

Divide et impera: how to leverage energy efficiency programmes in Swiss SMEs

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Keywords

energy efficiency programmes, implementation, SME, benefits, barriers, stages of change

Abstract

Energy efficiency plays a key role in both the European and the Swiss energy strategies. In recent years many programmes have been launched focusing on corporate energy saving potential in Switzerland. However, only one percent of 250,000 Swiss small and medium enterprises (SMEs) – representing a potential energy saving of approximately 10 % of total Swiss power consumption – participate in energy efficiency programmes, and among them the actual implementation rates are poor. This paper is part of a research project that aims to give recommendations on how to increase participation in energy efficiency programmes and to improve the implementation rate of energy efficiency measures in SMEs. The paper focuses on identifying different market segments in order to design specific programme approaches. It adopts the Stages of Change model (Prochaska & Di Clemente, 1983) to identify potential market segments as a function of their current energy efficiency behaviour and to analyse and profile each of these market segments based on company-specific factors, attitudes, perceptions and motivation. A survey of 334 SME representatives in Switzerland was carried out. Three different segments were identified: SMEs that do not participate in energy efficiency programmes, SMEs that plan to do so, and SMEs that have already joined a programme. In terms of participation in energy efficiency programmes, the study revealed that the three segments are linked to different needs, expectations and general conditions, and that they arise as a result of different factors. It suggests that in order to foster the implementation of energy efficiency

programs, SMEs on different stages of change need to be approached in different ways, and that programme characteristics need to take into account company size and ownership of business premises, provide clear and transparent communication of the implementation effort involved, showcase “best practice” examples, and develop a more comprehensive and/or amended definition of cost savings and benefits.

Introduction

Energy efficiency plays a central role in the European and the Swiss energy strategies. In Switzerland in particular, small and medium-sized enterprises (SMEs) with power consumptions of between 10 and 500 MWh per year could represent savings of up to 10 % of the total Swiss electricity consumption (Rohrer et al., 2014). One way to exploit these potential savings in companies is through so-called energy efficiency programmes. In this context ‘energy efficiency programmes’ refers to programmes supported by external funding bodies that promote energy saving measures and measures to improve energy efficiency by providing, for example, advice or financial incentives. According to estimates, of the 250,000 SMEs in Switzerland with a power consumption of between 10 and 500 MWh per year, only about one percent are involved in energy efficiency programmes. Furthermore, the actual implementation rate of measures recommended in energy efficiency programmes is low (see Eymann & Räber, 2013). Potential barriers to the acceptance and implementation of measures recommended by energy efficiency programmes as well as factors that affect willingness to participate and implement energy efficiency measures have already been discussed in the literature (e.g., Sorrell, O’Malley, Schleich & Scott, 2004; Worrell, Bernstein, Roy, Price & Harnisch, 2009;

Fleiter, Schleich & Ravivanpong, 2012; Eymann & Räber, 2013). For example, the main obstacles to participation in energy efficiency programmes are primarily said to be lack of investment capital, prioritisation of other investments and lack of time (e.g. Brueggemann, 2005; Thollander, Danestig & Rohdin, 2007; Thamling, Seefeldt & Glöckner, 2010). The main reasons for participating in energy efficiency programmes are, predominantly, expected cost reductions, long-term benefits from the investment and a contribution to climate protection (e.g. Brueggemann, 2005; Euro Chambers, 2010; Thamling et al., 2010). A facilitator for the implementation of measures supported by energy efficiency programmes is, according to Eymann and Räber (2013), the extent of the consultation process. The conversion rates for projects that involve just a single consultation are considerably lower than when more intensive monitoring and multiple detailed consultations are provided. The conversion rate is also positively influenced by constructive feedback and demonstrations that measures have been successful. What specific implications do these factors have when promoting energy efficiency programmes? To date, most of the recent literature taking success factors, facilitators or barriers of the implementation of energy efficiency programmes into account, focuses on the industrial sector (e.g. Thollander & Palm, 2012). In fact, however, in Switzerland almost 40 % of the mentioned target audience in this paper (SMEs with power consumptions of between 10 and 500 MWh) is operating in non-productive industries (Bachmann et al., 2014), in which success factors, facilitators, barriers and basic conditions might differ significantly. The aim of this paper is to describe, *inter alia*, motivational factors and barriers of implementing energy efficiency programmes and to give recommendations how to increase willingness to participate in energy efficiency programmes among small and medium-sized enterprises mainly operating in non-productive industries. Furthermore, it attempts to fill a perceived gap in the literature by formulating comprehensive advice on how to approach potential participants as well as specific design criteria for energy efficiency programmes at the bottom line. For this purpose, potential SME customer segments needed to be identified that could serve as a basis for developing advice on how to approach potential participants and defining characteristic features of energy efficiency programmes.

STAGES OF CHANGE MODEL

A potential theoretical approach for defining SME customer segments is the transtheoretical model (Stages of Change; Prochaska & DiClemente, 1983; Prochaska, & Prochaska Levensque, 2001), which has been used and adapted to examine the willingness of companies to participate in energy efficiency programmes. The “Stages of Change” model describes the process of behavioural change that people (or organisations) go through. In order for behavioural change to actually occur, qualitatively different stages of change must be reached. The first stage is called the precontemplation stage. This stage describes people who do not intend to show a certain behaviour in the near future. People at this stage are not aware of the importance of behavioural change and often lack information on the long-term consequences of their current actions. In the second stage (contemplation) a person becomes conscious of the problem associated with their current actions and actively engages with the issue. Specific actions have not yet, necessar-

ily, been considered. At this stage, there is still ambivalence to behavioural change. Only at the third stage (preparation) are the first specific decisions in favour of behavioural change taken. At the fourth stage (action), the first actions reflecting the changed behaviour and changes in a person's own environment in favour of the behavioural change can be seen. At the fifth stage (maintenance and termination; Prochaska et al., 2001), the behaviour becomes routine, which actively strengthens it and prevents relapse.

RESEARCH QUESTIONS

Based on the Stages of Change model (Prochaska & DiClemente, 1983; Prochaska et al., 2001) SMEs can be divided into different customer segments. It is believed that the best methods of approaching potential participants and the most pertinent characteristic features of energy efficiency programmes are different, depending on the stage of change of a person or company. For example, companies at the “precontemplation” stage must first be made aware of the fundamental issues of energy efficiency, something that is not necessary for companies that are almost ready to actually implement energy efficiency programmes. It is also possible that companies that are at the same stage of change differ in other ways: Companies with a negative attitude towards the issue of energy efficiency are probably systematically less likely to participate in energy efficiency programmes than is the case for companies with a positive attitude. Even corporate factors, such as turnover or business size, could have a systematic effect on participation in energy efficiency programmes. As part of an online survey, information concerning stage of change, structural business factors (size, number of employees, etc.), attitudes and motivation to participate, subjective perception of the costs and benefits of participation, barriers to participation and variable energy consumption was collected. The aim was to provide a comprehensive description and characterisation of potential customer segments developed on the Stages of Change, which could be used as the basis for deriving how potential small and medium-sized enterprises should be approached and for defining important specific characteristics of energy efficiency programmes. The ultimate goal is for this to lead to increased participation and implementation rates for such programmes.

Method

PARTICIPANTS

A total of 334 small and medium-sized enterprises (Mdn = 12 employees; 49 % from non-productive and 51 % from productive industries) participated in the online survey, of which 71.6 % completed the survey in full. The companies were recruited with the help of newsletters, industry associations, utility companies, industry associations and newspaper articles. Addresses were also purchased from online service providers. Participation in the online survey took approximately 30 minutes.

MATERIALS AND PROCEDURE

The online survey contained a total of 63 questions that can be conceptually divided into the following conceptual groups: structural business factors, energy use in companies, willingness to change, attitudes and motivation to participate in en-

ergy efficiency programmes, subjective perception of costs and benefits of participation, self-efficacy, future prospects of the company, barriers to participation, information resources for energy efficiency programmes, and evaluation of participation. The questions were grouped dependent on whether they had to be answered from a company or an individual point of view. This resulted in the following three survey sections: the first part included questions about the relevance and implementation of energy efficiency within the company, the second part focused on questions about the structure of the company, and in the third part questions on personal attitudes towards energy efficiency were posed. The first part also included two screening questions (“Does your company already participate in an energy efficiency programme?” and “Have you previously participated in an energy efficiency programme?”). Depending on the answers to the screening questions, respondents were routed down different question paths. For example, only businesses that had already participated in an energy efficiency programme had to evaluate such a programme. Parts two and three of the survey were answered by all of the respondents. The questions required either open responses or were marked on a 5-point Likert scale. In cases where the answers for questions were mandatory, “do not know” and/or “no information” responses were also made available. Questions without these answer options could be skipped. This led to questions having a different number of responses that could be evaluated. At the start of the survey, the questionnaire participants were informed that their responses would be anonymous.

Results

Initially the companies were assigned to different stages of change. Next, the remaining data that had been collected, such as structural business factors, attitudes, motivation, barriers to participation, and information connected to energy use in companies were evaluated dependent on the stages of change. The principal variables that are reported here are those that may be of importance to how potential participants are approached and the design of energy efficiency programmes.

STAGES OF CHANGE

Based on their response to a question about their participation in energy efficiency programmes, the companies were assigned to different stages of change. The question was, in accordance with Prochaska et al. (2001), answered on a 5-tiered scale (Level 1 = No, and we believe that this will not happen in the next 6 months; Level 2 = No, but we intend to start in the next 6 months; Level 3 = No, but we will start in the next 30 days; Level 4 = Yes, we have been doing this for less than 6 months; level 5 = Yes, we have been doing this for more than 6 months). Because of the great similarity between the results of the dependent variables for levels 2 and 3 as well as levels 4 and 5, the data for these levels was combined for the remaining variables. The businesses were, therefore, divided into three levels of readiness for change: *No Participation* (companies that do not invest in energy efficiency programmes; $N_{NP} = 172$), *Planned Participation* (companies that plan to participate in energy efficiency programmes; $N_{PP} = 42$) and *Realised Participation* (companies that already participate in energy efficiency programmes for more or less than 6 months; $N_{RP} = 93$).

STRUCTURAL BUSINESS FACTORS

Number of employees

In terms of the number of employees, there was a significant difference in the stage of change (Fisher-Yates, $p \leq .001$). Small businesses (0–9 employees) were more often assigned to the “No Participation” or “Planned Participation” stages, whereas larger companies (50–250 employees) were more often at the “Realised Participation” stage.

Annual turnover

The annual turnover of a company also has a significant effect on its stage of change (Fisher-Yates, $p \leq .05$), with companies that have already participated in a programme tending to have a greater turnover than companies at the “Planned Participation” and “No Participation” stages.

Share of owned business space

SMEs’ ownership of their business space was also a significant differentiating factor in terms of their stage of change (Fisher-Yates, $p \leq .001$). Companies at the “No Participation” stage were almost exclusively tenants, whereas companies at the “Realised Participation” stage were, in the majority of cases, owners of their business space.

Industry classification

In terms of industry classification, there was no significant difference in the stage of change. However, data shows that 60 % of the companies at the “No Participation” and “Planned Participation” stages can be assigned to non-productive industries. Companies at the “Realised Participation” stage are typically acting in the industry sector.

FACTORS THAT PROMOTE PARTICIPATION

Motivation

Data concerning motivation to participate in energy efficiency programmes was collected based on Heckhausen (1989) and examined reasons for participating in energy efficiency programmes, expectations of energy efficiency programmes, and the importance of energy savings compared to other company goals. The potential reasons for participating in energy efficiency programmes were collected as responses to an open question and subsequently categorised into eight categories (see Figure 1). The three most frequently mentioned categories from the entire sample were cost savings (28.4 %), environmental awareness (16 %), and energy savings (12.4 %). Depending on the stage of change, the frequency with which the three categories were mentioned differed significantly ($\chi^2(14) = 38,269$, $p \leq .001$). Companies at the “No Participation” and “Planned Participation” stages most frequently named cost reductions as a possible reason for participating in energy efficiency. Companies at the “Realised Participation” stage, however, most commonly mentioned aspects of sustainability and environmental awareness.

There was also a significant difference in the three stages of change in terms of specific expectations of energy efficiency programmes (Fisher-Yates, $p \leq .001$; Figure 2). Companies at the “No Participation” stage most often cited cost reductions and energy savings, whereas companies at the “Planned Par-

“Realised Participation” stages most frequently, and far ahead of other factors, mentioned cost reductions.

A comparison of the observed and expected number of frequencies also shows that a disproportionately large number of companies at the “No Participation” stage have no specific expectations (“do not know” category). The stages of change also differ significantly in terms of the importance of energy savings in comparison to other company goals ($M_{NP} = 3.21$; $M_{PP} = 3.45$;

$M_{RP} = 3.88$; $F(2,292) = 11,176$, $p \leq .001$, $\eta^2 = .071$). Pairwise comparison of mean values (post hoc test: Scheffé) demonstrated significant differences between the “No Participation” and the “Realised Participation” stages ($p \leq .001$; Figure 3). This means that the saving energy is relatively more important than other goals in companies that have already implemented energy efficiency programmes than for companies that do not plan to invest in energy efficiency programmes.

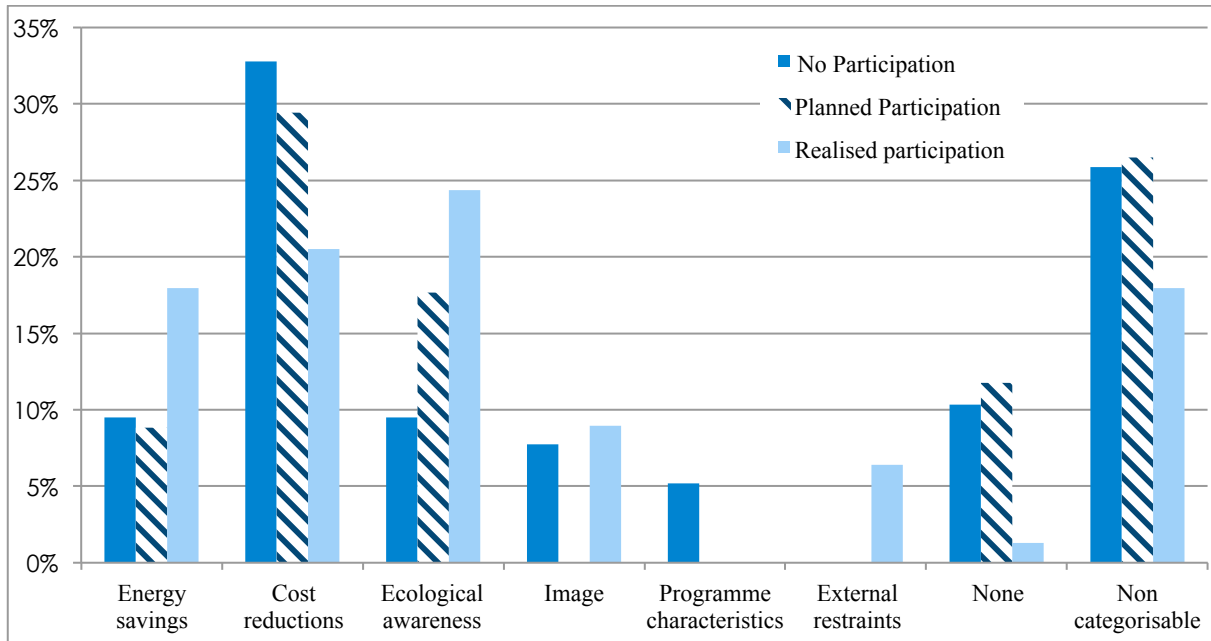


Figure 1. Reasons for Investing in Energy Efficiency Programmes. Frequency distribution (in %) of the categorised responses to the open question on the reasons for a company to invest in energy efficiency programmes. The percentages are displayed relative to the respective group sizes ($N_{NP} = 117$, $N_{PP} = 32$, $N_{RP} = 76$).

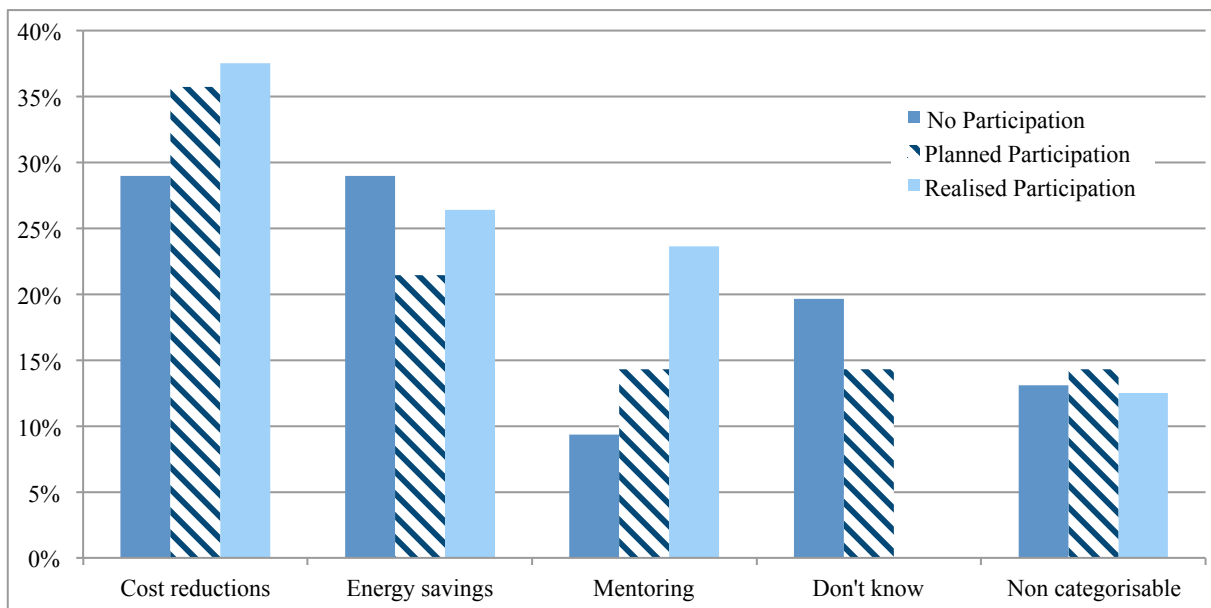


Figure 2. Expectations of Energy Efficiency Programmes. Frequency distribution (in %) of the categorised responses to the open question on the specific expectations of energy efficiency programmes. The percentages are given relative to the respective group size ($N_{NP} = 107$, $N_{PP} = 28$, $N_{RP} = 72$).

Attitude

Attitudes towards participation in energy efficiency programmes were collected based on Ajzen (1991) and examined people's beliefs that energy efficiency measures can be well implemented in their own companies as well as their assessment of the usefulness (or not) of participation in such a project.

Depending on their stage of change, the SME representatives differed significantly both in their conviction that energy efficiency measures could be well implemented in their company ($M_{NP} = 2.93$; $M_{PP} = 3.62$; $M_{RP} = 3.92$; $F(2,214) = 19.201$, $p \leq .001$, $\eta^2 = .152$; Figure 4), and in their assessment of the usefulness of the measures ($M_{NP} = 2.21$; $M_{PP} = 2.46$; $M_{RP} = 2.06$; $F(2,221) = 6.422$, $p = .002$, $\eta^2 = .055$; Figure 4). Pairwise comparisons of mean values (post hoc test: Scheffé) show that companies at the "No Participation" stage were significantly less convinced that energy efficiency measures could be successfully implemented in their companies than SMEs at the "Planned Participation" ($p \leq .05$) and "Realised Participation" ($p \leq .001$) stages. When assessing the usefulness of such measures there was a significant difference between the "No Participation" and "realized participation" ($p \leq .001$) groups. Companies that have no intention of participating in an energy efficiency programme in the future assessed the participation in such a programme as a significantly less useful. A comparison with the mean value of the scale ($M_{Scale} = 3$) shows that participation is generally considered to be useful at all stages ($M = 3.35$, $SD = 1.18$; $t(216) = 4.423$, $p \leq .001$). Assessment of the respondents' perceptions of the disadvantages of participation revealed no significant differences. A comparison with the median value of the scale ($M_{Scale} = 3$) shows that none of the companies that participate in energy efficiency programmes

evaluated them as disadvantageous ($M = 2.19$, $SD = 1.180$; $t(217) = -10.106$, $p \leq .001$).

Competitors as a social norm

The personal perception as to how or indeed whether competitor companies address energy efficiency and beliefs about whether behavioural expectations exist in their particular business environment may increase the chance of a person exhibiting a certain behaviour (see Ajzen, 1991). Respondents were therefore asked whether they knew of companies in the same industry that advocate participation in energy efficiency programmes and/or participate in energy efficiency programmes.

It can be seen that, depending on the stage of change, the level of knowledge of companies that advocate participation in energy efficiency programmes ($M_{NP} = 1.98$; $M_{PP} = 3.23$; $M_{RP} = 3.09$; $F(2,174) = 25.559$, $p \leq .001$, $\eta^2 = .283$) and of companies that actually participate in a programme ($M_{NP} = 1.87$; $M_{PP} = 3.04$; $M_{RP} = 3.24$; $F(2,176) = 34.697$, $p \leq .001$, $\eta^2 = .227$; Figure 5) differed significantly. Pairwise comparisons of mean values (post hoc test: Scheffé) show that companies at the "No Participation" stage know significantly fewer companies that have already invested in energy efficiency or are advocates for participation in such programmes than companies at the "Planned Participation" ($p \leq .001$) and "Realised Participation" ($p \leq .001$) stages.

BARRIERS TO PARTICIPATION

Representatives of companies that are at the "No Participation" and "Planned Participation" stages were asked about their reasons for never having participated in energy efficiency programmes. The responses to the open question were grouped

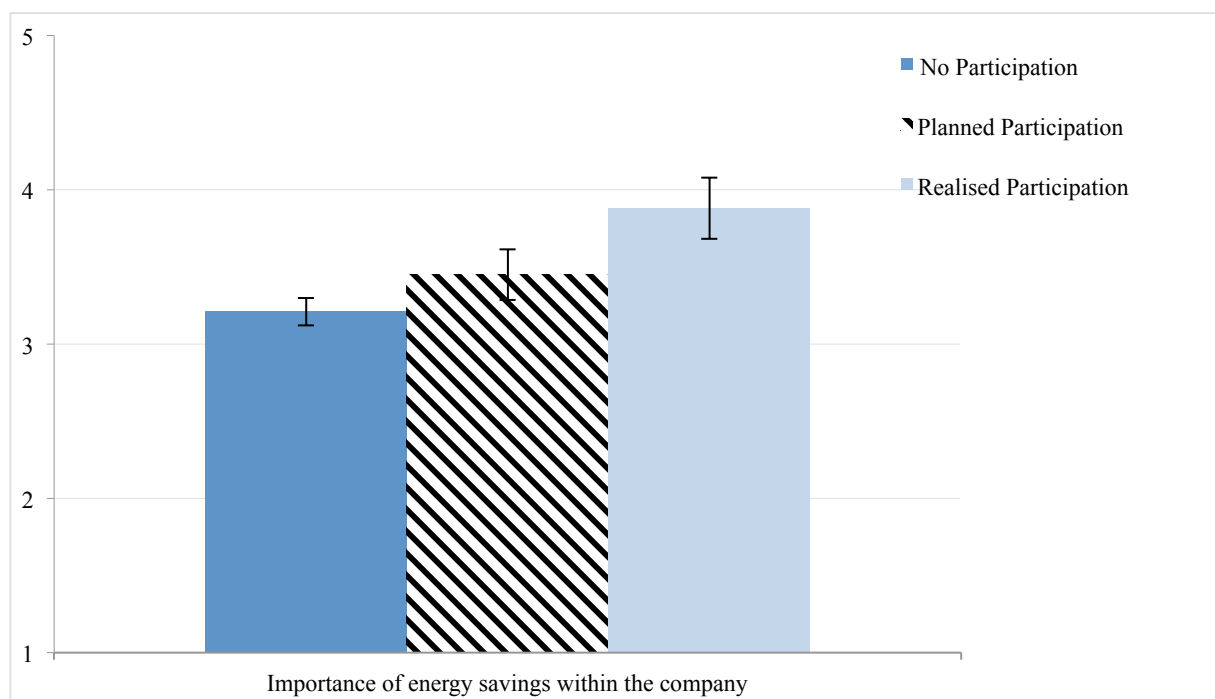


Figure 3. Importance of Energy Savings within the Company. Averages for the question: "How important are energy savings to your business relative to other company goals?" ($N = 295$) 1 = not important at all, 5 = very important. Error bars show standard error of the estimate.

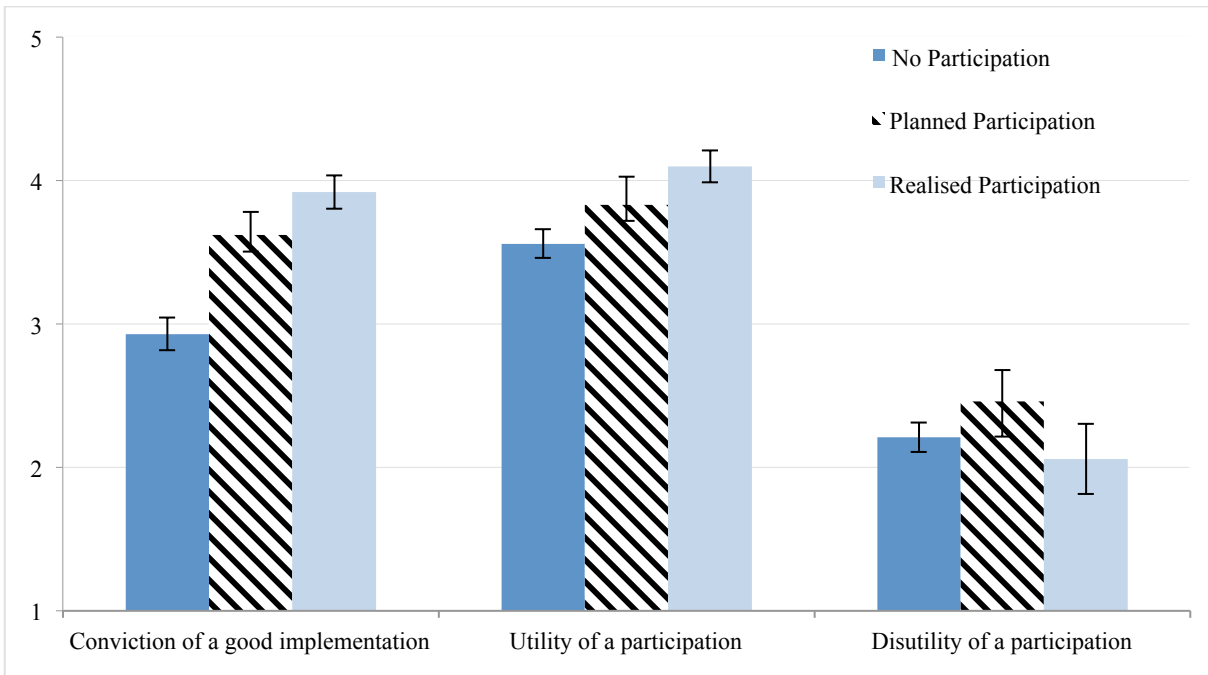


Figure 4. Attitude and Belief towards Energy Efficiency Programmes. Mean values for “Attitudes” with respect to the belief that energy efficiency measures can be successfully implemented in a respondent’s company (N = 217) and the usefulness and negative effect of participation in energy efficiency programmes (N = 224). 1 = Strongly disagree, 5 = Strongly agree. Error bars show standard error of the estimate.

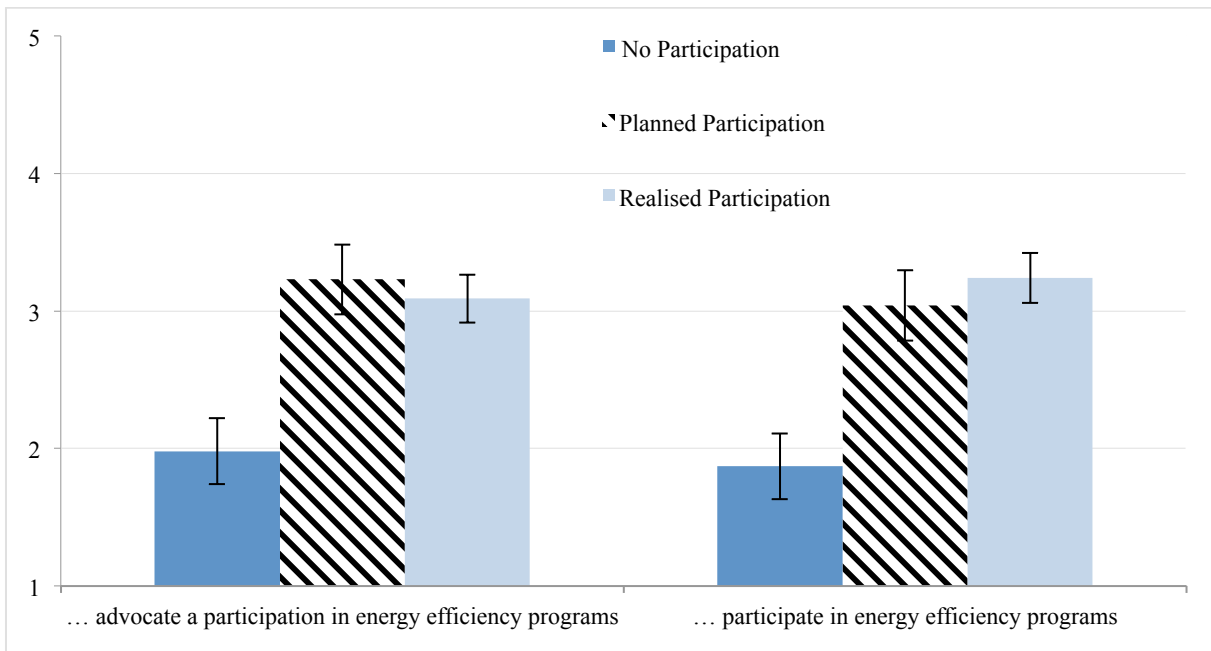


Figure 5. Knowledge of other Companies advocating/participating in Energy Efficiency Programmes. Mean value for the statement: “I know a lot of companies in our industry which advocate the participation in energy efficiency programmes” (N = 177) or “I know a lot of companies in our industry which participate in energy efficiency programmes” (N = 179). 1 = Strongly disagree, 5 = Strongly agree. Error bars show standard error of the estimate.

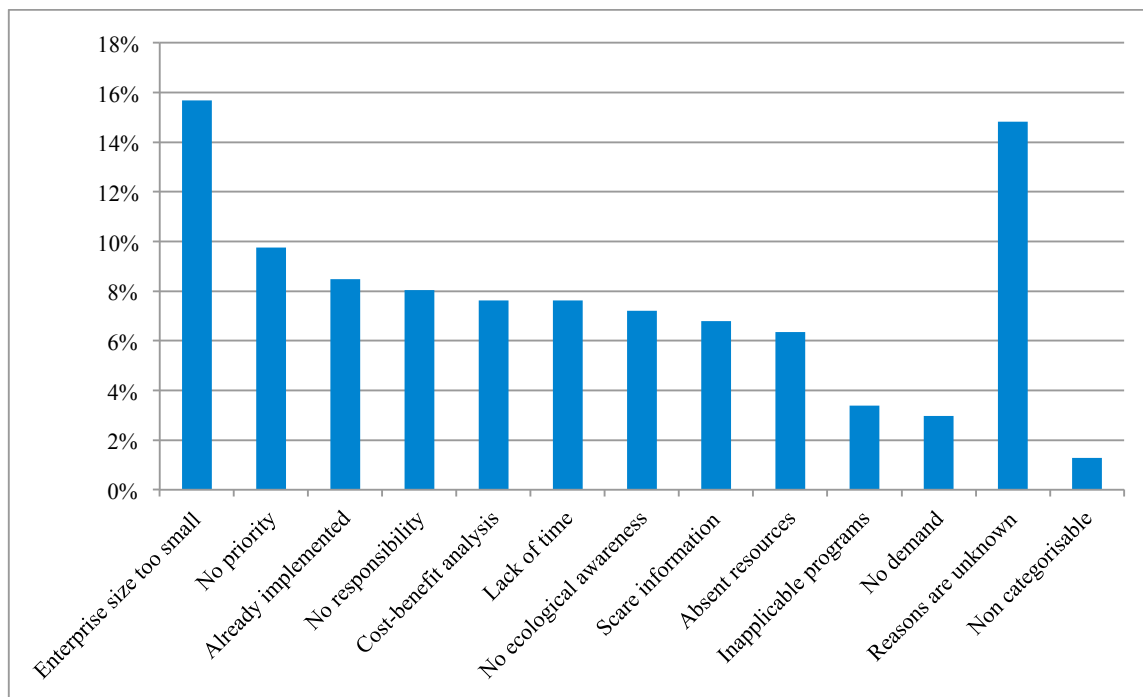


Figure 6. Barriers to Participation in Energy Efficiency Programmes. Frequency distribution (in %) of the categorised responses to the open question on barriers to participation in energy efficiency programmes. The percentages are given relative to the respective group size ($N_{NP} = 138$; $N_{PP} = 32$).

into 13 categories (Figure 6). The most important barrier was identified as small business size, followed by unknown reasons for not participating in energy efficiency programmes.

COSTS AND BENEFITS OF PARTICIPATION

If the cost of a particular behaviour is greater than the benefit, it is unlikely that this behaviour will be displayed (e.g. Piliavin, Dovidio, Gaertner, & Clark, 1981). In this study, information on costs and benefits of participation in energy efficiency programmes was collected based on descriptions of the (potential) expenses that would result from participation as well as a subjective evaluation on a Likert scale describing the relationship between costs and benefits. The answers to the open question about the cost of participation in energy efficiency programmes were categorised into seven categories (Figure 7). The difference between the frequencies of these categories is significant ($\chi^2(14) = 38,851$, $p \leq .001$). A disproportionate number of companies at the “No Participation” and “Planned Participation” stages failed to provide any specific opinions about the possible costs of participation. For companies that already participated in energy efficiency programmes, financial investment was the greatest issue.

Based on the deviation from the mean value of the scale ($M_{Scale} = 0$) companies evaluated the relationship between costs and benefits on a scale from -5 (predominant cost) to 5 (predominant benefit) as generally positive ($M = 0.31$ SD = 2.51; $t(261) = 2.016$, $p \leq .05$). The relationship between the costs and benefits of participation dependent on the stage of change was significantly different ($M_{NP} = -0.27$; $M_{PP} = 0.94$; $M_{RP} = 1.05$; $F(2,259) = 8.924$, $p \leq .001$, $\eta^2 = .065$). Pairwise mean comparisons (post hoc test: Scheffé) showed that companies at the “Realised Participation” ($p \leq .001$) and “Planned Participation” ($p \leq .05$) stages had a significantly more positive view of the ratio of costs to benefits than companies at the “No Participation” stage.

ENERGY USE IN COMPANIES

Energy consumption and potential savings in companies

Energy consumption was measured based on multiple energy sources (electricity, oil, gas and other). However, only 69, i.e. 21 %, of the respondents provided information regarding their energy consumption. The data showed that the higher the energy consumption, the more likely the company was to be assigned to the “Realised Participation” stage (Fisher-Yates, $p \leq .05$). Data for energy saving potential was collected for electricity and heat. Of the 246 respondents who answered this question, 130 indicated that they knew of no potential electricity savings. For heat savings, 148 survey participants provided no information. The frequency with which no information on savings was provided differed significantly depending on the stage of change for both electricity ($\chi^2(2) = 26,203$; $p \leq .001$) and heat ($\chi^2(2) = 17,778$; $p \leq .001$). Companies at the “Realised Participation” stage were significantly more likely to provide information on possible saving potential than companies at the “Planned Participation” and “No Participation” stages.

Energy managers in companies

Companies that have their own energy manager are more likely to participate in energy efficiency programmes ($\chi^2(2) = 58,224$, $p \leq .001$).

DESCRIPTION OF THE THREE CUSTOMER SEGMENTS IN SUMMARY

Based on the stages of change (Prochaska & DiClemente, 1983), three customer segments were identified (No Participation, Planned Participation and Realised Participation), which systematically differed based on data collected on structural business factors, motivation, attitudes, subjective assessment of the cost-benefit ratio, and energy use in companies. The com-

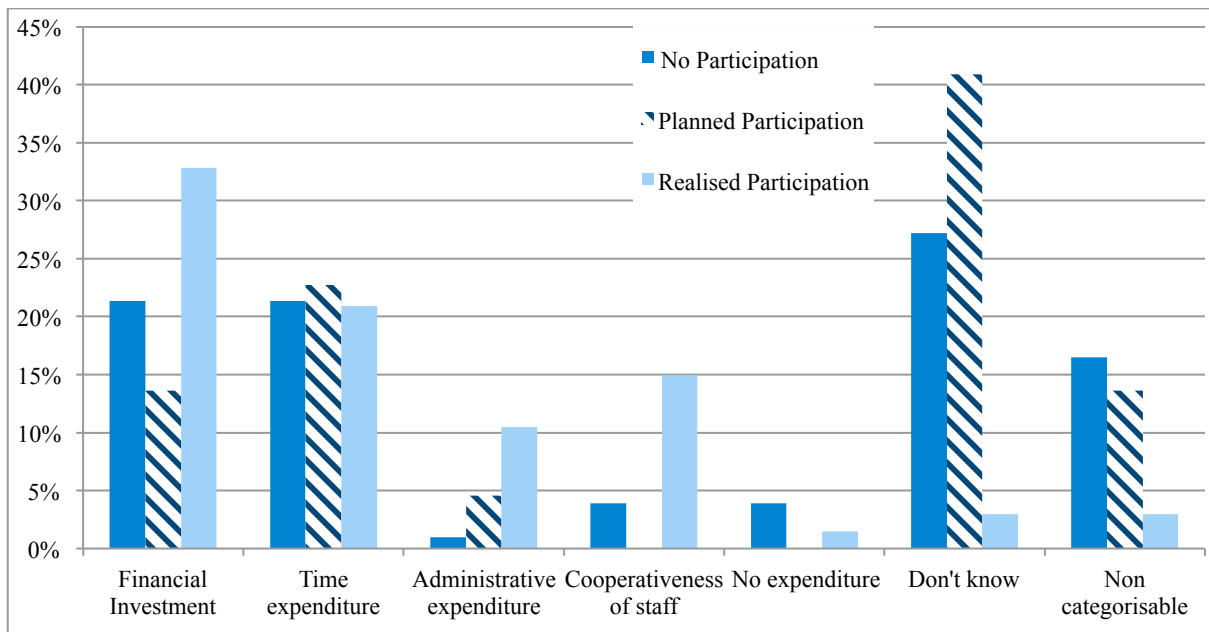


Figure 7. Effort required to Participate in Energy Efficiency Programmes. Frequency distribution (in %) of the categorised responses to the open question on the cost of participation in energy efficiency programmes. The percentages are given relative to the respective group size ($N_{NP} = 103$; $N_{PP} = 22$; $N_{RP} = 67$).

panies assigned to the three different stages of change can be described as follows:

Companies at the “No Participation” stage are typically small businesses with an average of 1–9 employees and compared to companies at the “Planned Participation” and “Realised Participation” stages tend to have a lower turnover. Those companies are usually acting in non-productive industries and the premises from which these businesses operate are typically rented. They do not have energy managers, energy consumption is typically unknown, and they were unable to provide any information on potential energy savings. The companies see the fundamental benefits of energy efficiency programmes, but have no specific expectations of these programmes and do not know what the cost and the concrete benefits of participation for their company would be. The greatest motivation for these companies to participate in energy efficiency programmes would be cost savings. The greatest barriers to their participation are grounded in the assumption that their company is too small. Knowledge of other companies that have already invested in energy efficiency programmes or advocate participation tends to be low.

Companies at the “Planned Participation” stage are typically small to medium-sized businesses with between 1 and 49 employees, acting in non-productive industries. In contrast to the companies at the “No Participation” stage they tend to own their own premises. They also often have a person who is responsible for energy issues in the organisation. Their motivation for participation in energy efficiency programmes is primarily cost savings. As a result, the most common specific expectation of energy efficiency programmes was cost reductions. The companies had no clear understanding of the effort required to participate in a programme. The extent of their knowledge of companies that had already invested in an energy efficiency programme or advocate participation was high. The greatest barrier to participation was the assumption that the company was too small to

effectively participate. Overall, however, companies at this stage present a comparatively heterogeneous picture across all of the analysed dimensions. The individual characteristics of some of the dimensions are quite similar to companies at the “No Participation” stage (e.g. motivation, barriers). Other dimensions, however, show a greater contextual proximity to the companies at the “Realised Participation” stage. Examples include the level of premises ownership and knowledge of other companies that participate in energy efficiency programmes.

SMEs at the “Realised Participation” stage are typically medium to large businesses with up to 250 employees and also had the highest annual turnovers and highest energy consumption. In contrast to “No Participation” and “Planned Realisation” stage, companies at this stage mainly operate in the industrial sector. Typically, they own their own premises and employ a person who is responsible for energy issues. Anchoring energy saving to the company’s goals is especially important for companies at this stage. They most commonly gave environmental awareness and sustainability as motivating factors for participating in energy efficiency programmes. Their specific expectations of an energy efficiency programmes were cost savings, advice on energy efficiency measures and monitoring of implementations. Companies at this stage are aware of many other companies that invest in energy efficiency programmes and advocate participation. They also expressed the most pronounced belief that they can effectively implement energy efficiency measures in their own company.

Discussion

What practical implications can be formulated from these results to improve how potential participants in non-productive industries receive information and to define the key characteristics of energy efficiency programmes?

COMPANY SIZE AS A MAIN BARRIER

The results show that the main barrier to participation in energy efficiency programmes is predominantly the perception that a company is too small. This perception might be linked to structural factors like low energy consumption and costs, limited financial and staffing resources, priority of investments and also to their belief that energy efficiency measures can be implemented in their company less successfully in comparison to companies at “Planned Participation” and “Realised Participation” stage. When providing information to companies that have never participated in an energy efficiency programme, potential prejudices must be reduced in order to make explicitly clear that small companies are part of the target group, and that participation in energy efficiency programmes can be successful irrespective of the number of employees. Further, it is essential that new energy efficiency programmes are developed that are specifically geared to the needs and circumstances of small businesses (i.e. comparatively low annual turnover, limited staff resources, comparatively low energy costs). In the literature, no mentioning of this barrier has been found (see Eymann & Räber, 2013 for an overview). The fact that small businesses need to be a greater focus of energy efficiency programmes and should become an explicit target audience, especially in non-productive industries, is therefore an important finding.

As the second most frequent answer, companies indicated that the reasons for not participating in energy efficiency programmes are unknown. This answer was predominantly given from companies at the “No Participation” stage and shows that companies are either uninformed or unaware of the energy efficiency topic. The fact that possible barriers are unknown illustrates that these companies have not yet been dealt with a possible participation in energy efficiency programmes at this point. Such companies are less receptive for arguments promoting energy efficiency but must be approached with actions that either clarify the subject matter or direct their attention towards energy efficiency. One simple example could be the visualisation of the power consumption in the company’s office.

COST SAVINGS AS THE MAIN MOTIVATOR

Cost savings and cost reductions represent the greatest motivations for companies at the “No Participation” stage to participate in energy efficiency programmes. This is consistent with previous findings in the literature on factors that promote participation in energy efficiency programmes (Eymann & Räber, 2013). The majority of the companies at the “No Participation” stage operate in non-productive industries, which predominantly implies an office routine. Such companies have an average energy consumption of 34 Mwh per year, which does not exceed annually energy costs of €6,000 (Bachman et al., 2014). Significant cost savings in this target audience is therefore hard to achieve. As a consequence, the understanding of the term “cost savings” needs to be redefined in the information provided to potential participants and then taken into account in the redesign of programmes which fail to provide such motivationally significant cost savings. Of relevance here are the so-called *non-energy related benefits* (Gudbjerg et al., 2014; Nehler et al., 2014). These are benefits from energy efficiency measures that do not arise solely from reduced energy consumption. Measures to improve energy efficiency are usually associated with

the modernisation of equipment. Such upgrades provide additional benefits, which can exceed energy gains (cost savings) by up to 250 %. An example is the modernisation of lighting, which provides a pleasant working environment and therefore allows people to concentrate on their work better, with the result that they make fewer errors, have less non-productive time and deliver better quality work.

Subjective perceptions of the cost-benefit ratio were only positive at the “Planned Participation” and “Realised Participation” stages of change. Companies at the “No Participation” stage had a slightly negative perception, i.e. that the perceived costs exceeded perceived benefits. In addition, companies at the “No Participation” stage were unaware of the cost or effort involved in participating in energy efficiency programmes. Although investments like substitution of technical devices might be transparent, there is a high subjective uncertainty concerning possible follow-up costs and consequences, like lack of personnel resources, additional financial investments, lack of time etc. The perceived costs exceed the perceived benefits by far, which results in a renunciative behaviour (see for example Kahneman & Tversky, 1979). This might be an important barrier to participation as well. The lack of knowledge of potential costs and efforts should be addressed when providing people with information on energy efficiency programmes and the effort required to implement the programme should be communicated transparently and informatively. Furthermore, perceived costs must be reduced and perceived benefits must be enhanced. Again, non-energy related benefits (Gudbjerg et al., 2014; Nehler et al., 2014) might play a key role for this achievement.

DEFINITION OF A NEW SOCIAL NORM

Another approach for deriving specific implications for the design of energy efficiency programmes and ways of informing potential participants is to examine the role of social norms and so-called “peers”. “Peers” refers to businesses that operate in the same industry that may be seen as role models as well as competitors. In comparison to companies at the “Realised Participation” stage, companies at the “No Participation” stage are aware of significantly fewer companies in their sector that have already participated in energy efficiency programmes or advocate participation. In fact, only few best practice examples in this specific sector (non-productive industries, low energy costs etc.) are available. It cannot be inferred from this study whether knowledge of such companies increases the motivation for participating in energy efficiency programmes or whether participation itself increases their knowledge (c.f. companies at the “Realised Participation” stage). Nevertheless, it can be assumed that the emphasis of a social norm (“other companies in this sector already participate in energy efficiency programmes”) and the contact with best practice examples could increase willingness to comply with the social norm and consequently increase participation rate. Thus, a recommendation is to introduce the investment in energy efficiency as a new standard. This could either be achieved by simply communicating the new norm (“investing in energy efficiency is state of the art”) or by bringing companies at the “No Participation” stage together with companies that have already successfully invested in energy efficiency programmes (best practice examples).

LANDLORD-TENANT DILEMMA

Systematic differences were also noted in terms of the proportion of its premises a company owns. Companies at the “No Participation” stage were significantly more likely to be tenants. However, companies at the “Realised Participation” stage were, in most cases, owners of their own business premises. In these cases the landlord-tenant dilemma (Halloy, 2013) may well play a role. The landlord-tenant dilemma describes the problem that, although the responsibility for investments in energy efficiency primarily lies with the owner of the building, the tenants are the main beneficiaries of such investments. If the building is not used by the owner, this results in a negative incentive structure, which leads to reduced investment in energy efficiency. Since the majority of the tenants were at the “No Participation” stage, measures must be developed and propagated so that those companies can implement and also profit from energy efficiency. A negative landlord-tenant incentive structure must be avoided.

Willingness to participate among SMEs at the “No Participation” stage may be increased by reconsidering how they are provided information and the design of the programme content. This can be achieved by taking into account company size and ownership of business premises, by providing clear and transparent communication of the implementation effort involved, by showcasing “best practice” examples, and by developing a more comprehensive and/or amended definition of cost savings and benefits. The development of appropriate measures and the design of energy efficiency programmes that incorporate these design features may also increase the conversion rates within the programmes. In a follow-up project, the implementation of different approaches to motivate small companies for participation will be tested in a field trial.

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Acknowledgement

We would like to thank Thea Weiss, Evelyn Lobsiger and Senem Kavci for providing valuable input to the project, and WWF Switzerland/Foundation Pro Evolution, the Federal Office of Energy and the Electricity Utility of the Canton of Zurich (EKZ) for funding the “Negawatt instead of megawatts” project. We would also like to thank the reviewers and panel leader of the eceee Summer Study on energy efficiency for their valuable input.