Making sense of sustainability, energy policies and citizens' related domestic behaviour. A case study in Germany

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Abstract

The objective of this paper is to illustrate the main results of a German case study on citizen awareness and habits regarding sustainability, energy consumption and related public policies. A specific methodological tool, called STAVE, has been developed in order to create evidence about citizens' daily energy-related behaviour at home and to investigate their motives, activities and obstacles as to saving energy. The results show how participants are aware that energy use is strongly linked to environmental issues and climate change. Moreover, they are able to deliver a rich picture of their everyday energy use at home including motives and barriers to save energy. Another major topic that goes beyond reasoning about energy use at home is the question of the social aspects of sustainability. Thus, there were interactions about the connections between social status and the opportunity to engage in a sustainable lifestyle. In this sense, the methodology used allows raising some contradictions and paradoxes among participant discourses, and it seems clear that to live in a sustainable way is a major challenge for participants. According to the recent literature, the need for a means to support policy making for sustainability by exploring the complexities of environment-related citizen behaviours is evident. In this sense, the STAVE method provides a procedure and a set of techniques that can be used in different ways to investigate and explore the patterns of sustainability-related practical reasoning and practical action deployed by citizens across a broad range of real-world settings.

Keywords: public engagement; sustainable development; energy consumption; public policies; citizen participation.

Resumen. *La percepción del sentido de la sostenibilidad, las políticas energéticas y los hábitos de los ciudadanos con respecto al consumo doméstico de la energía. Un estudio de caso en Alemania*

La finalidad de este artículo es ilustrar los principales resultados de un estudio de caso sobre los conocimientos y hábitos de una muestra de personas en Alemania con respecto al consumo doméstico de energía y las políticas públicas relacionadas con la sostenibilidad. Para ello, se ha desarrollado un método específico basado en la deliberación grupal, llamado STAVE, capaz de generar evidencias sobre los conocimientos y los comportamientos cotidianos relacionados con el uso doméstico de la energía. Los resultados muestran cómo los participantes perciben que dicho uso está fuertemente relacionado con riesgos ambientales y, en particular, con el cambio climático, así como los motivos y las barreras percibidas para ahorrar energía, para llevar a cabo estilos de vida sostenibles. En ese sentido, la metodología utilizada permite hacer emerger algunas contradicciones y paradojas en los discursos de los participantes, lo cual permite observar que, a pesar de su posible predisposición positiva, vivir de una manera sostenible constituye un reto considerable para estas personas. De acuerdo con la bibliografía reciente, la elaboración de políticas públicas sobre sostenibilidad requeriría del apoyo de una potente investigación social dedicada a explorar los comportamientos ciudadanos en toda su complejidad. En esta línea, el método STAVE proporciona un protocolo claro y un conjunto de técnicas útiles para investigar los razonamientos prácticos relacionados con la sostenibilidad, así como los comportamientos llevados a cabo por los ciudadanos en una amplia gama de contextos del mundo real.

Palabras clave: implicación ciudadana; desarrollo sostenible; consumo de energía; políticas públicas; participación ciudadana.

Sumario

1. Policies on sustainability and the development of the STAVE tool

The European Commission's recent evaluation of the EU Energy Efficiency Plan shows that – with the current policies – only 20% of the 2020 objectives have been achieved (CEC, 2011a). Although policy makers and citizens both apparently recognize the seriousness of the problem, and the need to act in order to solve it, the available evidence suggests that the proposed objectives are not being achieved (Stern, 2007; Tol, 2002). An important set of new measures are being proposed, in which those aiming to promote sustainable consumption play an essential role.

Citizen behaviour is increasingly recognized as an essential consideration in making policies aimed at promoting sustainability work. In recent years, multiple initiatives aimed at modifying consumer behaviour in order to enable

and encourage more sustainable habits have been developed (CEC, 2006; CEC, 2010; CEC, 2011b). Importantly, citizens confronted by such policy initiatives declare high levels of concern about environmental issues like climate change (95% in the EU) and a willingness to modify their behaviours (87%) in an effort to mitigate such effects (Eurobarometer, 2011). On the basis of these citizen accounts, high levels of effectiveness might be expected from measures aiming to support behavioural changes designed to enhance sustainable consumption. However, there is considerable evidence that real-world citizen behaviour does not match these stated aspirations. Citizen energy consumption levels, for example, keep increasing, representing 26%-28% of the total energy consumption in the EU (Ballu and Toulouse, 2010).

In order to address these difficulties, policy makers increasingly recognize that shifting citizen behaviour is far more than a matter of simply informing consumers about the impact of their behaviour (Alaszewski and Horlick-Jones, 2003; WHO, 2007). A number of research strands suggest that such behaviours are embedded within a matrix of factors like everyday associations, preferred ways of life, economic constraints, and emotional commitments (Douglas and Isherwood, 1979; Bourdieu, 1986; Sanne, 2002; Molotch, 2003). In recognition of this complexity, policy initiatives now tend to take a more sophisticated form than being simply about 'public education', and include elements of communication, advertising, incentives, and citizen engagement (HM Government, 2005; CEC, 2008). In this context, the need for a means to support policy making for sustainability by exploring the complexities of environment-related citizen behaviours is evident.

The main objective of the EU PACHELBEL research project (EU FP7)[1] was to contribute to these challenges by designing and testing a research methodology aimed to better understand how policy makers draw upon different sources of knowledge about human behaviour in developing policy initiatives to promote sustainable consumption. In our research, the linking process between the worlds of policy making and everyday life has been addressed through the development of a tool which we have called STAVE (*Systematic Tool for Behavioural Assumption Validation and Exploration*), designed to support the work of policy making for sustainability in real-world settings. With STAVE, we have attempted to provide useful knowledge about citizens' real-world sustainability-related practices. We have also attempted to reconcile the gap between citizens' actual practices (what they do) and citizens' accounts of

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1. PACHELBEL (Policy Addressing Climate Change & Learning about Consumer Behaviour and Everyday Life) was a three-year (2010-2012) collaborative project under the European Community's Seventh Framework Programme Environment (EU FP7). The PACHELBEL Consortium comprised 10 partners from 6 European countries: Spain, France, Germany, Romania, Sweden and the UK and was coordinated by the CIEMAT-CISOT (SPAIN). The main objective of the project was to better understand how policy makers draw upon different sources about human behaviour in developing policy initiatives to promote sustainable consumption among people. More information can be found at the webpage of the project: www.pachelbel.eu

such behaviours, as captured by conventional social research (what they say they do).
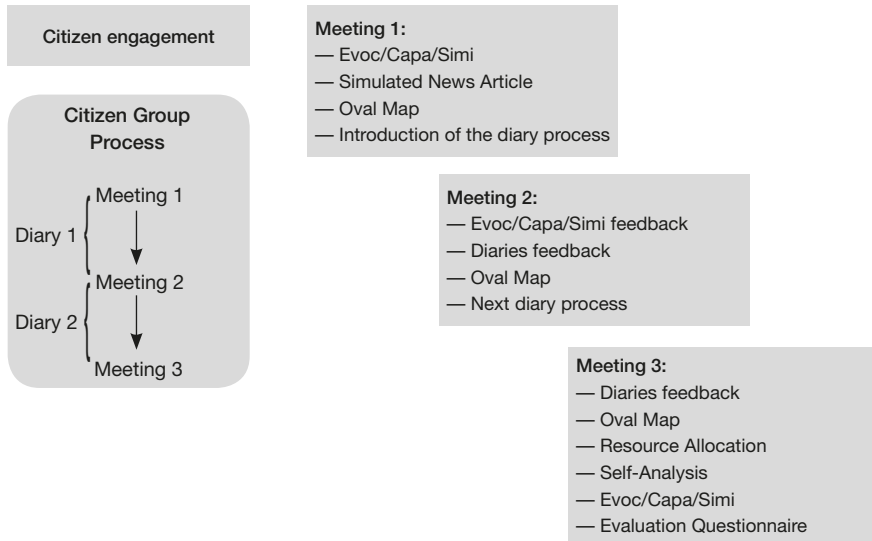
At the heart of the STAVE mechanism lie engagement processes with groups drawn from the two spheres of policy making and of everyday life. Regarding policy makers, STAVE facilitates engagement with the policy making process (e.g. taking part in meetings, interviewing policy officials, working with the policy makers) to better understand the practices entailed in the day-to-day accomplishment of policy making; the organizational settings in which knowledge utilization occurs, and the specific knowledge needs in terms of citizen behaviours.

The citizen's sphere is understood as the lay people whose behaviours policy makers try to influence in order to increase the environmental soundness of their daily consumption patterns. Depending on the investigated policy issue, "citizens" could be more precisely specified on the basis of socio-demographic segmentation characteristics (age, gender, income, consumers of energy, car drivers, etc.). STAVE facilitates engagement with lay citizens by means of hybrid group discussions (building on focus group practice enhanced by a range of facilitation and stimulus devices, including the keeping of diaries by participants) to tap into features of the everyday lives of lay groups, their practical reasoning and learning processes, and the likely impact on their lives of a range of policies aimed at promoting sustainable consumption.

A series of group meetings were designed in order to generate discussions that make visible understandings and practices that are socially shared by the participant citizens through a set of procedures to explore and capture grounded and authentic accounts of the citizens' actual behaviours. Group discussions and everyday life were linked by means of diaries relating to the policy issues in question (citizen engagement process). A process based on three sequential group meetings was designed (figure 1), and various stimulus materials and tasks were developed for the citizen groups that lent themselves to stimulating group discussion (i.e. cartoons, website descriptions of kitchen appliances, diary excerpts, and simulated newspaper or magazine articles). Group exercises based around oval mapping tasks and resource allocation exercises were also used to elicit and access the shared (rather than individual and possibly idiosyncratic) reasoning of the group participants. Short sustainability-related questionnaire devices (EVOC-CAPA) were used to elicit 'in principle' accounts of behaviours, which sometimes contrasted in insightful ways with the more grounded patterns of shared practical reasoning evident in the group discussions and in the diaries of their daily activities that participants completed.

In brief, STAVE provides a toolkit of techniques that can be used in different ways to investigate and explore the patterns of sustainability-related practical reasoning and practical action deployed by citizens across a broad range of real-world settings. The nature of our research could therefore be described as a kind of action research, in the sense that the exact nature and focus of our empirical work with policy-making organisations was primarily driven by the policy makers' concerns and needs, rather than by matters of scholarly

Figure 1. The internal structure of the STAVE citizen group process

Citizen engagement

Citizen Group Process

Diary 1 { Meeting 1

Meeting 2

Diary 2 {

Meeting 3

Meeting 1:
— Evoc/Capa/Simi
— Simulated News Article
— Oval Map
— Introduction of the diary process

Meeting 2:
— Evoc/Capa/Simi feedback
— Diaries feedback
— Oval Map
— Next diary process

Meeting 3:
— Diaries feedback
— Oval Map
— Resource Allocation
— Self-Analysis
— Evoc/Capa/Simi
— Evaluation Questionnaire

Source: Prades et al. (2015)

interest (Hart and Bond, 1995). Such research necessitates the active involvement of practitioners throughout the research activity. It also often requires the work to be done according to timescales that are sometimes unusually short in comparison with much academic work. This style of action research has been termed 'quasi-consultancy' by Horlick-Jones and Rosenhead (2002). They argue that this kind of engagement with problem situations can provide access to naturally-occurring patterns of action and practical reasoning of the very kind that we sought.

2. Case study: policy issue and method design

The objective of this paper is to illustrate the main results of a German case study on citizen awareness and habits regarding sustainability, energy consumption, and related public policies. As in other countries, in Germany climate change is one of the most important topics of the debate on sustainability issues. Other topics like sustainable consumption, energy savings, transportation, or renewable energies are frequently directly connected to the overall climate change issue. Coping with the challenges of climate change is seen as the responsibility of various actors: *Individual citizens* can contribute to climate protection through behavioural changes (e.g. saving energy) and by exerting pressure upon industry to modify its economic models. In this context, the strong capacity of action at the local and regional levels to address the global

climate change issue is being stressed. *Economic sectors* need to start a transition towards renewable energies and green technologies and to break down the existing industrial power structure which threatens more sustainable sectors (such as organic food and organic textiles) and prevents them from developing. The *government* should implement aid policies particularly centred upon energy and home electricity, but also supportive actions to help families to save energy (through educative action), especially the most economically modest families. In fact, after the Fukushima nuclear disaster, the German energy sector was faced with a radical turn. The decision was made to abandon nuclear power until 2022 and increase the share of electricity produced from renewable energies to 80% by 2050. To support this transition to a renewable energy system, energy consumption should be reduced (e.g. through improved energy efficiency). This applies not only to industrial processes, but also to using energy at home. In other words, citizens are expected to contribute even more strongly to energy savings and hence climate protection.

The German policy partner of the PACHELBEL project was the Ministry of the Environment of Baden-Württemberg (UVM). Baden-Württemberg is one of the 16 German states (Länder). In this state, the ministry is in charge of environmental, climate protection, and energy policies. The collaborating policy officials' experience with public participation processes was related to some so-called Internet consultations. These were questionnaire-based online surveys aimed at eliciting citizens' and stakeholders' opinions and evaluations in view of scheduled policy initiatives. Initially, even such a low-intensity tool for involving lay people in policy making had to deal with opponents. But in the meantime – as one policy official stressed – an Internet consultation "definitely" belongs to the policy making processes of the ministry. Since the change of the state government in March 2011, participatory approaches have been gaining strongly in importance.

The policy issue of the German STAVE interventions was domestic energy use in the fields of electric kitchen appliances, electronic devices, heating, and hot water (power and heat). The objective was to create evidence about citizens' daily energy-related behaviour at home and to investigate their motives, activities and obstacles as to saving energy. The selection of this substantive issue was agreed upon with the UVM, the German policy partner. During the year 2010 and after, the ministry had developed the so-called Climate Protection Concept 2020+. This was a very broad policy programme which addressed almost all climate-relevant sectors, including consumer areas like traffic and energy use at home. In the consultations with the UVM about the topic to be chosen for STAVE, it turned out that the latter issue was of specific interest for the policy makers as they felt a considerable lack of knowledge on citizens' attitudes and behaviours regarding this consumption domain.

A 'project group' formed by three policy officials and two research members of PACHELBEL project was established. This allowed researchers to attend real working settings inside the German policy partner by doing interviews and holding several feed-back meetings along the project's life.

The citizen STAVE interventions were carried out in July 2011 with the following groups:

— 1 group of tenants (households with children) (Group 1)
— 1 group of tenants (single and couple households without children) (Group 2)
— 1 group of homeowners (households with children) (Group 3)

The participants were selected through a local social research consultancy company according to the sample criteria. It must be said that the sample does not cover all the possible narratives and ideas about energy consumption, but it responds to the policy makers' claim, as they had the impression that they needed to know more about mobility behaviour than about energy-related domestic behaviour. Thus, the sample criteria rely on the assumption that the domestic energy use of 'homeowners' and 'tenants' should be different, as well as that of people with and without children. These are the two main sample criteria. Due to the lack of resources, it was not possible to take into consideration other criteria such as gender or age, so the groups included people of both sexes and were restricted to a specific age interval (table 1).

Each citizen group met three times over a period of one month (day 1, day 15, day 30), resulting in 9 group meetings in total. After meeting 1 and meeting 2, two series of diaries were carried out.

Several techniques were implemented in the group meetings. In the first meeting, an initial brief questionnaire set (called EVOC and CAPA) was completed by the participants. On the one hand, EVOC is a free-association exercise that addresses in sum 'what does a given concept evoke for you?' This technique provides a simple way to identify the notions a given community shares (or does not share) about social issues – in this case each participant identified five words or ideas that came to their minds when they thought of 'sustainable consumption'. On the other hand, the CAPA questionnaire is designed to address the participant's personal identification with the issue, in our case 'sustainable consumption'. This instrument deals with three dimensions: one about the sustainable consumption issue in general, a second question about the participant's personal identification with the issue, and a third question exploring the perceived capacity to act.

Table 1. Sample composition

Criteria	Group 1	Group 2	Group 3
Number of participants	7 + 1 (1 person only attended sessions 2, 3)	8	8
Gender	7 women, 1 man	4 women, 4 men	5 women, 3 men
Age range	20 – 54	20 – 67	27 – 64
Socioeconomic status	Middle and high	Low and middle	Middle and high
Location	Big city in the south of Germany (Stuttgart)	Big city in the south of Germany (Stuttgart)	Big city in the south of Germany (Stuttgart)

Second, a simulated newspaper article was delivered and discussed in order to present information in a form that was familiar and easy to grasp by the group participants. Thus, a single statement could give rise to the interpretation that this practice is a common part of everyday life or alternatively that this practice is environmentally damaging. The reading of the simulated newspaper lead to a debate on the issues highlighted therein (mainly policy measures regarding energy savings). The article was a good bridge between the previous general discussion of sustainable consumption and the succeeding oval mapping exercise on individual possibilities of reducing household-related energy use.

Third, a rich collection of things people can do in order to save energy at home were elicited through the oval mapping technique. At first we requested the participants to draw three different ideas on oval maps. They then had to stick these maps on a pinboard while explaining their meaning and clustering them. We then opened the discussion and always when new ideas arose people made further maps, thus achieving a structured and focussed oval mapping exercise.

Finally, the participants filled in a questionnaire with general information on their domestic energy use (e.g. appliances, size of the flat, etc.). This information was needed to support our understanding of the energy diaries the participants were requested to keep between the sessions (cf. below).

Between the first and the second meetings, we requested the participants to keep diaries for 7 days on their energy use at home. We designed a diary template which consisted of two parts. The first part entailed a structured section where people made entries on their daily use of devices and lighting. The template then provided some open space for participants' depictions about their everyday life related to energy use at home. We used an electronic diary format based on Google docs. After receiving two or three diaries, we called almost all the participants to give them feedback and – if they were obviously uncertain how to report about energy use – communicate some additional ideas on what to write in the diary.

The second meeting started with a brief report about the results from the EVOC and CAPA questionnaires using two charts which we circulated as handouts. People were interested in the results, especially they wanted to know whether and how their own group differed from the other groups (CAPA). We then fed in some selected findings from the diaries in order to elicit comments and discussions on these issues (e.g. complaints about the carefree energy use of teenagers or using a dishwasher and at the same time doing part of the washing up by hand). The next part of the meetings dealt with the continuation of the oval mapping exercise. We recalled the oval maps from the last meeting which were about general ideas on how to reduce energy use at home. We then requested the participants to go to the pinboard and mark the activities they had not yet done with a dot. After this, we let participants draw additional maps with triggers for carrying out energy saving habits (those they actually do). Each participant was requested to come to the front and stick his/her

maps on the board, say something about their contents, and discuss them with the group.

The last topic of the meetings were devoted to the questions the policy makers asked the participants. The most interesting question for the policy makers was whether people accepted policy measures aimed at reducing domestic energy use. We chose a handful of consumer-related measures from the Climate Protection Concept 2020+ (CPC 2020+) that would be appropriate for group discussions. Four measures in the field of energy efficient buildings and two in the field of electrical appliances were selected to be discussed by the STAVE groups. Beginning with the extensive, expert-oriented descriptions in the CPC 2020+, we elaborated easy-to-understand sheets for both action fields.

As the group deliberations have shown, the information sheets worked well in providing participants with sufficient knowledge to be able to reason about these questions. It was also possible for the groups to agree on shared answers. We wrote down the group's answers on a pinboard template which we had prepared in advance for this exercise. It turned out that the homeowner group (G3) had a very intensive and well-informed discussion, whereas the two tenant groups (G1, G2) had some difficulties in talking about measures which did not affect them directly. Nonetheless, the tenant groups were also able to jointly create answers.

Between the second and third meetings, the participants were again requested to keep diaries for 7 days on their energy use at home. The same diary template and format (Google docs based electronic diaries) were used.

We started the third meeting with a quick feedback session on the second diary week. The participants reported no problems but some of them said that they had the feeling that there was nothing new to report about. In order to elicit lively discussions among participants, we then asked them to talk about individual learning and behavioural experiences that all group members should adopt.

A new oval mapping exercise was then done. The results from the oval mapping of the second meeting were recalled. Whereas the focus of the previous meetings had been on energy saving behaviour and its triggers, participants now reflected on barriers that prevent them from behaving in an energy efficient way at home. This was very fruitful because it helped to get a realistic picture of how domestic energy use and citizens' reasoning about environmental and climate protection is embedded in their complex, sometimes contradictory everyday lives.

After that, as in the previous meeting, a handout with brief descriptions of measures of the Climate Protection Concept 2020+ was circulated, this time with two measures in the field of electric appliances. As the topics discussed this time were easier to understand than those of the last meeting (energy efficient buildings), group deliberations were quite lively from the very beginning. This was especially true for the two tenant groups (G1, G2) who had to struggle with the issues the last time.

A resource allocation exercise was then carried out. The resource allocation exercise was used as an individual ranking of the six policy measures discussed during this and the last meeting. It worked very well and it was fun for the participants to have the chance to clearly point out their favourites. A few participants added additional measures, thus indicating that they have their own ideas for achieving energy savings.

Finally, the participants filled in the EVOC-CAPA set a second time, this time without discussing the entries. This allowed the researchers to evaluate how the participants' answers had changed along the method implementation. Finally, at the very end of the sessions, an evaluation-satisfaction questionnaire (on the whole process) was filled in by each participant.

All the data gathered was carefully classified and analysed, and sometimes reintroduced in the group discussions in an iterative process in order to face participants with their own discourses and opinions.

3. Results

Here we will present the main results on sustainable-related citizen behaviour, knowledge and awareness, with a special focus on the daily experiences and practices of the participants.

3.1. Awareness on sustainability

From the very beginning of the group discussions, it became obvious that the participants were aware that energy use is strongly linked to environmental issues and climate change. In this regard, they recognized that efforts even on the level of household energy use are necessary to reduce energy consumption (no rule without an exception: one participant negated the existence of climate change). Given this basic understanding, the participants usually addressed sustainability topics spontaneously when reasoning about their ideas and behaviour patterns with respect to domestic energy consumption. Sustainability-related reasoning triggered by the facilitator was an exception.

a) Environmentally-friendly consumption

The participants were able to deliver a rich picture of their everyday energy use at home, including motives and barriers to save energy (cf. below). On repeated occasions they looked beyond their household practices and put energy consumption and environmental protection into a wider reference frame. More specifically, the participants stressed the significance of looking at the whole picture of ecological consequences of consumption since producing and disposing goods causes many environmental problems in terms of emitting pollution or using scarce resources. Thus, conscious purchasing behaviour would be at least as essential as being aware of one's household energy use. In this context, some people raised doubts if the life cycle assessment of replacing old by new appliances would be positive. Some suspected that public funding

for purchasing energy efficient devices would be driven more by economic factors than environmentally-friendly ones. Other participants were not so sure that replacement acquisitions would make sense in terms of ecology, but in general there was high uncertainty among participants on how to behave (e.g. the proper time to purchase a new washing machine, fridge, etc.).

b) Globalisation

In the context of reasoning about the sense of replacing old devices for new ones, the issue of globalisation arose. The participants stated that it would be bad in terms of CO_2 emissions to purchase new appliances that had been produced abroad, such as in China. As a counterargument, one person doubted that consumers would be willing to pay higher prices for appliances and replacement parts that were completely produced in Germany or Europe. Furthermore, the participants were concerned about the fact that old devices might be sold as second-hand goods in Easter European countries, thereby thwarting the environmental advantages of new appliances by relocating CO_2 emissions. On the other hand one participant argued that "devices that consume much energy according to our standards will be energy efficient appliances in the context of these countries" (G1, S3, P1).[2] Overall, the participants agreed on the need to address energy efficiency on a European and global rather than national level.

c) Rebound effect

Furthermore, it was interesting to see that the rebound effect was put on the agenda in relation to the replacement of old household appliances by new energy efficient appliances. Participants recognized that this could have the effect that the latter will be used more intensively and that this would counteract the intention that energy-saving appliances will lead to decreasing domestic energy consumption. One participant said: "If I purchase energy-saving light bulbs and leave them on the whole day, I will also have a high energy bill" (G1, S3, P2).

Another person compared energy savings with quitting smoking: "In the beginning you say, 'this money goes to the savings accounts of my son and daughter.' Then one day you go out for dinner with the family, and later on it will be trickled away on shopping" (G3, S1, P18).

It was also said that regulators should be aware of the rebound effect, for example when providing funding to purchase energy efficient appliances. For some participants it was an eye-opening experience to think about the impacts of energy efficiency in this manner: "Up to now I have never thought about… if I purchase a new fridge… what I am going to do with the money saved to remain ecologically balanced?" (G2, S1, P15).

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2. From now on the quote codification is: GX: Group number; SX: Session number; PX: Participant number.

d) Social aspects

Another major topic that goes beyond reasoning about energy use at home in a strict sense is the question of the social aspects of sustainability. In this regard, there were interactions about the connections between social status and the opportunity to engage in a sustainable lifestyle: Some participants said that people with a high income are in a better position to think about the environment than those who have less money (e.g. wealthy people would be able to buy expensive hybrid cars, while lower-income households would not). Others were convinced that having little money forces people to live in an environmentally-friendly manner because consuming less energy involves a significant contribution to their household budget. But there was also the idea that awareness is the decisive factor for the environmental impact of a person or household: "I do not believe that it makes a difference whether someone is rich or poor. I think it depends on awareness" (G2, S1, P12).

The participants also feared that rising rents for energetically refurbished flats would result in a general price increase in the housing market. In their view, tenants who live in refurbished flats might benefit from lower energy costs, but other groups might suffer from higher rents without benefiting from modernisation measures and this would specifically affect economically weaker social groups.

Finally, the question of social justice appeared in the context of the idea that the provision of comparative data of one's own energy consumption with that of similar households would be very helpful for detecting possibilities for energy savings. Some participants went a step further and wanted to combine this comparative approach with scaled energy prices so that households with above average consumption would have to pay higher prices and vice versa. Others rejected this idea, arguing that it may affect mainly socially weak citizens and would thus be a mechanism that would not meet the requirements of social justice.

e) Sources of knowledge about everyday sustainability

There are only a few passages where participants explicitly talked about the sources that influence their knowledge and beliefs about sustainability, and on which they rely when it comes to making or justifying behavioural decisions. One participant said that she was shocked when she had learned in a newspaper article how much water is needed to produce a pair of jeans. From this she drew the conclusion that taking into account sustainability when purchasing goods may be more important in terms of environmental protection than saving energy at home. The participants also reported that they exchanged experiences with friends and acquaintances before purchasing a new household appliance, such as a washing machine.

> I have purchased a new washing machine and I talked with friends and acquaintances beforehand, 'What model do you have?', 'How much water and energy does it use?', 'What is its energy efficiency class?', 'Are you satisfied with

the quality of the wash cycle?'. You need to consider these things carefully, and that is why one talks with others about them (G1, S1, P3).

Moreover, attending the STAVE groups drove most of the participants to raise the topics discussed in conversations with family members, friends, and colleagues. In addition, the diaries contained scattered hints that the participants had read newspaper articles or TV programmes about energy saving light bulbs or the importance of saving energy at home.

3.2. The meaning of behaving sustainably

As we will see below, to live in a sustainable way is a major challenge for participants. One can describe it as daily attempts to match energy husbanding requirements with the temporal, financial, and social demands of organising a private household. This matching is related to various fields of action in the domain of energy use:

— No use – no energy consumption: An important goal of participants is to take care that no energy will be consumed when a device is not being used. This relates to things like switching off the stand-by mode, or turning off the lights when leaving a room.
— Limiting or avoiding the use of equipment: A major topic concerns not using appliances and sanitary fittings at all or for the least amount of time possible to perform a household task, or only for special purposes. This involves such tasks as hanging out the laundry instead of using a tumble dryer, selecting the short programme of the washing machine, or using the tumble dryer only for towels and bed linen.
— Energy efficiency: The participants reported that they try to use appliances in a way that the energy that is utilized to run a process or device will have the highest possible benefit. This involves running washing machines or dishwashers with the maximum load, setting fridges on low cool scales, or not putting hot dishes in the fridge.
— Heating: As regards heating, the participants were concerned about achieving a comfortable room climate without wasting heat energy. In this sense, they said that they would take care to air out rooms quickly rather than leaving windows open longer, or that they would be prepared to wear warm clothes at home instead of increasing room temperatures.

a) Driving forces

Why do the participants do all these things? They often referred to environmental issues in order to explain their motives for behaving in an energy savings way. "For the sake of the environment!" (G3, S2, P21), or "I frequently think of the environment, by doing that I do not harm my environment very much" (G1, S2, P3) are two examples of this kind of reasoning. Such motives were sometimes accompanied by strong moral claims insofar as protecting the

environment by energy saving habits forms part of one's deep convictions. One person said that it was important for her to have a clear conscience about "what my contribution was in this life" (G3, S2, P19), whereas another participant said: "It is a matter of decency not to run the heater when the windows are open" (G1, S2, P2).

Contributing to environmental protection, though, was just one factor among others that prompted participants to try to integrate energy saving habits into their everyday lives. Behaving in an energy efficient manner is frequently related to economic benefits. One person said that "To save energy is good for the environment and the household budget" (G1, S2, P4), while another stated that a "low electricity bill and environmental behaviour for me, mentally, is always one package indeed" (G1, S1, P7). But there is also evidence that participants think only in economic terms: "I save energy to save money, it is that simple" (G2, S2, P16).

The focus on savings as a driving force for using less energy is sometimes characterized as expression of the intention to lead a thrifty lifestyle. This applies to both energy and money and is frequently related to one's own education: "There is a lot of education in it, and starting from this I have developed a special awareness, and that it is why I am doing this in that way" (G1, S2, P6).

Another participant argued that it does not feel good to waste things: "I am not keen on doing useless things. One becomes aware that one is squandering energy, and that is not fun. One does not feel well when acting stupid like that" (G1, S2, P8).

Another participant highlighted the positive emotions of doing the right thing: "Being aware of energy savings makes me feel good. I then do not think that I am a better person, but it feels as if I have behaved properly and have been doing something which is useful for the community" (G2, S3, P11).

Parents often said that through keeping an energy saving household they would seek to give their children an example of a proper lifestyle. Some participants stated that they wanted to be a model for their children's environmental awareness and encourage their ability to cherish things.

Another set of motives for saving energy at home had to do with household equipment. Some participants were highly interested in technical innovations. These people expressed a strong willingness to replace existing appliances or devices for new ones if they performed better in terms of energy efficiency and improved features. In contrast, other participants focused not on replacing devices, but rather using equipment in a careful manner in order to prolong its useful life.

b) Barriers

As shown above, the participants are aware of various opportunities on how to lead a life without wasting energy. Another important fact is that they are indeed highly motivated to effectively adopt energy savings behavioural patterns. In this regard, the participants reported quite a few examples of what they do with respect to efficient energy consumption. But they also stated that

day-to-day requirements and circumstances often prevent them from sticking to sustainable habits when it comes to actually carrying out household activities. In what follows these topics will be looked at in greater detail.

One major topic to explain why sustainable household energy use is not possible are the various and sometimes overlapping requirements of everyday organisation. On the one hand, people do not behave in an energy efficient manner because this conflicts with their objective to run their daily business without too much friction. Thus, in their efforts to save time and ensure a clearly arranged daily routine, participants accept higher energy use. The following quotes and diary entries illustrate this:

> I always use the tumble dryer, this is just an organisational thing. It you are outside home all day you cannot hang out the laundry, indoor there is not enough space. So I turn on the washing machine in the morning, and when I come home in the evening the laundry is washed and I put it in the tumble dryer. One hour later it is dry and I can put it in the wardrobe (G1, S2, P7).

> The idea 'I need it again in a couple of minutes', electronic devices, turning off the computer or the light… When I know I will soon continue to use it or go back to that room, I will leave it on (G1, S3, P6).

On the other hand, precisely because something has mixed up their carefully organised daily routine, participants were not able to stick to an energy efficient behaviour. Such disturbances could be caused by time pressures, forgetting to do something, or unexpected events.

> When I am pressured for time…, for example switching off the plug bar to which several devices are connected…, shutting down the computer…, I look at my watch, the bus leaves in a couple of minutes, I know the computer is shutting down but I need to go and the plug bar is still on (G1, S3, P6).

> If I am distracted because the telephone rings…, I go to another room, the call becomes very long, the lights are on here and there (G1, S3, P2).

Another crucial factor of unsustainable habits are different attitudes about domestic energy use between life partners, spouses, parents and children, or other people who are living together. Some participants reported that in order to avoid on-going domestic disputes, they would sometimes, and contrary to their own beliefs, refrain from insisting on saving energy. This applies particularly to the behavioural patterns of teenagers whom participants often describe as being unaware of environmental issues:

> The greatest energy user at home is my son. Once he is back from work the laptop is on, the TV is on, and five minutes later he falls asleep. The things then will run till all hours. I think this is a problem of these affluent children… My son is 19 years old, he grew up at a time when saving energy was not important. (…) This generation takes things like TVs or

computers for granted, only when they get their own electricity bill will they start thinking, I think practical experience is crucial. When I preach 'turn off that thing' I am talking to a wall. I think this is something others experience too. (G1, S2, P7)

Another problem for energy-conscious parents arises from their limited capacity to observe and control what their young children are doing. "The kids often run from room to room, switch on something, then to the next room, turn on the light, then they jump to the living room, turn on our electric piano, and I am doing something in the kitchen" (G1, S3, P5).

Some participants said that they would like to purchase more energy efficient devices and products but could not afford them. "LED light bulbs would be worth considering, I am convinced of that, but I am put off by the price, they are too expensive" (G1, S3, P3).

In other cases, the participants rely on factors such as well-being, convenience, laziness, or individual freedom in order to justify inefficient energy consumption; for example, taking long hot showers or not turning off the heating while airing out rooms.

> Sometimes I am too lazy or tired to get up and shut off the light in the hallway (G1, S3, P6).

> I like fluffy towels, and that is why I use my tumble dryer even in summer, I think that is well-being" (G1, S3, P4).

> I am not an Eskimo, I pay my rent, and that is why I would like to have it warm in my flat and will not wear clothes like an Eskimo (G1, S3, P3).

> I think it is comfort if one sometimes does not turn off the water while soaping up under the shower. It can get unpleasantly cold. Actually you should turn it off, but you think 'It is just so nice and warm', and then you leave it on (G1, S3, P4).

A few people raised doubts if activities like using energy saving light bulbs and replacing household appliances really have energy saving effects, or, yet more radical, if energy saving at home makes sense at all in terms of climate protection. "I consciously do not turn down the heating while airing out my flat some minutes since I am not convinced that this saves energy" (G1, S3, P7).

Finally, a lively discussion began when a member of group 1 (P6) said it might be valuable to install laundry rooms in blocks of flats where people can jointly use washing machines and tumble dryers. The group members' reactions went from amusement to disgust, and no one saw the sense in sharing household equipment in terms of sustainability. Obviously, washing ones clothes and those of one's family are activities that people wish to keep private to protect themselves from the real and imagined bad habits of others.

3.3. Relation between self-awareness and real actions in terms of sustainability

The evidence presented above shows that there is a gap between participants' self-perception about the environmental soundness of their behaviour and their concrete, daily energy-using practices. According to some participants' self-assessment, organizing everyday life in a climate-friendly way can be taken for granted. These participants claimed that they have already achieved a high level of sustainable energy use:

> I believe I do what I can to save energy at home (G1, S1, P5).

> We have been doing small things like turning off the shower while soaping up for such a long time that they are not a problem anymore (G1, S1, P7).

> I think we have always thought about energy savings and I do not see any big opportunities to save even more. So I don't think we have any reason to change our behaviour (G2, S2, P13).

The participants were able to list a broad spectrum of things they can do and are already doing in order to avoid wasting energy. However, they did not say that it is easy to act in an energy saving way. Indeed, the interactions made it clear that a high degree of attention and commitment is necessary to maintain a sustainable lifestyle. Nevertheless, most of them are more or less convinced that they have become accustomed to taking care of the environment. Self-critical statements like the following were rare: "I already do a lot, however, I would be able to improve some things or could work on them more intensively to achieve improvements" (G1, S1, P2).

Obviously, the latter attitude is a more realistic description of participants' everyday practices. If we look at the obstacles for reducing energy use, it becomes clear that participants often fail to apply energy saving habits. Regarding the mismatch between self-perception and behaviour, it is possible to distinguish three approaches as to how participants make sense of it.

First, they concede that, upon closer consideration, they more or less frequently do not behave sustainability at home since burdensome everyday requirements or budget restrictions make them lose sight of an energy efficient household organisation. This reasoning relies on "objective" circumstances and will be justified with reference to concrete situations and decisions where participants were supposedly forced to behave in an unsustainable way, such as cooking without a lid in order to have fewer dishes to wash, or not using LED light bulbs for cost reasons.

Second, the participants admitted that there are situations in which purposely do not behave sustainably since they gave higher priority to other factors. Examples of this pattern of behaviour using the tumble dryer since it makes towels fluffy, or turning on the heating on a cool summer day because they have the individual freedom to do so instead of wearing warmer clothes.

Third, some participants stated that there was no reason to perform some actions because they did not believe in their energy saving impacts. Those who sustained this argument said that they would not turn off the heating while airing a room, or would wash the dishes by hand instead of using a dishwasher. A few participants even considered domestic electricity savings as a false approach since the amount of energy that can be saved (e.g. by switching off the standby mode) would be negligible compared to the challenges of climate change. Furthermore, these participants were also convinced that lower electricity consumption would have only minor economic impacts:

> I have recognized a growing insight that it completely does not matter if the washing machine runs one or two times, it simply runs, the same with the dishwasher. It is a tiny part of what you can achieve with heating, hot water, or changed traffic behaviour (G3, S3, P19).

> Why should we save energy? Why should we save about 100 euros per year? You almost don't feel it, it is 8 Euros per month, that gives me no reason to change my behaviour (G2, S2, P9).

3.4. Research method impact on people's awareness and habits

The research method proposed here does not pretend to be a standard type of neutral observation approach (although it generates a lot of information based on participant observation); rather, it is based on an action research approach through participatory and engagement tools, spaces and moments. In this way, the public engagement generated through the STAVE method has had visible consequences on the knowledge, awareness and habits of the participants.

3.5. Changes in awareness

According to our observations, the reasoning about sustainability changed over the group process at different levels. On the one hand, there was a shift from claiming that sustainability is already highly integrated into everyday practices of domestic energy consumption to reasoning about the manifold exceptions to this picture. One reason for this change from sugar-coated self-descriptions to self-critical deliberations was that participants increasingly saw that no one would be found at fault when talking about non-sustainable energy uses, but rather that others are struggling with similar problems. Keeping a diary was another factor that triggered this process as it required participants to record daily inventories and reflections about their domestic energy use.

Another change in the nature of reasoning about sustainability can be located at the level of a growing awareness of the real amount of one's energy consumption. This learning process is closely related to the diaries which provided participants with self-created information about their household behaviour. Many said that this exercise had opened their eyes and made them astonished

about *"things that I have not perceived previously"* (G1, S2, P6), as the following examples of this kind of reasoning show:

> This is the first time I have become aware of how many hours a day the children are watching TV. We had to add up the hours, and if in the end you see the sum you almost get frightened and say 'Today our televisions have been running for 7, 8, 9 hours, and the lights have been on for 6 hours although it is summer' (G1, S2, P3).

> I realize that we are usually busy in everyday life and do not reflect on our behaviour. Therefore, I had to make a conscious effort to not leave devices running unnecessarily (G1, D1, P2).

3.6. *Changes in habits*

Some participants put the insights and suggestions they had learned by participating in their STAVE group into practice, such as trying to be more careful when using energy at home, searching for advice and information, or purchasing energy saving products, as the quotes indicate:

> I have specifically looked for standby devices, bought some new plug bars, and made sure that everything is switched off. I also asked my daughter to be more aware of this because she is not used to turning the standby mode off (G1, S3, P4).

> I have paid more attention to the lighting, particularly halogen lamps, indirect lighting, desk lamps, these additional lighting fixtures…, which is what can definitely be reduced (G1, S3, P7).

> For example, I increasingly use the residual heat of the hotplate, that is, I switch it off in due time before the food has finished cooking (G2, D2, P14).

> I have phoned someone to check my devices with an electricity meter (G1, D2, P6).

Not all participants, of course, said that the group and diary process influenced their thinking or way of behaviour. One person stated that: "For me all this is just a confirmation that we do everything properly" (G2, S2, P13).
Yet another participant reasoned rigidly:

> I talked with my wife and we came to the conclusion that we will use as much energy as we can afford. Say no more! We will not get bewildered by the propaganda in the papers or by policy. We use as much energy as we can afford. It could be a lot, and could be even more if it is for our comfort (G2, S3, P9).

Overall, some new actions arose as a result of the STAVE group discussions, such as:

— Cleaning the windows, cleaning the dust on the bulbs.
— Checking the position of the fridge and the distance to the wall.
— Buying containers to prevent moisture in the fridge.
— Family discussions on savings possibilities.
— Avoiding opening the fridge frequently.
— Defrosting the fridge regularly.
— Off-screen computers.
— Turning off the TV while doing other activities at home.
— Recycling.
— Adjusting the temperature of hot water.
— Walking to work or using public transportation instead of driving.

In short, the engagement process developed here has had some influence on people's awareness and habits, which shows the additional function of the STAVE method as a participatory tool or mechanism at the local level. This is something that most social science research tools have in common, but what is usually hidden or underestimated in standard research concepts and procedures. In our approach this is made visible from the beginning and valuated as a positive added value.

4. Policy officials feedback and reactions

During the application of the STAVE method, feedback about the in-progress findings were presented to the policy officials that had been involved as partners in the process (a 'project group' formed by these policy makers was constituted from the beginning of the process). Overall, they were all very interested in the STAVE findings about domestic energy use. One of them commented that the findings were "very good" and said STAVE had elicited "new and surprising results." (PO2). During the presentation of the results, the policy officials repeatedly asked further questions that covered a wide range of issues around engagement with citizens. Following the presentation of the work-in-progress, the policy officials discussed what effects the results could have for policy, how STAVE contributed to producing the results, and how to evaluate STAVE from the perspective of the policy makers.

Although the policy officials viewed Internet consultations (used by them previously) as a fast, cheap, and easy to evaluate tool, such techniques result in very low response rates and data that only deliver "snapshots with no information about which motives drove these answers" (PO1). In the policy officials' view, STAVE differs clearly from Internet consultations as it offers the chance to create learning processes and scrutinize an issue from various perspectives and with different component parts. In their opinion, these features permit STAVE to provide much more meaningful findings than Internet consultations. STAVE also showed that given the appropriate procedures, citizens are highly interested in participating in policy processes.

In general, the policy officials said that STAVE provided them with a realistic view of household behaviour. Thinking about how to achieve reduced energy consumption is important for them as policy makers who continuously deal with this issue. They felt that this had led them to assume that saving energy is a top priority for everyone: "STAVE results with respect to an average household are different from my own. Thus, I have learned that it is important not to lose track of reality" (PO2).

The policy makers highly valued the insights that were gained by applying STAVE and analysing the evidence gathered. They were surprised about the rich picture of the attitudes and behaviour patterns regarding domestic energy use. In their view, the interplay of the oval mapping exercise with the diaries created a frank and dynamic atmosphere for discussion, which triggered participants' politically instructive self-reflecting reasoning about their everyday lives. As to the former, they were convinced that especially the most interesting findings (i.e. barriers of energy savings) could not have been obtained by an empirical design that was not based on citizens' interactions.

5. Conclusions

The focus of the German STAVE interventions was on investigating citizens' energy-using behaviour, in a way that can be characterized as being explorative. A central challenge in the STAVE design process has been to establish translation processes in order to link the two spheres of discourse and practice. On the one hand there was a requirement to produce suitable means by which the needs of the policy community in question could be captured and translated into a form suitable to 'pose questions' to the citizen community being investigated. The second requirement was to capture the deliberations of the citizen groups, and to translate this into a form where it could be fed into the policy-making process in meaningful and constructive ways.

The German policy makers responded with interest, and sometimes surprise, when confronted with STAVE feedback. They mostly valued the opportunity to gain deeper insight into citizen behaviours, and the ways in which citizen rationalised those behaviours. In some cases the data confirmed their hunches and expectations. A key benefit, as recognised by policy makers in several countries (see Prades et al., 2015), was the novel capacity of STAVE to shed some light on the problem we have already characterised as 'the gap between what citizens say and what they do'. German policy makers were also pleasantly surprised by the capacity of STAVE to engender a willingness by citizen participants to talk openly about their domestic and other everyday practices. On occasions they were surprised by citizens' capacity to recognize, and reflect upon, the occurrence of inconsistencies between their environment-related practices and their accounts of those practices. It must also be said that we found evidence that policy makers' involvement in the use of STAVE seems to have promoted an enhanced degree of reflection of the ways in which they considered policy issues, and

contributed to rethink their existing knowledge and assumptions about citizen behaviours.

Turning to the citizens' behaviours and aspirations, numerous theoretical frameworks have been developed in the literature to explain the gap between the possession of environmental knowledge and environmental awareness, and displaying pro-environmental behaviour. Although many hundreds of studies have been undertaken and several sets of barriers and driving forces have been identified, no definitive explanation has yet been found. For instance, after analysing different theoretical models, Kollmuss and Agyeman (2002) concluded that all the studied analytical frameworks have some validity in certain circumstances, and that the question of what shapes pro-environmental behaviour is such a complex one that it cannot be visualized through a single framework. Although this could be true, according to our point of view, one of the main difficulties in exploring pro-environmental knowledge, attitudes and behaviours relies on the data gathering methodology. People frequently tend to hide their true intentions and behaviours regarding domestic environmental issues, such as waste management, energy use, and others. For this reason, STAVE can be a useful methodology in investigating such research objectives, as it has been shown capable of generating a high degree of constructive engagement with groups of citizens. Such engagement is highly effective in eliciting patterns of socially-shared everyday behaviours, and authentic ways of talking about such behaviours. At first the citizen participants were cautious, but as they become more involved in the process they clearly displayed a sense of freedom to explain their informal doubts and contradictions; features of their everyday experience that we suspect would be difficult to capture using more conventional social research methods.

Regarding the substantive results of the German case study, our research allowed creating evidence about citizens' daily energy-related behaviour at home, and to investigate their motives, activities and obstacles as to saving energy. In this sense, participants were able to list a broad spectrum of things which they can do and are already doing in order to avoid wasting energy, and even explaining the motives (for sustainability, for saving, etc.). These findings are in line with previous studies (e.g. Kopsakangas-Savolainen and Juutinen, 2013) showing that the importance given to reducing electricity consumption is positively correlated with environmental attitudes, including the importance of climate change mitigation, and that economic motives for energy savings are also very important factors explaining respondents' attitudes towards reducing electricity consumption and their energy saving behaviour.

In our study, however, the participants did not say that it is easy to act in an energy saving way, which is congruent with the existing literature on how consumers' sovereignty in choosing their environmentally-oriented behaviour is constrained by a variety of factors outside consumers' control (e.g. Stern, 1999). Indeed, the particpants concede that, upon closer consideration, they at times do not behave sustainability at home since burdensome everyday requirements or budget restrictions make them lose sight of an energy efficient hou-

sehold organisation. These results are not easy to find in the literature based mainly on quantitative research, because to fill the gap between intentions and behaviours a kind of ethnographic approach, or at least a qualitative one, is needed. The participants also admitted that there are situations in which they purposely do not behave sustainably since they give other factors a higher priority. Moreover, the reasoning that one does not do some things because one denies that they would have any energy saving impact was found among the participants' discourses. These statements depict a complex picture of the everyday life and relationships with sustainability issues, which policy makers should take into account when designing and elaborating policies. The STAVE method can be a useful tool to introduce citizens' views into policy design, and to help policy makers to reflect upon their own assumptions and work.

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