



“Let's do it ourselves” Individual motivations for investing in renewables at community level



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ABSTRACT

Renewable energy communities have multiplied the last years in many countries, even in contexts that the structural conditions are not favorable. The paper analyses individual motivations for partaking in local renewable projects and generating energy jointly in an investment community, in order to inform policy debates on how to support such communities. To do so, we applied a socio-psychological approach for studying renewable energy communities in Germany and the Netherlands. Our results show that mainly gain (such as decreasing energy costs) and normative (such as addressing climate change) considerations played a role in the decision, but in the background hedonic motivations were also present, such as having fun and integrating in a community. Each of the groups examined emerged in already existing strong communities, where trust was relatively high, which seems to be an important condition for the realization of local energy projects. Consequently, we argue that tailor-made incentives addressing the different types of motivations can be more effective for the support and spread of renewable energy communities.

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1. Introduction

If we want to transform the current centralized and fossil-based energy system to a sustainable one, the support and therefore a better understanding of renewable energy investors and generators is indispensable, including actors such as the state, companies or individual investors. In this regard, renewable energy production at

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the community level is very promising. It involves people in a neighborhood, who invest in renewable energy technologies jointly and generate the energy they consume, forming what we call renewable energy communities (REC). The growing importance of community-based energy production is well illustrated by the fact that, for example in Germany, citizens have set up more than 718 renewable energy cooperatives [1], while in the Netherlands there are an estimated 150–300 such communities¹ [2] (until 2012). Gaining a better insight on the motivations of renewable investors at the community level can help policy makers to develop more effective supporting mechanisms to address these communities.

Scholars have been studying motivations for investing in renewables for more than a decade [3–8]. These articles focus on motivations and barriers for adopting or installing renewable energy

governmental associations, NGOs, knowledge platforms² and companies that help the establishment and operation of renewable energy communities. Supporting such communities with specific policy instruments can help increase community self-reliance as well as the market share of renewables.

2. Theoretical framework

The literature on individual motivations for investing in renewable energy is diverse. A recent paper surveying the relevant literature analyzed and categorized the results of 18 articles on different types of motivations as follows [12]:

Table 1

Summary of motivations associated with adopting microgeneration. (based on table of Ref. [12, p. 658]).

Motivation	
Financial	Save or earn money from lower fuel bills and government incentives Increase the value of my home
Environmental	Help improve the environment
Security of supply	Protect against future higher energy costs Make the household more self-sufficient/less dependent on the utility companies Protect the household against power cuts
Uncertainty and trust	Use an innovative/high-tech system
Impact on residence	Improve the feeling or atmosphere within my home Show my environmental commitment to others

technologies at the *individual* level. Even though these studies are useful starting points, they do not help us understand motivations for contributing to *joint* investment projects. We expect motivations to participate in renewable energy communities to be more related to group projects. At the group level, there have been also a few studies, which explore the reasons communities engage in renewable energy projects [9–11]. Although, these articles provide a good starting point for understanding motivations for such collective action, they do not present the individual citizen's perspective (for example [11]).

When the individual participant is the starting point, the motivations are provided in a descriptive way in the literature, for instance by simply listing the answers of the respondents (for example [10]), without an understanding of the underlying psychological mechanisms and rationales. As a result, our understanding of the participant's point of view is limited, and cannot be easily compared with other cases. Therefore, the aim of this paper is to answer the following research question: *What are the individual motivations for investing in renewables and generating energy jointly by participating in a local investment community?*

In order to explore this topic, we start from a social psychology approach, since we expect that some motivations would be related to motivations for joint action. Such a theoretical starting point is generally lacking in relevant literature on individual motivations (for example [12]), but can be very useful to help us compare across different cases.

The research contributes to a better understanding of community based energy projects, and provides relevant information for the government and all the support institutions including

We expect some of these motivations to be similar in our cases of community investments; for instance, environmentally-related motivations are probably relevant whether one conducts the investment alone or in groups. However, motivations for joint investments may also be expected to be different. For instance, being a member of a group, and the social acceptance that this brings may play a role in participating in RECs, but not for individual investments. We may miss similar motivations if we assume that the reasons people invest individually are the same that drive people to invest jointly.

Various motivations can be found behind a decision to invest in renewable energy and doing it jointly with others. Lindenberg and Steg [13] studied environmental behavior and coupled motivations behind such individual behavior with goal-frames, arguing that in every situation people want to achieve a goal that combines certain types of motivations. Hence, motivations can be divided into three groups depending on what fundamental desires and needs they fulfill. They argue that people perceive every situation from a different point of view, a perception that is influenced by the goal they want to achieve. They distinguish among three goal-frames: the hedonic goal “to feel better, feel comfortable”, the gain goal “to guard and improve one's resources”, and the normative goal “to act appropriately” [13, p.119].

1. Within the *hedonic goal-frame* people want to improve the way they feel at the moment. This goal-frame has a short-term time horizon (focusing on the moment at hand) and motivates people to increase their pleasure (seeking excitement, happiness or direct improvement in self-regard) and avoid situations, which negatively affect their well-being (avoiding effort,

¹ The large variation of numbers is due to the different interpretations of this phenomenon in the literature depending on the degree of the ownership or the participation of the local residents [26].

² Knowledge platforms are either self-organized networks or co-operations between different stakeholders to support and educate RECs [2].

negative thoughts or uncertainty). People are more likely to behave environmentally responsible, if this behavior also provides them with satisfaction and pleasure. However, in case an action is relatively difficult or complicated, then the hedonic goal-frame discourages people from acting.

2. The *gain goal-frame* determines one's motivation to increase or protect resources. It has a middle- or long-term time horizon, which means the goals to be achieved are in the near or far future. In case this goal-frame is dominant, people are open to all kinds of incentives or opportunities which promise benefit. So people are more likely to act environmentally conscious, if they can also expect some profit.
3. Within the *normative goal-frame* people act appropriately, and behave ethically or morally. Their main goal is to meet norms expected by themselves or the community. It is more likely that people act according to normative goal-frames, if they are aware of environmental problems. However, the dominance of this goal-frame is reduced, if costs increase or the act becomes too complicated or time-consuming. In this situation the gain or hedonic goal-frames take over.

According to this theory, motivations in all three goal-frames are present at all types of environmental behavior; however, motivations belonging to the dominant goal-frame condition the way people interpret the situation and also the way of action. Motivations belonging to the other two goal-frames remain in the background and they either strengthen or weaken the dominant one. In case the goal changes, the interpretation of the situation and the action itself change as well.

Besides investigating individual motivations from the perspective of the goal-frames there are also some other theories that help us understand why people want to invest in energy technologies jointly. First of all, people are social beings and their basic need is to belong to a group [14,15], not only for the group's sake, but also since they can gain benefits through the group [16].

Based on these arguments, Olson [17] comes to the conclusion that every group or organization is seeking to ensure some kind of collective good. The acquisition of this collective good is beneficial for all members of the group. Thus, if a group decides to start an energy project and to produce the energy they need, then the group has initiated collective action. The members of the group become shareholders of the collective good, which is the community energy system including both the technological and social aspects.

Further, Olson argues that collective action is not necessary, if the person can achieve his or her goal also alone. Therefore groups are formed only when:

- 1) people have a common interest and unorganized, individual action is not able to realize this interest, or
- 2) realizing an (individual) interest alone involves greater sacrifice and effort than doing it with others. Following this line of reasoning, people would aim at procuring technologies jointly, because with collective action they would have advantages that they would not gain, if they invested in renewables alone.

How can we understand this sacrifice and effort in the case of investment on renewable energy technologies? One of the reasons people may decide to invest in a technology jointly is that this way they can divide, and thereby reduce, transaction costs. Transaction cost is a cost incurred in trading goods or services [18]. It includes not only monetary, but also other costs, such as time, energy etc, which, for example, incur during searching for suppliers, or specific technologies. Bargaining costs are also part of transaction costs: these are the costs of establishing a contract, which may comprise of applying for permits, consulting a lawyer or cooperating with the municipality. Secondly, it is a general belief that community-based

projects can obtain permissions and local acceptance – which can be very important in case of the NIMBY phenomenon – easier than others and it is twice more likely that they get accepted by the local residents than external projects [11]. Thirdly, costs of monitoring and implementing the contract are considered as transaction costs as well, which can arise if the supplier does not comply with the contract. Finally, costs may incur relating to the estimation of the locally available resources, which fundamentally means what each area can provide in terms of nature and resources as natural endowment (for example availability of geothermal resources, or locations with strong winds).

Apart from dividing transaction costs, sharing the risks (such as the failure of the technology; changes in regulations or on the market that can lead to financial loss) with others can also attract individuals to procure a technology jointly. In the course of collective action, the risk and also its consequences are distributed among all the group members, which renders major investment possible and allows for taking higher risks than in case of individual action [19]. If a person decides to invest in renewable energy together with others, then he or she can, presumably, afford a greater and more expensive technology for smaller input, since joint investment reduces the costs and risks [20].

In addition, people can also have other motivations for taking part in a collective action. While the former motivations (reducing transaction costs and risks) have mainly a gaining element, other motivations may be based on norms and values [21]. Lindenberg and Foss [22] suggest that partaking in a joint production requires different motivations than in case of independent action, which they call joint production motivation. Motivations aiming for “the realization of joint goals or meeting joint appropriateness standards” within the normative goal-frame are “the all-important preconditions for joint production motivation” [22, p. 506]. Especially in the case of renewable energy communities, it has been suggested that ideological reasons, such as improving the neighborhood's conditions, serving as good example for others and supporting and strengthening the local community are among the most important reasons for participation [10,23]. Moreover, people might join community energy projects after their successful establishment because of direct or indirect social pressure (as they do not want to be left out) [24]. Joining to an already proven, successful project has lower risk but higher benefit promises than starting projects. It may also be the case that joint investment increases the person's short-term pleasure: collective action can be exciting, it creates a good spirit and it may increase the people's self-esteem [10]. Furthermore, doing something good and useful in a group provides immediate feedback and reinforcement from the other members of the community, which are important normative considerations and at the same time they strengthen the relationship between members, which is a hedonic aspect.

There is some speculation in the literature with respect to the role of strong local and municipal leadership in motivating individuals to participate in RECs. Even though one would expect that this factor is important, there is not enough evidence for this. “The origins of the groups are very strongly rooted in civil society: well over half (59%) were set up by individuals, and a further third (34%) by pre-existing community groups. This indicates that the community energy sector is predominantly citizen led and community-based from the outset (as opposed to projects being set up by businesses or local authorities and later involving community groups)” [25]. Another study also conducting interviews in the Netherlands on civil society-based renewable energy organizations suggested that sufficient evidence is lacking to validate the hypothesis that authorities play a role in the individual motivations [26].

In conclusion, we expect that what drives individuals to invest in micro-generation is partly similar to what drives people to

participate in RECs. Even though the literature emphasizes gain and normative motivations in this decision, we also expect hedonic motivations to play a role.

3. Methodology

Based on the goal-frame theory, we examined the motivations of people in two Dutch (Amsterdam Zuid, Thermobello) and two German communities (Jühnde and Freiamt) that realized joint renewable investments to identify which goal-frame was the dominant for the joint investment decision. We conducted 41 semi-structured interviews both with the frontrunners that initiated and invested more time and effort in these projects, and with average members, whose contribution was smaller. In addition to the community members, we also interviewed companies, municipalities and researchers (in the case of Jühnde) that helped the communities. The scope conditions for our research population were: 1) communities in the Netherlands or Germany that invested in renewable energy, 2) the investment is a citizen initiative, 3) the members of the initial investment community (people who bought the technology) live in the same location/region, 4) all the members of the investment community are shareholders in all or at least one of the technologies.

Table 2
Interviewees per case.

Frontrunner	Average member	Other	Total
4 (male) 1 (female)	5 (male)	3 – city councilor Göttingen (female), – the LEADER (EU program) manager for the region Göttingen (male), – psychologist researcher from the University Göttingen (female)	13
3 (male)	4 (male)	2 – CEO of the OekoStromgruppe, the company that helped the organization of the project (male), – mayor (female)	9
2 (male) 2 (female) 5 (male)	3 (male) 1 (female) 4 (male)	– 2 – founder of Eva-Lanxmeer (female), – formal director of Vitens (male)	8 11

Renewable energy communities in the Netherlands differ with respect to their size (ranging from small communities with a few members to large communities of 3000 members), location (islands, villages, city neighborhoods, districts in small towns, or just small communities in apartment buildings), and the technology they use (solar PVs, water pumps, wind mills, biomass power plant). These projects also encompass different organizational forms, such as wind or solar cooperatives, joint solar procurement projects and small energy companies that produce and supply energy not only for their members, but also to other customers [2]. Therefore, we used the diverse case method for case selection, since diverse cases of the population are likely to be representative for the full variety of cases [27]. Consequently, we chose four cases from different locations (village, small town, city), with different sizes and with different technologies and resources (wind, solar, biogas, thermal water).

In each case we had a contact person, who helped us to get in touch with other community members, so we could do face-to-face interviews usually by visiting people at their home. The interview guide covered, among other things, the personal motivations for participating in a joint investment project. All the

interviews were recorded and transcribed, and our interviewees are anonymized for the purpose of this paper.

All the interviews were taken in 2013, years after the realization of the projects. We are aware that our interviewees might have had different motivations when making the decisions than the ones they communicate in retrospect. In addition, there may be a recall bias, as in all other interview-based studies [28]. Nevertheless, we are here interested in the perceptions of the participants themselves and their interpretations.

We conducted a qualitative analysis on the interview transcripts, using the theoretical constructs of the goal-framing theory. We coded the motivations using the three goal-frames discussed earlier (hedonic, normative and gain), and tried to answer: What is the main goal-frame influencing the decision to invest jointly? How is this goal-frame framed by the respondent? We considered the goal-frame with the most mentioned motivations as the dominant one. However the analysis also allowed us to pay attention to motivations that do not fit in any of the goal-frame categories, or motivations that belong to more than one goal-frames.

In addition, we sought to identify the characteristics, which may influence variation in these goal-frames. More specifically we looked into whether there were differences between project frontrunners, that initiated and invested more time and effort in these projects,

and average members, that simply invested in the projects. Previous literature has shown that this distinction is relevant for sustainability transitions [29], and that often the focus is on involving frontrunners [30]. In addition, prior research shows that citizens prefer different degrees of participation, making thus the distinction between frontrunners and average members of these projects relevant [31] even though this has not been systematically explored. We also looked into gender differences in the cases: previous research has suggested that in energy project planning there seems to be unequal gender distribution with men having a more prominent role than women [32], whereas another study found a predominance of women in organizing local sustainability projects [33].

4. Results

4.1. Jühnde

The first case that we analyze is Jühnde, an agricultural village in Lower-Saxony, Germany, with a population of 780 residents.

They produce both heat and electricity 100% from renewable energy resources and cover all the energy needs of the investment community. The core of the energy production comes from a combined biogas power plant that uses methane, which is complemented in winter by wooden chips. The heat is distributed via a local grid to the households. The total heat production of the village is 6500 MW h/year, while 5000 MW h electricity is produced annually (about double the amount of the local consumption). The project cost 5.3 million Euros, one third of which was paid with governmental and regional funds and the rest by the residents and some business investors.

The idea of a self-sufficient bio-energy village was developed in the University of Göttingen in 2001 as an experiment for a complete shift from fossil energy production to renewables. The university contacted several villages, to choose the village that can participate in the experiment. In each village, the researchers gave a presentation of the danger of climate change and the depleting fossil-fuel resources and of the financial and environmental benefits of a bio-energy project. The community in Jühnde showed such a big interest that the mayor together with other members and local farmers organized a field trip to a wood chip heating system and to a biogas plant to learn more about these installations.

On the same day of the field trip, the villagers founded an initiative named “Initiative Bioenergiedorf Jühnde”. Its mission was to create knowledge on bio-energy in the community, to find a position towards bio-energy and later to actively support the campaign to get selected by the university. Several working groups were organized within this initiative according to the different professions and interests of the community members.

Finally, Jühnde was selected across 54 villages on the basis of local support (more than two thirds of the people supported the project) and agriculture, since the farmers were able and willing to produce crops for the biogas power plant. At the beginning of the project, the university actively participated in the organization of the work of the groups. However, after some time, the researchers retained more and more an observing position. In the following years, the villagers became more and more independent until the whole system started operating in 2005. During the whole process, the community was involved in every decision making.

After 2005, the project was led by a project manager from Eco-Institute, a private company who supported the foundation of the local cooperative. Today 70% of the local residents are members of the cooperative, which organized the whole process within four years. At present, 12 other villages in the region want to become the next bio-energy village.

4.1.1. Motivations

The idea of the project attracted the attention of the villagers from the very beginning on, which according to our interviewees, was always supported by most of the people. We can find motivations belonging to all three goal-frames behind the investment decisions; however, the gain motivations are unequivocally the dominant ones, followed by normative and finally by hedonic considerations. *Being independent from big oil companies and thereby from increasing fossil prices.* – was the most cited gain motivation, and *Protecting the climate or environment.* – was the second most cited motivation, which belongs to the normative goal-frame. In this case, the influence of the university presentation at the beginning of the project is very visible on the motivations or at least on their articulation: our respondents here gave more elaborate answers than the members of other cases and they could better categorize and specify, which factors played a role in their decision making.

“Well, first of all we wanted to be independent. We used to have a gas storage tank in our garden because we had no central energy provision. Each person had his own storage tank for heating (gas or oil). In my opinion, this was nonsense because it’s expensive. Secondly, even if you fill up your tank it is sometimes not enough to get you through the winter and filling it up in the middle of the winter meant waiting for a couple of weeks and buying the resource for high prices.” (Interviewee 2.1, male, average member)³

The answer of a farmer also mirrors the main points of the university presentation. – “Independence from oil, because you don’t need any oil. Secondly, [I] liked the fact that the added economic value would stay in the village once the plant was up and running. The people from Jühnde deliver the resources and we earn what we feed in. So everything is localized in contrast to a big electricity supplier.... I was also interested in environmental protection.” (Interviewee 3.1, male, average member)

The second most mentioned gain motivation is also related to the prices and saving money on the heating costs in the long run. It is important to add that, according to most respondents, the financial support from the regional and national government was crucial in the investment decision, although it rather reinforced the already existing gain motivations. In addition, due to the German feed-in tariff, EEG (Erneuerbare Energien Gesetz – Energy Sources Act) the prospect of a stable, guaranteed income also played an important role in the individual decision making.

Participating in a joint production was the best way for the villagers to benefit from the university’s support and also from the support of the local and regional government. It reduced transaction costs and risks, since professionals helped them for free and they experienced no difficulties with the permits. As one of our interviewees explained it – *“Jühnde received a lot of support. The University initiated the project and the University itself received funding from the FNR [Fachagentur Nachwachsende Rohstoffe – the central coordinating institution for research, development and demonstration projects in the field of renewable resources] for their research. The FNR also funded a big portion of the planning costs during the project so that the people from Jühnde had to invest money only in a quite late phase of the project. This put us in the comfortable situation that we could wait until the end of the planning phase, because up to that point we had not invested much money. Given this background the FNR supported us strongly during the planning phase. In addition we were supported by the input of expert knowledge from the University. Further we received ideological support from all the political parties and all the political levels like the municipality council, the regional government, the government of Lower-Saxony and finally also the national government.”* (Interviewee 5.1, male, frontrunner). According to another interviewee they received not only ideological support: *“Jühnde and the regional government helped us in lobbying at the state and national level. In addition the national government gave a guarantee to the ministry that in case the pilot project fails they pay back the money to the ministry”* (Interviewee 8.1, male, frontrunner). In addition, through the researchers they could receive additional funds from the government, which were essential for the construction of the heating grid.

In terms of the normative goal-frame, addressing climate-change and protecting the environment were most often mentioned. Moreover, educative and patriotic motivations were in many cases present, as well as contribution to the next generation. As one of the interviews said – *“And I was told that once we did the project, other villages would follow our example and in the end it has*

³ The notation indicates that the interviewee is the second interviewee, of case 1.

really happened now, so that more people do something for the environment and for our children.” (Interviewee 6.1, male, average member).

With respect to the hedonic goal-frame, we found different motivations for participation. One of the university researchers (a psychologist), who worked together with the villagers in the project summarized them as follows: *“Most of the people in the working groups weren’t born in Jühnde, but moved there later. Since this is a very strong and closed community, this [participating in the working groups] was a possible way for them to integrate into the local society. Others liked the attention of the media and the honor and the appreciation of the locals for their work. At the same time it was good for them to increase the living standards in the community and work together with other villagers.”* (Interviewee 12.1, female, researcher).

The answer of a villager also confirmed the psychologist’s insights: *“I think you don’t have many chances in life to participate in such a relatively big thing and we did not want to let this chance go. We wanted to participate in it. Well, it was a lot of fun. We had just moved here so we did not know many people and hardly any people knew us. And suddenly there was a group of people who met regularly and friendships developed. So having fun just getting to know others through the work was a motivation in itself”* (interviewee 5.1, male, frontrunner).

All in all, we can conclude that motivations from all three goal-frames were present in the answers of almost all interviewees, however mainly gain and secondly normative motivations played crucial role in the investment decisions.

4.2. Freiamt

Freiamt has 4,300 residents and is located in the south-west of Germany, near Freiburg. Since 2007 the village produces 14 million kWh of electricity from renewable energy sources annually; exceeding the village’s electricity demand by 2 million kWh. The electricity is produced from multiple renewable energy sources: five windmills, 240 roof-mounted PV panels on private houses, two small hydro power plants and two biogas plants constructed in 2002 and 2007. In addition, 150 private houses have installed solar thermal collectors for water heating. All the generated electricity is fed into the national grid. Heating demands are met with heat produced by the biogas plant and several wood-chip and wood-pellet heating systems.

The community project started in 1996, when an external investor approached the villagers to buy land in Freiamt in order to construct wind farms. The population reacted in a skeptical way and nobody sold their land. Instead, some community members got curious about this option and wanted to investigate, whether there was a potential to gain money with wind energy. Hence, seven community members founded an association for the promotion of wind power (Verein zur Förderung der Windenergie in Freiamt) in 1997, with the aim to set up two windmills. As a first test, the association put up a wooden pole in 1997 to make measurements and get data on wind speeds. The results were very promising, so the association concluded in 1999 that it is economically viable to construct a windmill there. The same year, the association started the project to construct two windmills and asked the relevant authorities for the necessary permissions. Two private companies joined the project as partners.

In 2000 a private company (Freiamt Windmühlen GmbH & Co. Beteiligungs KG) was set up in order to execute the project. The company initially had 150 (now +200) private shareholders, more than 50 of them being community members in Freiamt. Until today five windmills have been constructed and operated by Freiamt Windmühlen GmbH & Co. Beteiligungs KG. All electricity

from wind energy in Freiamt is fed into the national grid⁴. The association for wind power is still active today (2014) and according to the village’s mayor, it has established itself as an influential body for all community members. Today, the company has 350 active shareholders with a third of them being community members, while the rest of the shareholders live in neighboring villages.

In addition, Freiamt has more than 240 PV systems installed on private homes. The association for wind energy tried to construct several PV systems jointly with community members. However, there was not much interest from the citizens who rather preferred to install their solar systems individually, without collective action (*“If my neighbor puts a PV system on his roof, I will too”*). As they said, installation was much easier and cheaper than the wind project, so there was no sense for them to do it collectively. Also, there is a small biogas plant operated by a local farmer. Nineteen private homes and one school are connected to it.

4.2.1. Motivations

In contrast to Jühnde, gain and normative motivations were equally present, while there was limited evidence of hedonic considerations. Another difference between the two communities is that the answers about the motivations were less elaborate in Freiamt, while in Jühnde the presentation of the university summarized the possible reasons for investing and provided a framework in which people could think, and justify their actions.

The main gain motivation in this case was clearly the profit that the villagers expected to earn with the project. As one of our interviewees said *“When I first started earning money, I had some money left to invest. I thought about what to do with this money. For me it was not very attractive to put the money in a bank account, because the interest-rates were declining. With the wind project it was obvious that there would be profit if you invested money”* (Interviewee 1.2, male, average member). Another interviewee said: *“First and foremost the attractive possibility to invest my money. The positive forecasts about the energy yield and the return on investment were decisive for me to invest”* (Interviewee 2.2, male, average member).

Besides the profit, the stability of the project was also important for many respondents that helped to decrease the (psychological) risk of the investment. *“It is more important to the people to invest in things that are stable in value; things they can see, they can touch and where they can say, ‘I own a part of this’ instead of virtual investments. I think this is the main motivation. People don’t want to invest in a share, but they want to invest in a wind turbine, which they can see and they know that they own a certain part of it.”* (Interviewee 5.2, male, frontrunner). The stability was an important factor that was also reinforced by the EEG: *“The project would not have been realized without the Renewable Energy Sources Act (EEG) because with this, you already know in advance how much money you will receive for the electricity you produce. Without this Act we also would not have received any loans from the banks. And also the parts of this Act, which oblige energy suppliers to buy the electricity and to connect us to the grid, were crucial.”* (Interviewee 6.2, male, frontrunner).

Reducing transaction costs as a gain motivation is present also in this case. This is most visible in the individually applied solar PVs. Olson’s reasoning on the participation of collective action is valid in this situation too. Hence, procuring the wind mills jointly was reasonable to reduce transaction costs, but the investment in PVs was simple enough to realize it on their own. *“I think the support from the government was big and it was easy to buy such a PV system, because there was a lot of supply. I think most PV systems were installed for economic reasons. You don’t need to cooperate if you install a PV system, because you can go to the bank and get a*

⁴ The wind energy they produce cannot be used directly, but the villagers can buy it back for the same price.

loan. *With the windmill it is more difficult I think.*" (Interviewee 7.2, male, frontrunner).

The main normative motivations in this case were also environment protection: "... we all, especially the next generation, want to live in an environment, which is "healthy". We have to start acting now because later it will not be possible any more. And we have to do it with small steps; we can't just change the whole energy system over night and turn off all nuclear power plants and use renewables only. In my opinion it won't work this way." (Interviewee 1.2, male, average member) and supporting the development of renewable energy technologies: "Also the motivation to support the wind power development. I believe that there are some "real" *Freiämters*, who want to genuinely support wind power development." (Interviewee 4.2, male, average member). In several cases we also found patriotic considerations, thus the protection or improvement of the local community. "What fascinated me was that we could try such a project here in the region and also the ecological background I mentioned in the beginning."; "The motivation to do it on our own was simple that we didn't want anyone else to come here and construct his windmill in our town." (Interviewee 3.2, male, average member). This sense of independence is emphasized also in the first case, and could also be related to hedonic goal-frame: a sense of good feeling created by being able to control one's own resources.

It should be noted that sometimes, the categorization of motivations in the hedonic or normative goal-frame is not very self-evident, as some excerpts contain both normative and hedonic elements: "*Apart from the economic motivations maybe also the feeling of being part of the group that produces electricity here in *Freiämt*. I think this aspect/motivation connects the people within the community.*" (Interviewee 6.2, male, frontrunner).

In conclusion, the *Freiämt* case indicates the coexistence of gain and normative goal-frames behind the decision to invest jointly in wind energy, as well as individually in solar PVs. Hedonic goal-frames are less relevant.

4.3. Amsterdam Zuid

The community is located in the south of Amsterdam: a houseboat area including 80 boats. The residents regard it as a village in a city, because the people know each other very well and they form a strong community. The neighborhood used to be divided between the old and new residents. The first generation of houseboat owners moved there in the 1960–70's, because they could not afford to live in a house and they could not "*find their place in the mainstream society*". Later, living on a houseboat became expensive and only wealthier people could afford it⁵. While the first generation houseboat owners were low-educated, newcomers were rather high-educated. The awareness of environmental problems is high, since there are several initiatives related to environment protection. An overwhelming majority of the residents (95%) are members of the local association (*Vereniging van Eigenaren*), which exists for 50 years and once a year they have a general assembly. That was the connecting point and the forum where people met each other.

Four local people started the project in 2008, when they wanted to buy solar PVs on their own, because that year the local government launched a solar program for subsidizing individual application of solar PVs. However, when the technology supplier offered them 20–30% price discount in case they bought PVs in large quantities, the initiators decided to involve other people

from the neighborhood. They organized a meeting in the local association, but not enough people came. So they cooperated with a few other enthusiastic residents to organize a communication campaign to attract as many people as possible. They put advertisements in the local newspaper, distributed leaflets and they also went to each boat personally. Visiting all the residents one by one proved to be the most effective way of involving people in the project. In the end, 35–40 people joined the project.

Finally, one of the initiators ordered all the solar panels, and helped people apply for subsidies. When the solar panels arrived, the people got together and helped each other to put them on the roofs of the boats. After the first year, the initiators repeated the whole project twice. The last time, even though they did not go to each people's house, there were already people who came to them to join. The municipality's solar program continued in the following years, so they could apply for subsidies again.

4.3.1. Motivations

As in the German cases, the motivations belonging to the gain goal-frame were dominant also in the houseboat-neighborhood of Amsterdam Zuid. However, normative considerations had almost the same importance in the decision, while hedonic motivations played only a minor role.

Saving money in the long run was the most prominent gain motivation, followed by the opportunity of reducing transaction costs by participating in the project: "*We know that the price of the fossil energy will increase so it is a good investment to buy solar PVs now.*" (Interviewee 3.3, male, frontrunner); "*Because there was this subsidy and it was well organized.*" (Interviewee 2.3, male, average member). Similarly to Jühnde, regulations, such as *saldering* (a tax exemption that guarantees that up to 5000 kW h/year the behind-the-meter produced electricity is exempt from VAT and energy tax) and subsidies played an important role in the investment decision and reinforced the gain motivations of the people. – "*Saldering was really essential, without it we wouldn't have invested in this project.*" (Interviewee 7.3, male, frontrunner); "*We got subsidy from the local government, called *Zon op je dak*. The national government gave us also subsidies for the heating. Yes, we started the whole project just because of the subsidies.*" (Interviewee 6.3, female, frontrunner).

The most common normative motivation was related to the environment, similarly to the previous cases: "*I was very positive about it, because I wanted to do something for the environment.*" (Interviewee 1.3, female, average member), or doing something good for the next generations: "*And it is also good to have some energy left for the next generation.*" (Interviewee 2.3, male, average member). "*People have strong principals and worldviews and they are a bit more pro-environmentalist than the average.*" (Interviewee 1.3, female, average member) In addition, the complexity of the project was also much lower than in the previous cases, which meant less cooperation and joint action for the common goal. Nevertheless, also in this neighborhood the main hedonic motivation was the collaboration: "*It was also fun to do it together and help each other.*" (Interviewee 4.3, male, average member).

4.4. Thermo Bello

Thermo Bello is a district heating company owned by residents in the district EVA Lanxmeer. Eight hundred people (300 households) live in the neighborhood, which is located in Culemborg, a small town near Utrecht, the Netherlands. This district is different from the other parts of the town, and it also has a different history, since it was a planned ecological project of the local municipality. The eco-houses are built around common gardens, which people can cultivate together, producing seasonal fruits and vegetables; no cars are allowed. Besides that, EVA Lanxmeer can boast a very strong

⁵ It was a form of suburbanization, when the wealthier residents of Amsterdam moved out from the city center to the green outskirts areas, thereby increasing the house prices in these neighborhoods.

community with an intensive social life. People know each other and every hof (courtyard) has its own projects and parties that the residents organize.

The story of Thermo Bello started in 2006, when Vitens, a public water company wanted to sell its subsidiary, a local heating system. The company distributed heat emitted in the process of cooling down drinking water. Since there was no big company interested in this system at that time, even though Vitens offered it much under market price, the company also asked the local municipality and the association of house owners whether they wanted to buy it. Although the municipality didn't show any interest, there were four residents who saw the potential in it and decided to investigate the option of setting up a local company and taking over the heating system.

At the beginning of the following year a business development association was set up (Vereniging Ontwikkeling Expertise Warmtenet – VOEW) and the local inhabitants could become members of this association. In the end, 68 people joined the association. They set up 4 working groups (financial, organizational, communication and technology) with 5–6 people in each group led by the board members of the association. Everybody worked voluntarily. They put together all the information in a feasibility study and wrote a business plan.

In 2008 they presented it in the next assembly of the Bell (local association – vereniging van eigenaren), which would decide whether to realize this project. The large majority of the people was positive. So they could establish a limited liability company with shares. Finally the company started its operation in 2009 and took over the heating system from Vitens.

4.4.1. Motivations

In contrast to the previous cases, motivations belonging to all three goal-frames were equally present in the decision on participating in the takeover of Thermo Bello. Such as in Jühnde, the fear of increasing oil prices and the wish for independence were the dominant gain motivations. *“Costs. There was a fear that the heating prices would go up, so a lot of people wanted to avoid that, so did I.”* (Interviewee 6.4, male, frontrunner); *“We were afraid if a big company bought the system, then we would lose all the control on it and we wouldn't have any kind of influence on the tariffs.”* (Interviewee 1.4, male, frontrunner). The financial support of the local government was essential also in this case, which reinforced the gain motivations and made it possible to realize the investment. – *“We had a very good relationship with the municipality, because it initiated this district. They gave a financial guarantee to the bank after the loan (70,000€). It meant two percent lower interest rate from the bank. The alderman helped us to lobby at the province level. The Province of Gelderland also gave us 150,000€ for the expansion (since the pipeline didn't reach all the buildings we had to expand it). Without the guarantee we couldn't have done this project.”* (Interviewee 5.4, male, frontrunner).

The wish for independence can be also found among the normative motivations, which was more prominent than environmental considerations. *“Let's do it ourselves. We can do it better on our own.”* (Interviewee 6.4, male, frontrunner); *“It was ideal for all of us. It was small-scale, people could get involved in it. It is more the feeling, that we do everything ourselves, independently.”* (Interviewee 4.4, male, average member). Here again the sense of independence, as in Freiamt and Jühnde, is mentioned.

These considerations were also present among the motivations belonging to the hedonic goal-frame – *“It's fun to take a challenge and being an innovator.”* (Interviewee 6.4, male, frontrunner) – while practicing a person's creativity and work together with others were also important factors according to our interviewees – *“I am interested in sustainability and technology. I like to create something together with others.”* (Interviewee 1.4, male, frontrunner); *“I am also a social type and like to work together with others*

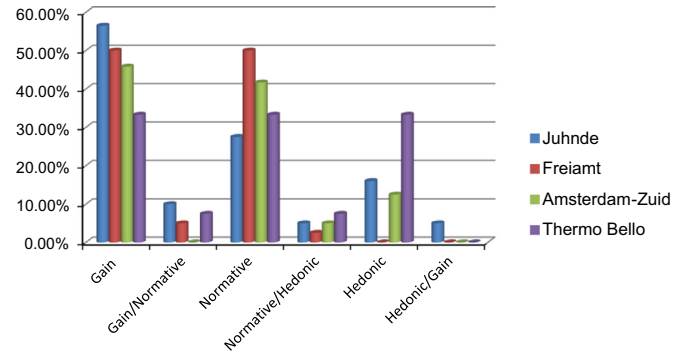


Fig. 1. Distribution of the pure and mixed categories of goal-frames in the cases.

which I had a chance for here.” (Interviewee 3.4, male, average member).

In Fig. 1 we summarize the types of motivations identified per case. We show how many times gain, normative and hedonic motivations were mentioned per case. A word of caution here: since the research is based on qualitative analysis of non-representative interviews per case, the percentages should not be interpreted as generalizable results, but rather as indications of which were the more and less prominent motivations per case. In addition, the figure also indicates motivations which transgressed the framework we used, and can be understood in terms of multiple goal-frames. This is further discussed in the last section.

In Table 3, below we also show the distribution of dominant and background goal-frames with respect to the type of participant: frontrunner or average member. We also discuss this table in the next section.

5. Discussion and conclusions

Based on our empirical data gained in all four cases, we can conclude that mostly gain, but also normative motivations were the key drivers for joint energy production, and hedonic considerations were less important. However, while in the case of Jühnde and Amsterdam Zuid there is a clear dominance of gain motivations, followed by normative ones, in the case of Freiamt and Thermo Bello gain and normative motivations were equally present (Fig. 1). Hedonic motivations were evident in Jühnde, Amsterdam Zuid, and Thermobello, but somewhat absent in Freiamt.

The most frequent gain motivation in all cases was cutting energy costs. Specifically, the respondents expected lower energy prices after the projects and thereby saving some money in the long run. It was in several cases related to the independence from big energy companies and from increasing fossil prices. Besides the cost reduction, in Jühnde and Freiamt people also hoped for some profit from the investment, which is indeed more probable in Germany than in the Netherlands due to the German feed-in tariff (EEG), the most established feed-in policies worldwide that guarantees a fixed price for the sold renewable energy, above the market price [34]⁶. The Dutch feed-in system is less favorable in this sense [35]. Therefore, it is not surprising that the influence of this policy on the motivations was visible, although it rather

⁶ However, the EEG regulations changed in 2014. According to that, new investors have to purchase the electricity they generate at the wholesale market, which gives no guarantee for fixed price thereby making electricity production risky and difficult. In addition, a sliding premium was introduced that is less reliable than fixed tariffs and which substantially decreases the calculability of the profit. These changes might have a negative influence on gain motivations in future projects that can even discourage several community investors for making new investments.

Table 3

Distribution of dominant and background goal-frames in respect to the role of the respondents.

Case		Dominant goal-frame	Background goal-frames
Jühnde	<i>Frontrunner</i>	Gain	Normative Hedonic –
	<i>Average member</i>	Gain –	Normative Hedonic –
Freiamt	<i>Frontrunner</i>	Gain –	Normative –
	<i>Average member</i>	Gain –	Normative –
Amsterdam-Zuid	<i>Frontrunner</i>	Gain Normative –	–
	<i>Average member</i>	Normative –	Gain Hedonic –
Thermo Bello	<i>Frontrunner</i>	Gain Normative Hedonic –	–
	<i>Average member</i>	Gain Normative Hedonic –	–

reinforced the already existing gain motivations. We also found an influential regulation in the Netherlands, namely the saldering law that also strengthened gain motivations in the Amsterdam Zuid case. Finally, reducing transaction costs and risks was also an important factor in the decision making, which also belongs to the gain goal-frame.

Regarding the normative goal-frame, the protection of the environment was the most dominant motivation. Supporting the development of renewable energy technologies can be also linked to this motivation. In addition, protecting the rights of next generation was also often mentioned. Local patriotic considerations such as strengthening the community or the local economy were only present in the German cases. It is important to mention here that these latter motivations are specifically group motivations or, how Lindenbergh and Foss [22] call them, joint production motivations, since within the normative goal-frame they tend towards a common interest, while all the other considerations are important only from the individual's point of view.

Motivations belonging to the hedonic goal-frame were mainly focusing on the opportunity to get to know each other and to gain new friendships. However, the options of having fun and being creative were also attractive for many people. In the case of Jühnde the project provided also a good chance for the newcomers to get accepted by the community, which they had difficulties with before. Even though the goal-frame framework proved to be very useful for this analysis, the clear categorization of all motivations as well as the identification of the dominance of a certain goal-frame in each case was not always clear-cut. Firstly, we had difficulties to fit some of the answers in only one of the categories; *becoming independent from big oil companies*, could be gain (gaining back the control on prices) or normative (preferring local production over mass production) motivation. In such cases we either used the context of the transcript to assign the explanation to a goal-frame, or used a mixed category (see Fig. 1). This suggests that the goal-frames have to be applied with a certain degree of flexibility. Especially with respect to the motivation for independence, it has to be noted that it was mentioned by participants in all three rural cases, and missing in the urban case (Amsterdam Zuid). In rural environments self-reliance is very important,

whereas in urban environments interdependence and not self-reliance are the norm.

Secondly, we could also observe the interplay between the dominant and the background goal-frames and other factors that also influenced the motivations, thereby changing the possibilities and the motivations at the same time. On the one hand, we cannot neglect the importance of contingency in all of the cases. Without the initiative of the university in Jühnde the project may never have been realized. In Freiamt, the investors that wanted to buy the lands turned the villagers' attention to the possibility of wind power. In Amsterdam Zuid, the supplier offered a reduced price for joint procurement, which triggered the collective action. In the case of Thermo Bello, the project started because of the plans of the water company.

On the other hand, the support of the local governments and national policy instruments (subsidies, feed-in tariffs) or the initiative and help of the university in Jühnde strengthened the gain motivations. In this respect, our cases provide some evidence for the role of the local (and national) authorities in motivating the participants, in contrast to previous cases [26]. Further ethnographic research in such projects needs to clarify how the interplay of the goal-frames develops over time, and which factors trigger change in the dominant goal-frames.

With respect to the difference between frontrunners and average members of these communities, we observed no remarkable differences in any of the cases (see Table 2 previous section). This is quite intriguing: our data do not support a differentiation between frontrunners and average members on the basis of motivations⁷. In other words, frontrunners do not necessarily become frontrunners because they have different types of motivations than average members (see Table 1). Personal characteristics, such as style of leadership, or even contingent factors, such as free time available, may play a big role here. Further research is needed to clarify what makes a community member a frontrunner, since a lot of schemes, such as transition management or strategic niche management are relying on attracting and engaging these frontrunners [30,36].

It is important to note here that more than 90% of our interviewees (except in Amsterdam Zuid, where it was more balanced) were male, mirroring the male predominance of the participants in these projects. As one of our interviewees in Freiamt said: “...and mainly men conducted the project. At the shareholder meetings there were 90% men.” (interviewee 2.2, male, average member). This is the first time, to our knowledge, that gender inequality in such projects comes to the fore. Further research can illuminate whether this is related to gender inequalities in energy project planning [32], or to more general unequal gender distribution of technology use [37].

In relation to the previous studies on motivations for micro-generation, and renewable investments, our results are somewhat different. There are a number of motivations identified in previous cases but not in our results, which can indicate that they relate more to individual investment. Examples of such individual-investment motivations are: increase of value of the house, protection from power cuts, show environmental commitment to others [12]. Other motivations were similar to the ones identified before in the literature, such as improving local conditions and strengthening community [10,23], and participating in an exciting project, contributing to self-esteem [10]. Other motivations we identified were new, like educating and helping the next

⁷ The only small exception was in the case of Amsterdam Zuid, where average members had only normative motivations in the dominant goal-frame in contrast to the frontrunners that were equally led by normative and gain motivations, and hedonic motivations remain in the background.

generation, being independent from big companies, being accepted by the community, using unused resources.

All in all, our results suggest that incentives addressing mainly the gain and normative motivations could be the most effective triggers, if we want to support the spread of renewable energy communities. Governmental policies could provide long term and calculable financial incentives, such as the German feed-in tariff (EEG) or local subsidies addressing joint investments, which seem to be very important factors in terms of gain motivations. At the same time, the support of non-governmental organizations for populating the idea of community based clean energy production could provide normative triggers. Hedonic motivations can be emphasized by local organizations and connecting networks.

It is also important to recognize that all the four investment groups were formed in already existing and strong communities, where people knew each other and had some experience on collective work before. We hypothesize that in absence of supportive regulatory framework, which can guarantee financial gains, such projects would tend to emerge in rather closely-knit communities, where trust is relatively high. Hence, only the introduction of incentives addressing gain and normative motivations is probably not sufficient for accelerating local energy production, but they have to be tailor-made to the already existing strong communities, since they have most likely the potential to become renewable energy communities in the near future. It could be the case that in communities that are not so closely-knit, other types of motivations play a role, which necessitate different incentives, probably to realize low complexity projects, such as solar panel installation. Further research is necessary to establish whether RECs can be established in such communities, for instance in urban areas.

References

- [1] DGRV – Deutscher Genossenschafts- und Raiffeisenverband e.V., 2014. *Energiegenossenschaften*. Berlin.
- [2] Energieke BottomUp in Lage Landen n.d. (<http://www.asisearch.nl/wp-content/uploads/2012/08/ESSAY-Energieke-BottomUp-in-Lage-Landen-Schwenck-e-21082012-FINAL.pdf>); 2014 [accessed 17.11.14].
- [3] Claudy MC, Michelsen C, O'Driscoll A, Mullen MR. Consumer awareness in the adoption of microgeneration technologies. *Renew Sustain Energy Rev* 2010;14:2154–60. <http://dx.doi.org/10.1016/j.rser.2010.03.028>.
- [4] Mahapatra K, Gustavsson L. An adopter-centric approach to analyze the diffusion patterns of innovative residential heating systems in Sweden. *Energy Policy* 2008;36:577–90. <http://dx.doi.org/10.1016/j.enpol.2007.10.006>.
- [5] Marques AC, Fuinhas JA, Pires Manso JR. Motivations driving renewable energy in European countries: a panel data approach. *Energy Policy* 2010;38:6877–85. <http://dx.doi.org/10.1016/j.enpol.2010.07.003>.
- [6] Palm J, Tengvard M. Motives for and barriers to household adoption of small-scale production of electricity: examples from Sweden. *Sustain Sci Pract Policy* 2011;7:6–15.
- [7] Paladino A, Pandit AP. Competing on service and branding in the renewable electricity sector. *Energy Policy* 2012;45:378–88. <http://dx.doi.org/10.1016/j.enpol.2012.02.046>.
- [8] Zahedi A. A review of drivers, benefits, and challenges in integrating renewable energy sources into electricity grid. *Renew Sustain Energy Rev* 2011;15:4775–9. <http://dx.doi.org/10.1016/j.rser.2011.07.074>.
- [9] Bomberg E, McEwen N. Mobilizing community energy. *Energy Policy* 2012;51:435–44. <http://dx.doi.org/10.1016/j.enpol.2012.08.045>.
- [10] Rogers JC, Simmons EA, Convery I, Weatherall A. Public perceptions of opportunities for community-based renewable energy projects. *Energy Policy* 2008;36:4217–26. <http://dx.doi.org/10.1016/j.enpol.2008.07.028>.
- [11] Walker G. What are the barriers and incentives for community-owned means of energy production and use? *Energy Policy* 2008;36:4401–5. <http://dx.doi.org/10.1016/j.enpol.2008.09.032>.
- [12] Balcombe P, Rigby D, Azapagic A. Motivations and barriers associated with adopting microgeneration energy technologies in the UK. *Renew Sustain Energy Rev* 2013;22:655–66. <http://dx.doi.org/10.1016/j.rser.2013.02.012>.
- [13] Lindenberg S, Steg L. Normative, gain and hedonic goal frames guiding environmental behavior. *J Soc Issues* 2007;63:117–37. <http://dx.doi.org/10.1111/j.1540-4560.2007.00499.x>.
- [14] Cartwright D, Zander A. *Group dynamics research and theory*. n.d.
- [15] LOWIE RH. *Social Organization*. n.d.
- [16] Festinger L. *Group attraction and membership*. Gr. Dyn. Peterson, Row; 1953.
- [17] OLSON M. *The Logic of Collective Action*; 2009.
- [18] Hirshleifer J, Glazer A, Hirshleifer D. *Price theory and applications: decisions, markets, and information*; 2005.
- [19] Samuelson P, Nordhaus W. *Economics*. New York: McGraw-Hill Companies Inc.; 1998.
- [20] Kogut B. Joint ventures: theoretical and empirical perspectives. *Strateg Manag J* 1988;9:319–32. <http://dx.doi.org/10.1002/smj.4250090403>.
- [21] Seyfang G. *New economics of sustainable consumption, seeds of change*. Basingstoke: Palgrave MacMillan; 2009.
- [22] Lindenberg S, Foss NJ. Managing joint production motivation: the role of goal framing and governance mechanisms. *Acad Manag Rev* 2011;36:500–25.
- [23] Walker G, Cass N. Carbon reduction, “the public” and renewable energy: engaging with socio-technical configurations. *Area* 2007;39:458–69. <http://dx.doi.org/10.1111/j.1475-4762.2007.00772.x>.
- [24] Hoffman SM, High-Pippert A. From private lives to collective action: recruitment and participation incentives for a community energy program. *Energy Policy* 2010;38:7567–74. <http://dx.doi.org/10.1016/j.enpol.2009.06.054>.
- [25] Seyfang G, Park JJ, Smith A. A thousand flowers blooming? An examination of community energy in the UK. *Energy Policy* 2013;61:977–89. <http://dx.doi.org/10.1016/j.enpol.2013.06.030>.
- [26] Boon FP, Dieperink C. Local civil society based renewable energy organisations in the Netherlands: exploring the factors that stimulate their emergence and development. *Energy Policy* 2014;69:297–307. <http://dx.doi.org/10.1016/j.enpol.2014.01.046>.
- [27] Seawright J, Gerring J. Case selection techniques in case study research: a menu of qualitative and quantitative options. *Polit Res Q* 2008;61:294–308. <http://dx.doi.org/10.1177/1065912907313077>.
- [28] Yin RK. *Applications of case study research*; 2011.
- [29] Kern F, Smith A. Restructuring energy systems for sustainability? *Energy transition policy in the Netherlands*. *Energy Policy* 2008;36:4093–103. <http://dx.doi.org/10.1016/j.enpol.2008.06.018>.
- [30] Raven R. Analyzing emerging sustainable energy niches in Europe : a strategic niche management perspective. In: Verbong GPJ, Loorbach D, editors. *Governing the energy transition: reality, illusion or necessity?* New York: Routledge; 2012. p. 125–51.
- [31] Rogers JC, Simmons EA, Convery I, Weatherall A. Social impacts of community renewable energy projects: findings from a woodfuel case study. *Energy Policy* 2012;42:239–47. <http://dx.doi.org/10.1016/j.enpol.2011.11.081>.
- [32] Skutsch MM. The gender issue in energy project planning Welfare, empowerment or efficiency? *Energy Policy* 1998;26:945–55. [http://dx.doi.org/10.1016/S0301-4215\(98\)00037-8](http://dx.doi.org/10.1016/S0301-4215(98)00037-8).
- [33] Merritt A, Stubbs T. Incentives to promote Green Citizenship in UK transition towns. *Development* 2012;55:96–103. <http://dx.doi.org/10.1057/dev.2011.113>.
- [34] Mosher JN, Corscadden KW. Agriculture's contribution to the renewable energy sector: policy and economics – do they add up? *Renew Sustain Energy Rev* 2012;16:4157–64. <http://dx.doi.org/10.1016/j.rser.2012.03.027>.
- [35] Doci G, Vasileiadou E, Petersen A. Exploring the transition potential of renewable energy communities n.d.
- [36] LOORBACH D. Transition management for sustainable development: a prescriptive, complexity-based governance framework. *Governance* 2010;23:161–83. <http://dx.doi.org/10.1111/j.1468-0491.2009.01471.x>.
- [37] Grint K, Gill R. *The gender-technology relation: contemporary theory and research*. London: Talyor & Francis; 1995.