates that members who identify most to the cooperative are also those who actively participate most to its governance. *Trust* is slightly significant in column 1 and 2, but does no longer play any role when adding the

importance of returns on investment. Similarly, *environmental orientation*, *procedural BJW* and *distributive BJW* appear not to be significant, regardless of the specification. Overall, intrinsic motivations seem to play a very limited role in the level of contributions. In contrast, the coefficient for returns on investment is strongly significant and positive.

The dummy *BeauVent* is also highly significant and positively correlated with the level of contributions. This seems to indicate that BeauVent members tend to purchase more cooperative shares than Ecopower members, which is coherent with the fact that the average number of shares/member is higher in BeauVent than in Ecopower, as shown in table 1. However, when controlling for the frequency of attendance to general assemblies in column 4, the effect of the dummy *BeauVent* disappears. This suggests that the positive relationship between being a BeauVent member and the level of contributions is explained by the fact that BeauVent members are more actively engaged in its functioning. The sense of the causal relationship, however, is ambiguous. Their higher level of contributions could result from a more active involvement. Conversely, the fact of having invested a higher amount of money in the cooperative can make them feel more concerned with the financial situation of the organization and the way it is run and, therefore, more willing to have their say in the general assembly. In any case, this higher active engagement of BeauVent members is likely to be associated with the geographical concentration of membership. The costs of attending general assemblies and actively participating to the events of the cooperative are considerably lowered due to the local scale of the initiative.

Finally, among the control variables, only the variables *age* and *gender* are significant and have a positive effect.

6. Discussion and conclusions

Several findings can be drawn from the present analysis. First of all, as regards the determinants of the decision to join RE cooperatives, the results are consistent with the assumptions that intrinsic motivations are relevant drivers. Trust and environmental orientation positively affect the propensity to join and procedural and distributive beliefs in a just world are negatively associated with the latter, as expected. Monetary incentives are also very important: the relative electricity price offered by Ecopower and the absence of fixed fees–captured by the presence of PV panels–are also a relevant factor in explaining this decision in the case of Ecopower.

Second, regarding the factors explaining the level of contributions, results show that the relative electricity price does not play any role, as expected. A second result is that determinants of the level of contributions are different from those of the decision to join. Indeed, while in the analysis of the latter, all intrinsic motivations were significant, only social identification is

significantly associated with the level of contributions, even though its effect vanishes when controlling for active involvement in the governance of organizations.

Third, the comparison of Ecopower and BeauVent reveal some interesting findings. As far as monetary benefits are concerned, both cooperatives do not offer the same incentive schemes. Ecopower offers the possibility to Ecopower *and* BeauVent members to be supplied with green electricity, while BeauVent does not offer such service. This distinction explains the difference in size, measured in terms of number of members and the total number of shares purchased, between both organizations. This difference in incentive schemes also explains why the two sources of monetary private benefits–the return on investments and the incentives associated with electricity supply–do not have the same motivating effect. The possibility of being supplied with electricity is clearly the dominant factor for Ecopower members, for whom the return on investments tends to be less important. The reverse holds for BeauVent members.

Both the average number of shares/member and the analysis of the level of contributions show that BeauVent members tend to purchase more cooperative shares than their counterparts in Ecopower. This can be interpreted in terms of the impure public good framework presented in section 3.1. Indeed, attaching the possibility of being supplied with green electricity to the purchase of cooperative shares has a similar effect as joining an additional private benefit to a public good. However, because this possibility is independent from the number of shares owned by an individual, this increases the *total* amount of contributions–that is, the total number of shares–by attracting more members, but reduces the *individual* contribution levels–the number of shares per member. This is reflected by the fact that the relative electricity price offered by Ecopower is significant in the decision to join, but not in the level of contributions.

Finally, an important question concerns the identification of the sense of causality. Since individuals could not be randomized into the cooperative, going beyond identifying the relationship between intrinsic motivations and the fact of joining a cooperative, i.e. investigating whether intrinsic motivations cause the engagement in cooperatives is difficult. The reason is that these psychological motivations might be endogenous and affected by the fact of joining the cooperative. Therefore, the possibility of reverse causality cannot be excluded. However, this possibility is limited by the fact that the intrinsic motivations measured can be considered as stable personality traits. For instance, trust propensity is an individual's underlying trust level and indicates how much they are willing to rely on others in general. It is shaped by life experience and is regarded as a generally stable personality trait (DeNeve and Cooper 1998, Rotter 1967, Couch and Jones 1997). As regards beliefs in a just world, research in psychology has shown that they are personality dispositions that are reasonably stable over time (Dalbert 2000). In addition, according to experimental and questionnaire studies, there are no significant differences in the BJW of those who have experienced traumatic life events and those who have

not (Overcash et al. 1996), between those with differing event-specific justice judgments, for example, immigrants versus non-immigrants with differing justice judgments concerning the fate of immigrants (Dalbert and Yamauchi 1994), between those contemplating their own just or unjust behavior (Dalbert 1999), or between those typically complaining about being treated unfairly and their counterparts, for example, prisoners and their guards (Dalbert et al. 2001). The same argument holds for environmental orientation: we sought to measure the individuals' underlying orientation toward the environment rather than attitudes toward renewable energy or wind turbines, which are most likely to be affected by the involvement in the cooperative. As to social identification, the question of the influence of the involvement in the cooperative is irrelevant, since such involvement obviously happens before the process of social identification.
These features and the finding that psychological motivations are little subject to the inclusion of covariates provide some confidence that the insights from this study are not purely correlational and render it less likely that the reported relationships are exclusively driven by unobserved correlates.

7. References

Andreoni, J. 1990. 'Impure Altruism and Donations to Public Goods: A Theory of Warm-Glow Giving.' *The Economic Journal,* 100:401, 464-77.

Bauwens, T. 2015. 'The Evolution Of Members' Motivations In Environmentally-Oriented Cooperatives: The Case Of Renewable Energy.' *Annals of Public & Cooperative Economics*.

Bénabou, R. & Tirole, J. 2010. 'Individual and Corporate Social Responsibility.' *Economica,* 77:305, 1-19.

Bouma, J., Bulte, E. & van Soest, D. 2008. 'Trust and cooperation: Social capital and community resource management.' *Journal of Environmental Economics and Management,* 56:2, 155-66.

Castro, P., Garrido, M., Reis, E. & Menezes, J. 2009. 'Ambivalence and conservation behaviour: An exploratory study on the recycling of metal cans.' *Journal of Environmental Psychology,* 29:1, 24-33.

Cavalcanti, C., Engel, S. & Leibbrandt, A. 2013. 'Social integration, participation, and community resource management.' *Journal of Environmental Economics and Management,* 65:2, 262-76.

Colquitt, J. A. 2001. 'On the dimensionality of organizational justice: A construct validation of a measure.' *Journal of Applied Psychology,* 86:3, 386-400.

Cornes, R. & Sandler, T. 1984. 'Easy Riders, Joint Production, and Public Goods.' *The Economic Journal,* 94:375, 580-98.

Couch, L. L. & Jones, W. H. 1997. 'Measuring Levels of Trust.' *Journal of Research in Personality,* 31:3, 319-36.

Dalbert, C. 1999. 'The World is More Just for Me than Generally: About the Personal Belief in a Just World Scale's Validity.' *Social Justice Research,* 12:2, 79-98.

Dalbert, C. 2000. 'Beliefs in a just world questionnaire.' In J. Maltby, C. A. Lewis & A. Hill (Eds.) *Commissioned reviews of 250 psychological tests:* 461-65. Lampeter, UK: Edwin Mellen Press.

Dalbert, C., Lipkus, I. M., Sallay, H. & Goch, I. 2001. 'A just and an unjust world: structure and validity of different world beliefs.' *Personality and Individual Differences,* 30:4, 561-77.

Dalbert, C. & Yamauchi, L. A. 1994. 'Belief in a Just World and Attitudes Toward Immigrants and Foreign Workers: A Cultural Comparison Between Hawaii and Germany.' *Journal of Applied Social Psychology,* 24:18, 1612-26.

DECC 2014. 'Community Energy Strategy: Full Report.' London: Department of Energy & Climate Change.

Deci, E. L., Koestner, R. & Ryan, R. M. 1999. 'A meta-analytic review of experiments examining the effects of extrinsic rewards on intrinsic motivation.' *Psychological bulletin,* 125:6.

DeNeve, K. M. & Cooper, H. 1998. 'The happy personality: A meta-analysis of 137 personality traits and subjective well-being.' *Psychological bulletin,* 124:2, 197-229.

Devine-Wright, H. & Devine-Wright, P. 2004. 'From Demand Side Management to Demand Side Participation: Tracing an Environmental Psychology of Sustainable Electricity System Evolution.' *Journal of Applied Psychology,* 6:3-4, 167-77.

Fehr, E. & Schmidt, K. M. 1999. 'A Theory of Fairness, Competition, and Cooperation.' *The Quarterly Journal of Economics,* 114:3, 817-68.

Fielding, K. S., McDonald, R. & Louis, W. R. 2008. 'Theory of planned behaviour, identity and intentions to engage in environmental activism.' *Journal of Environmental Psychology,* 28:4, 318-26.

Fong, C. 2001. 'Social preferences, self-interest, and the demand for redistribution.' *Journal of Public Economics,* 82:2, 225-46.

Frey, B. 1997. *Not Just for the Money: An Economic Theory of Personal Motivation.* {Edward Elgar Publishing}.

Goette, L., Huffman, D. & Meier, S. 2006. 'The Impact of Group Membership on Cooperation and Norm Enforcement: Evidence Using Random Assignment to Real Social Groups.' *The American Economic Review,* 96:2, 212-16.

Hansmann, H. 1996. *The ownership of enterprise.* The Belknap Press of Harvard University Press.

Heiskanen, E., Johnson, M., Robinson, S., Vadovics, E. & Saastamoinen, M. 2010. 'Low-carbon communities as a context for individual behavioural change.' *Energy Policy,* 38:12, 7586-95.

Huybrechts, B. & Mertens, S. 2014. 'The Relevance Of The Cooperative Model In The Field Of Renewable Energy.' *Annals of Public and Cooperative Economics,* 85:2, 193-212.

Isaac, R. M. & Walker, J. M. 1988. 'Communication And Free-Riding Behavior: The Voluntary Contribution Mechanism.' *Economic Inquiry,* 26:4, 585-608.

Jacquemain, M. 1995. 'Représentations de la justice sociale: l'exemple de la Belgique francophone ' *L'Année Sociologique,* 45:2, 399-430.

Kotchen, M. J. 2005. 'Impure public goods and the comparative statics of environmentally friendly consumption.' *Journal of Environmental Economics and Management,* 49:2, 281-300.

Kotchen, M. J. & Moore, M. R. 2007. 'Private provision of environmental public goods: Household participation in green-electricity programs.' *Journal of Environmental Economics and Management,* 53:1, 1-16.

Litvine, D. & Wüstenhagen, R. 2011. 'Helping "light green" consumers walk the talk: Results of a behavioural intervention survey in the Swiss electricity market.' *Ecological Economics,* 70:3, 462-74.

Lucas, T., Alexander, S., Firestone, I. & LeBreton, J. M. 2007. 'Development and initial validation of a procedural and distributive just world measure.' *Personality and Individual Differences,* 43:1, 71-82.

Lucas, T., Zhdanova, L., Wendorf, C. & Alexander, S. 2013. 'Procedural and Distributive Justice Beliefs for Self and Others: Multilevel Associations with Life Satisfaction and Self-Rated Health.' *Journal of Happiness Studies,* 14:4, 1325-41.

Nyborg, K., Howarth, R. B. & Brekke, K. A. 2006. 'Green consumers and public policy: On socially contingent moral motivation.' *Resource and Energy Economics,* 28:4, 351-66.

Ostrom, E. 1998. 'A Behavioral Approach To The Rational Choice Theory Of Collective Action ' *American Political Science Review,* 92:1, 1-22.

Ostrom, E. 2003. 'Toward a Behavioral Theory Linking Trust, Reciprocity, and Reputation.' In E. Ostrom & J. Walker (Eds.) *Trust & Reciprocity. Interdisciplinary Lessons from Experimental Research*. New York: Russell Sage Foundation.

Ostrom, E. 2010. 'Polycentric systems for coping with collective action and global environmental change.' *Global Environmental Change,* 20:4, 550-57.

Ostrom, E. 2012. 'Nested externalities and polycentric institutions: must we wait for global solutions to climate change before taking actions at other scales?' *Economic Theory,* 49:2, 353-69.

Ostrom, E., Gardner, R. & Walker, J. 1991. 'Communication in a Commons: Cooperation Without External Enforcement.' In T. R. Palfrey (Ed.) *Laboratory Research in Political Economy*. Ann Arbor: University of Michigan Press.

Overcash, W. S., Calhoun, L. G., Cann, A. & Tedeschi, R. G. 1996. 'Coping with Crises: An Examination of the Impact of Traumatic Events on Religious Beliefs.' *The Journal of Genetic Psychology,* 157:4, 455-64.

Rotter, J. B. 1967. 'A new scale for the measurement of interpersonal trust1.' *Journal of Personality,* 35:4, 651-65.

Rubin, Z. & Peplau, L. A. 1975. 'Who Believes in a Just World?' *Journal of Social Issues,* 31:3, 65-89.

Schweizer-Ries, P. 2008. 'Energy sustainable communities: Environmental psychological investigations.' *Energy Policy,* 36:11, 4126-35.

Simpson, B. 2006. 'Social Identity and Cooperation in Social Dilemmas.' *Rationality and Society,* 18:4, 443-70.

Steg, L., Dreijerink, L. & Abrahamse, W. 2005. 'Factors influencing the acceptability of energy policies: A test of VBN theory.' *Journal of Environmental Psychology,* 25:4, 415-25.

Stern, P. C., Kalof, L., Dietz, T. & Guagnano, G. A. 1995. 'Values, Beliefs, and Proenvironmental Action: Attitude Formation Toward Emergent Attitude Objects.' *Journal of Applied Social Psychology,* 25:18, 1611-36.

Stürmer, S. & Kampmeier, C. 2003. 'Active citizenship: The role of community identification in community volunteerism and local participation.' *Psychologica Belgica,* 43:1-2, 103-22.

Tyler, T. R. & Blader, S. L. 2001. 'Identity and Cooperative Behavior in Groups.' *Group Processes & Intergroup Relations,* 4:3, 207-26.

van Zomeren, M., Postmes, T. & Spears, R. 2008. 'Toward an integrative social identity model of collective action: A quantitative research synthesis of three socio-psychological perspectives.' *Psychological bulletin,* 134:4, 504-35.

Walker, G., Devine-Wright, P., Hunter, S., High, H. & Evans, B. 2010. 'Trust and community: Exploring the meanings, contexts and dynamics of community renewable energy.' *Energy Policy,* 38:6, 2655-63.

Whitmarsh, L. & O'Neill, S. 2010. 'Green identity, green living? The role of pro-environmental self-identity in determining consistency across diverse pro-environmental behaviours.' *Journal of Environmental Psychology,* 30:3, 305-14.

Wooldridge, J. 2002. *Econometric analysis of cross section and panel data.* Cambridge, MA: MIT Press.

Tables

Table 1. General characteristics of cooperatives.

	Ecopower	**BeauVent**
Year of creation	1991	2000
Number of full-time equivalent workers	22	5.37
Number of members	47,419	2,391
Total capital (in euros)	48,328,750	4,781,500
Average number of shares/member	4.1	8
Average membership period (in years)	4.95	4.88

Source: created by author based on 2013 data provided by the cooperatives.

Table 2. Summary statistics and description of the variables used in the analysis.

Variable	Description	Ecopower members					BeauVent members				
		Obs.	*Mean*	*Standard deviation*	*Min*	*Max*	*Obs.*	*Mean*	*Standard deviation*	*Min*	*Max*
PRICE	=electricity price offered by Ecopower relative to the price of the market leader	4277	0.88	0.07	0.75	1.01	71	0.83	0.08	0.75	71
PVPANELS	=1 if household has PV panels	4222	0.46	0.50	0	1	70	0.57	0.5	0	70
TRUST	=1 if trust higher than the mean	4340	0.89	0.31	0	1	73	0.88	0.33	0	73
DISTRIB	=1 if distributive BJW higher than the mean	4340	0.56	0.50	0	1	73	0.56	0.5	0	73
PROCED	=1 if procedural BJW higher than the mean	4340	0.13	0.34	0	1	73	0.1	0.3	0	73
ENVORIENT	=1 if environmental orientation higher than the mean	4340	0.86	0.35	0	1	73	0.88	0.33	0	73
EDUC1	=1 if universitary education	4340	0.31	0.46	0	1	73	0.16	0.37	0	73
EDUC2	=1 if sup. non-universitary education	4183	0.41	0.49	0	1	70	0.59	0.5	0	70
EDUC3	=1 if sup. secondary education	4183	0.21	0.41	0	1	70	0.16	0.37	0	70
EDUC4	=1 if inf. secondary education	4183	0.05	0.22	0	1	70	0.04	0.2	0	70
AGE	Age in years	4326	49.07	11.85	2	87	73	52.1	13.15	24	73
GENDER	=1 if individual is a man	4317	0.81	0.39	0	1	72	0.79	0.41	0	72
WINDMILL	=1 if individual lives close to a windmill	4301	0.12	0.33	0	1	72	0.08	0.28	0	72
INCOME1	=1 if household income higher than 4000 €/month	4340	0.21	0.41	0	1	73	0.19	0.4	0	73
INCOME2	=1 if household income between 2000 and 4000 €/month	4340	0.46	0.50	0	1	73	0.41	0.5	0	73
HOUSESIZE	=number of residents in the household	4189	2.92	1.62	1	44	69	2.94	1.34	1	69
ANTWERP	=1 if individual lives in province of Antwerp	4277	0.25	0.43	0	1	71	0.07	0.26	0	71
EAST	=1 if individual lives in province of Eastern Flanders	4277	0.24	0.43	0	1	71	0.11	0.32	0	71
BRABANT	=1 if individual lives in province of Flemish Brabant	4277	0.19	0.39	0	1	71	0.07	0.26	0	71
WEST	=1 if individual lives in Western Flanders	4277	0.18	0.38	0	1	71	0.83	0.08	0.75	71

Source: survey (2014).

Table 2 (continued).

Variable	Statistics for control group				
	Obs.	*Mean*	*Standard deviation*	*Min*	*Max*
PRICE	500	0.87	0.07	0.75	1.01
PVPANELS	501	0.19	0.39	0	1
TRUST	501	0.22	0.41	0	1
DISTRIB	501	0.65	0.48	0	1
PROCED	501	0.50	0.50	0	1
ENVORIENT	501	0.27	0.45	0	1
EDUC1	501	0.24	0.42	0	1
EDUC2	501	0.47	0.50	0	1
EDUC3	501	0.24	0.43	0	1
EDUC4	501	0.05	0.21	0	1
AGE	501	46.82	11.47	19	65
GENDER	501	0.78	0.42	0	1
WINDMILL	501	0.11	0.31	0	1
INCOME1	501	0.18	0.38	0	1
INCOME2	501	0.45	0.50	0	1
HOUSESIZE	501	3.29	1.51	1	24
ANTWERP	494	0.22	0.41	0	1
EAST	494	0.26	0.44	0	1
BRABANT	494	0.18	0.38	0	1
WEST	494	0.21	0.41	0	1

Table 3. Determinants of the decision to join: probit regression with robust standard errors in parentheses.

	1	2	3	4
PRICE	-0.029 (0.061)	-0.137* (0.089)	-0.686*** (0.159)	-0.092 (0.112)
PVPANELS	0.131*** (0.009)	0.132*** (0.009)	0.166*** (0.038)	0.113*** (0.031)
TRUST	0.076*** (0.009)	0.070*** (0.09)	0.066** (0.030)	0.051*** (0.020)
DISTRIB	-0.078*** (0.010)	-0.075*** (0.010)	-0.036 (0.024)	-0.034** (0.017)
PROCED	-0.024*** (0.009)	-0.020** (0.009)	-0.035* (0.022)	-0.024** (0.015)
ENVORIENT	0.069*** (0.009)	0.064*** (0.009)	0.099*** (0.030)	0.047*** (0.020)
EDUC1		0.027 (0.063)		-0.032 (0.024)
EDUC2		-0.012 (0.069)		-0.018 (0.038)
EDUC3		-0.003 (0.069)		-0.030 (0.025)
EDUC4		0.011 (0.063)		-0.023 (0.020)
AGE		0.001*** (0.000)		0.001 (0.001)
GENDER		0.021* (0.012)		0.016 (0.012)
WINDMILL		0.014 (0.013)		-0.015 (0.014)
INCOME1		0.026** (0.012)		-0.004 (0.018)
INCOME2		0.017* (0.010)		0.003 (0.015)
HOUSESIZE		-0.016*** (0.005)		-0.013 (0.006)
ANTWERP		0.022 (0.014)		-0.011 (0.024)
EAST		0.000 (0.17)		0.022 (0.032)
BRABANT		0.012 (0.015)		
WEST		-0.019 (0.020)		0.207*** (0.065)
N	4013	4013	556	556

Note: models 1 and 2 include only Ecopower members and models 3 and 4 include only BeauVent members.
*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

Table 4. Determinants of the level of contributions: ordered probit regression with robust standard error in parentheses.

	1	2	3	4
PRICE	0.171 (0.361)	0.487 (0.534)	0.456 (0.559)	0.375 (0.565)
SOCIDENT	0.151*** (0.053)	0.135** (0.055)	0.118** (0.057)	0.093 (0.057)
TRUST	-0.089* (0.053)	-0.106*(0.055)	-0.060 (0.057)	-0.052 (0.057)
DISTRIB	0.055 (0.054)	0.029 (0.055)	-0.077 (0.057)	-0.073 (0.057)
PROCED	0.000 (0.052)	0.027 (0.054)	0.006 (0.056)	0.004 (0.057)
ENVORIENT	-0.007 (0.054)	-0.009 (0.056)	0.034 (0.058)	0.034 (0.059)
BEAUVENT	0.449*** (0.152)	0.419*** (0.160)	0.388** (0.169)	0.199 (0.177)
ROI			0.840*** (0.055)	0.849*** (0.055)
AGM				0.697*** (0.133)
EDUC1		0.075 (0.267)	0.190 (0.257)	0.223 (0.264)
EDUC2		-0.068 (0.264)	0.067 (0.253)	0.098 (0.260)
EDUC3		-0.247 (0.266)	-0.107 (0.256)	-0.063 (0.263)
EDUC4		-0.250 (0.280)	-0.207 (0.270)	-0.171 (0.278)
AGE		0.029*** (0.003)	0.030*** (0.003)	0.029*** (0.003)
GENDER		0.240*** (0.078)	0.188** (0.081)	0.184** (0.081)
WINDMILL		0.112 (0.081)	0.085 (0.076)	0.120 (0.085)
INCOME1		0.022 (0.081)	0.104 (0.085)	0.016 (0.067)
INCOME2		-0.043 (0.064)	-0.006 (0.066)	0.082 (0.076)
HOUSESIZE		-0.002 (0.016)	0.008 (0.015)	0.010 (0.015)
ANTWERP		0.041 (0.089)	0.094 (0.093)	0.070 (0.094)
EAST		0.109 (0.102)	0.138 (0.107)	0.113 (0.107)
BRABANT		-0.029 (0.100)	0.015 (0.104)	0.001 (0.105)
WEST		0.074 (0.112)	0.076 (0.116)	0.059 (0.117)
Cut1	1.262 (0.321)	3.189 (0.583)	3.670 (0.604)	3.596 (0.612)
Cut2	1.862 (0.321)	3.826 (0.585)	4.361 (0.607)	4.295 (0.614)
Cut3	2.083 (0.321)	4.061 (0.585)	4.610 (0.606)	4.548 (0.615)
Cut4	2.157 (0.321)	4.139 (0.584)	4.693 (0.606)	4.633 (0.614)
Cut5	2.228 (0.322)	4.213 (0.585)	4.772 (0.607)	4.713 (0.615)
Cut6	3.747 (0.436)	5.827 (0.654)	6.478 (0.679)	6.445 (0.694)
N	3368	3368	3368	3368

*Significant at the 10% level.
**Significant at the 5% level.
***Significant at the 1% level.

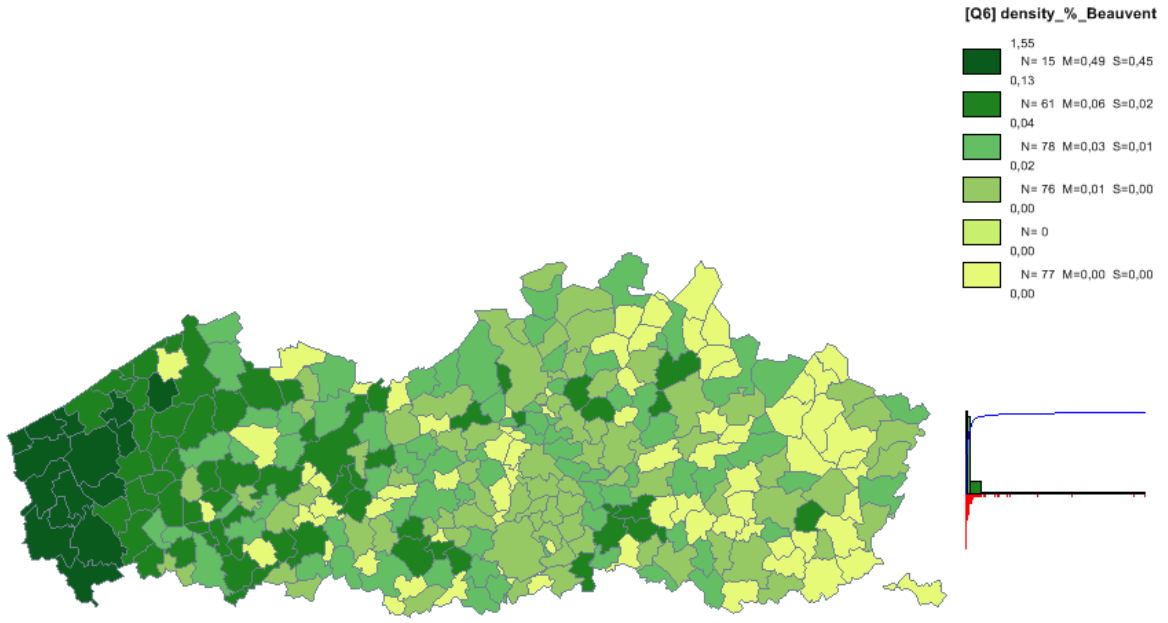
Table 5. Descriptive statistics for additional controls in the analysis of the level of contributions.

Variable	**Ecopower members**					**BeauVent members**				
	Obs.	*Mean*	*Standard deviation*	*Min*	*Max*	*Obs.*	*Mean*	*Standard deviation*	*Min*	*Max*
ROI	3934	0.23	0.42	0	1	62	0.40	0.49	0	1
AGM	3934	0.02	0.14	0	1	62	0.26	0.44	0	1

Source: survey (2014).

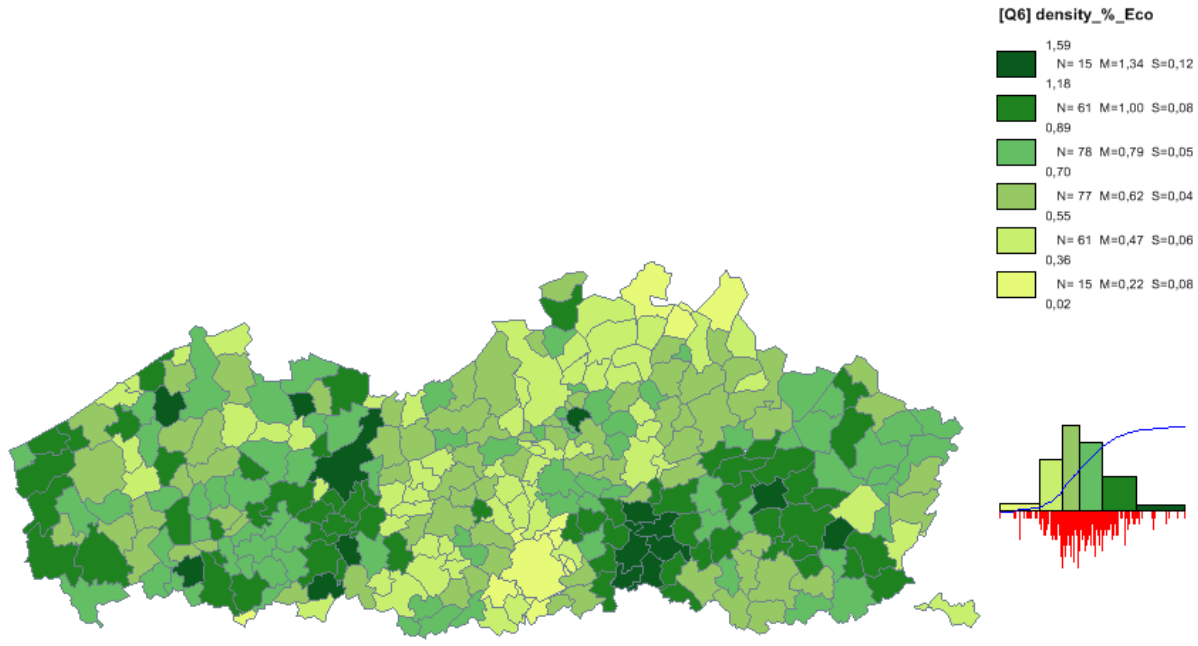
8. Appendix

Figure A1. Spatial density of Ecopower membership in Flanders.



Source: created by author based on data provided by the cooperative.

Figure A2. Spatial density of BeauVent membership in Flanders.



Source: created by author based on data provided by the cooperative.

Table A1. Item-total correlation and Cronbach's alpha for the different scales.

	Item-total correlation and Cronbach's alpha
Trust	
1. Would you say that most people can be trusted, or that you can't be too careful in dealing with people?	0.70
2. Do you think that most people would try to take advantage of you if they got the chance, or would they try to be fair?	0.66
3. Would you say that most of the time people try to be helpful or that they are mostly looking out for themselves?	0.65
Cronbach's alpha	0.82
Environmental orientation	
1. I feel concerned by climate change.	0.63
2. I think that human activities are one of the main causes of climate change	0.45
3. I am the type of person who cares about ecology	0.65
4. I consider myself as an eco-responsible consumer	0.68
5. I want to feel that I personally contribute to environment protection.	0.68
6. It suits me that my family or my friends see me as someone concerned by the environment	0.57
7. Make short distances on foot or with the bicycle	0.44
8. Refuse plastic bags in shops	0.45
9. Re-use used plastic bags	0.48
10. Buy fruit and vegetables grown locally rather than imported	0.40
11. Cut water while I'm brushing my teeth	0.40
Cronbach's alpha	0.84
Distributive beliefs in a just world	
1. In our country, there are too many social inequalities.	0.50
2. For an economy to work well, there are necessarily rich and poor.	0.51
3. Social equality is a good thing, but we have been too far in Belgium.	0.58
Cronbach's alpha	0.72
Procedural beliefs in a just world	
1. Policy-makers care about what the population thinks.	0.69
2. I have the impression that policy-makers take my opinion into account.	0.73
3. I think that political decisions are most of the time made in respect with moral and ethical norms.	0.61
Cronbach's alpha	0.81
Social identification	
1. I am proud to be part of the cooperative.	0.64
2. I have a lot in common with the other members of the cooperative.	0.67
3. Being a member of the cooperative is an important reflect of what I am.	0.72
4. I feel bonded with the other cooperative members.	0.70
5. I like talking about the cooperative in presence of others.	0.66
Cronbach's alpha	0.86

Source: created by author.