Making Energy Interventions more Effective: Situation, Interaction, and Precondition

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Abstract

A main purpose of this paper is to propose to policy makers, building professionals and other non-social scientists a way to make energy interventions more culturally informed and, thereby, more effective. The case study on house purchasers gives an ample illustration of the richer results that can be achieved by paying attention to three aspects of energy efficiency initiatives: the contexts and situations of choice in each particular case, the interaction among relevant social actors, and the culture-specific preconditions for choice. Research on how purchasers of new pre-fabricated houses in Sweden choose their heating system show how such decisions tend to fall between two stools. Furthermore, the organizational structure of housing companies frames house purchasers' decision making. An important result is that energy saving or conversion measures must be promoted at an early stage amongst those who plan and construct buildings (rather than later amongst dwellers and energy end users).

Keywords: Energy efficiency, heating system, renewable energies, effective interventions, situation, interaction, precondition, decision

1. Introduction

An important purpose of this paper is to give an ample illustration of the richer results that can be achieved by paying attention to three aspects of energy efficiency initiatives: the contexts and situations of choice in each particular case, the interaction among relevant social actors, and the culture-specific preconditions for choice. The example which is used in this paper concerns the process by which buyers of new pre-fabricated houses in Sweden tend to choose their heating system. To many policy makers and building professionals, economy, statistics and mathematical models may be easier to understand and consider than the suggested approach. However, such models can rarely be used to answer questions concerning how human beings think and act, how they interact, and why they do the things they do. In a recent study by Sardianou and Genoudi (2013), for example, statistical and econometric analyses were used to investigate factors which affect the willingness of consumers to adopt renewable energies in the residential sector. The results suggested that middle-aged and highly educated people are probably more willing to adopt renewable energies in their homes. The intention here is not to dismiss such research altogether, but to argue for the necessity of adding a wider approach and more qualitative methods for research and practice-oriented studies on which energy initiatives might be based. For instance, how do we explain the fact that decisions on how new houses should be heated are made one way rather than another? Why do purchasers of pre-fabricated houses in Sweden generally choose to heat their new homes with electricity rather than thermal energy? And why do they choose to install heating systems which prevent, rather than facilitate, the use of solar heating or other renewable energies? It is only by finding an answer to such questions that more profound and effective energy efficiency measures can be modelled.

1. 1. Background

A background to this paper is the many, largely unsuccessful, attempts to save and conserve energy since the early 1970s (Wilhite 2012).Energy researchers within Sociology, Social Anthropology and Political Science are increasingly critical of this situation. In 2000, some of these researchers called attention to the fact that energy demand had been steadily increasing in the United States and most European countries during the past twenty years (Wilhite et al. 2000).

Ryghaug and Sörensen (2009) are similarly critical of the lack of results from three decades of strategies from the Norwegian government to promote energy efficiency in building design. Building development in Norway seems to be going in the wrong direction, they say, and statistics show that new office buildings are actually less efficient than old ones. The former group of authors (Shove 2003, Wilhite et al. 2000) argue that a primary challenge for social scientists, now, is to better understand the dynamics of energy demand and the ways in which this demand is embedded in society, while the latter (Ryghaug and Sörensen 2009) argue that the supply side deserves the most attention since it is easier to achieve energy efficiency by influencing and regulating a limited number of supply side actors rather than by controlling a huge variety of actors on the demand side.

Common to these authors, however, is a shared view that social contexts and local practices tend to be constantly played down. This fact, they say, is an important explanation of the persistent inefficiency of energy policies, regulations and interventions throughout the world. Common to these, and many other researchers, is the opinion that a prevalent ignorance of social contexts and practices plays an important role in making energy policies, regulations and interventions inefficient (Lutzenhiser 1993, Lutzenhiser et al. 2008, Röpke 2009, Shove et al. 1998, Shove and Pantzar et al. 2012, Warde 2005, Wilhite 2008a, Wilhite and Nörgaard 2004). The idea of economically rational actors and aggregated individual consumers, stripped of their context, is highly influential (Boholm, Henning et al. 2013, Carrier and Miller 1999, Wilhite 2012), and 'non-technical aspects' tend to be treated as mere obstacles for technological progress (Guy and Shove 2000, Wilhite 2008b). In real life, of course, individual consumers are not merely economy-driven. Nor do they act in a vacuum, separated from their social and material environment and from other human beings. The challenge for us as social scientists is to be able to teach non-social scientists how energy interventions can be made more culturally informed and, thereby, be more effective. The suggestion of this paper to focus on *situation, interaction*, and *precondition* is one contribution to such an endeavor, exemplified by the present research on house purchasers.

1. 2. The Case

In Sweden, nearly half of the single-family houses use electricity as a sole energy carrier for heating purposes, and there is a continuously growing trend in this direction. This trend renders it difficult to use primary energies, renewable energies, and energy efficient heating systems that give room for flexibility. A number of social scientists and technical researchers turned their attention towards this problem in a multi-disciplinary research project conducted between 2007 and 2010. The aim of this multi-disciplinary research project has not merely been to achieve a reduction in the consumption of energy, but also to investigate why buyers of pre-fabricated houses tend to choose electrically driven heat pumps as a way of heating their new homes. A further aim was to support housing companies who wish to broaden their selection of heating systems, to include also systems for renewable energies (allowing for a further use of primary energy and careful resource handling) and more flexible heating systems (allowing for combinations of energy carriers, or an alteration from one to another). Some of the social scientific results are presented in this article. Qualitative interviews with house-purchasers, sellers and managers of two housing companies have been used as a method, as well as participant observation on building sites and during meetings.

1. 3. The Following Chapters

The three following chapters describe results from anthropological research on how Swedish house-purchasers tend to choose their new heating systems. The first chapter focuses on the context and situation in which they make these decisions. The second chapter focuses on the relational aspects of house-buyers' decision-making. In the third chapter, the preconditioning of their decisions is in focus. Finally, some of the main findings from the empirical study are compiled in the conclusions. The approach, which has been used and advocated here, is further discussed and summarized.

2. Situation: The Heating Decision

In the current case study, the most important situation and decision context for the customer is the purchasing and construction of a new house and home. By learning more about the procedures, experiences and perceptions of these processes, we can get closer to an explanation of why the house holders in this study decide to heat their new houses with electricity rather than the more flexible thermal installations that could preserve their options for solar and bio-fuel. When constructing a new home from scratch, many house purchasers feel swamped by decision making. Those who choose to participate in the entire construction process become involved in a sequence of events which may continue for a couple of years, sometimes even more.

During each step of the building process, they are required to make an immense number of decisions. In an attempt to keep costs down, many young couples choose to coordinate carpenters, electricians and other craftsmen themselves. They usually discover this to be more work and time consuming than expected, but also harder and more frustrating than they had imagined. House purchasers not only feel swamped by decision making, however. Usually, they are also driven by joy in being able to fulfill a dream of their perfect future home and the happiness in seeing this dream gradually being realized. Common to most of the customers is a wish to do something special to their future homes. They all want to give their houses that personal touch. According to the salesmen, house purchasers tend to focus on very different things. While some are most interested in the aesthetics of the exterior, others concentrate on the creation of a large kitchen with lots of space and exclusive kitchen equipment. Still others focus on how many bedrooms they will have. A buyer can plan an entire house around an old chest of drawers, prepare a built-in glass showcase in the living-room wall for a whisky collection, or decide to invent a way to throw dirty clothes from the bathroom down to the laundry basket one floor below. "Some people spend a lot of time on details like this", as one of the sellers said, "personal details which may not be mundane, but perfectly possible to accomplish."With this context in mind, it becomes perfectly understandable that few house purchasers will spend much time and effort on how the new house should be heated. From the new house-owner's perspective, such decisions tend to be a lot less interesting than those which promise to turn a neutral building into their own personal home.

3. Interaction: Householders – Salesmen - Managers

Thus, in our case study, decisions concerning heating equipment tend to be less prioritized (among those who construct their own homes) than many of the other decisions which concern their home-to-be. Still, also this energy decision needs to be made. In this situation, the easiest way is to turn to the housing company and listen to their advice. This is the issue that we now turn our attention towards. Many buyers learn to trust the advice and guidance of their particular salesman. This is especially the case in some companies (such as the 'multi-choice house' described in the next chapter), where the salesman – client relationship may continue for more than two years, sometimes remaining even after the construction of the house has been finished. However, one cannot go so far as to say that the salesmen actually are the ones who make these decisions for their clients. As it turned out, the salesmen also tend to have their main focus and attention elsewhere.

3. 1. The Diplomatic Salesman

The vast majority of the Swedish companies that sell prefabricated houses employ salesmen as consultants. In our study, these salespersons rent their offices in the main building of a housing firm, and are also included in its overall organization. Basically though, they run their own consulting agencies. This means that each salesman needs to attract house construction projects to himself (the seller is usually a man) rather than to other sellers. He depends on his ability to attract many house projects, not merely to the company at large, but to his own business. Consequently, it becomes essential for him to get a reputation of being a particularly trustworthy, honest and pleasant person to deal with. Therefore, the most essential characteristic of a successful house-seller is his social competence; His ability to be a good listener, to be diplomatic, and to be able to establish rapport with his clients. "You cannot create their needs", as one salesman put it. "I believe a salesman's job is to search for the needs of one's clients". A reluctance to change is another consequence of the fact that the salesmen are consultants with companies of their own. Each seller needs a certain knowledge about everything that concerns the building of a new house, ranging from building permits to door knobs. On the one hand, it is hardly possible for them to become specialists in each specific subject, such as heating or energy efficiency. But on the other hand, if the customer is going to have confidence in him, he has to be able to answer any question that may come up. Therefore, it is not easy for a salesman to make alterations in areas where he has acquired certain knowledge, and where previous customers have been satisfied.

3. 2. The Salesman's Advice

On a direct question, most salesmen assured us that their customers were free to decide on any heating system they wanted. This is probably correct in one sense. At the same time, several interviews with house purchasers clearly indicate that many salesmen tend to use their housing company's standard heating solution when giving customers their advice. At the two housing companies we followed more closely, these standard solutions included different variations using electricity with heat pumps.

The following quotation by one of the house buyers illustrates the way a salesman may guide his client towards the standard, mainly non-renewable, solution:

"We have chosen one of these ground source heat pumps. It suits the building site … Those whom we bought the house from sell them. If you ask around, how they (other people) experience it so… And then the guidance from the salesman there (at the housing company)… Because he said, 'There are these different suggestions, but for a big house like this it would be most cost effective with a ground source heat pump'. Then we asked about solar energy. We wanted to know if there was anything we should do to prepare for that or so. But that was all we did. 'There is no Government policy in that direction today that I know of, with subsidies or anything like that. So that is nothing you should worry about right now anyway'. That was the answer we got."

3. 3. Getting a Feeling for where the Trend is Going

The present standard heating solution for detached prefabricated houses in Sweden is to use electricity alone for house heating and domestic hot water, and to include varying kinds of electrically driven heat pumps in the equipment. Since one of the basic requirements for specific artefacts to be spread and implemented is their availability (Edqvist and Edquist 1980), this limited selection of heating equipment seriously restricts heating decisions among those who buy new prefabricated houses. One may then suspect that, basically, it is the managers of these house construction companies who decide which heating systems the newly built houses should have. In certain ways, this may be true. At the same time, we must realize that their decisions are also made in certain contexts and situations. Every change and new development is costly for a company, while stability means pay-off time for previous investments. As a consequence, they are often trying to strike a balance between change and continuity. Some investments or decisions are easier to make than others, though. The following description, or story, of how this may be perceived is put together from three different interviews:

Gunnar finds some kinds of decision easy to make. At some point old machines just had to be replaced. And it was never an issue whether or not one should adjust to new demands concerning working environment, building regulations etc. These things simply had to be done. It was also part of his role as a business executive to continuously revise the running of the factory and look for 'cost drivers', for those which would reduce costs. Such decision making was almost as easy and self-evident. Then there was a third kind of decision making which is more difficult, like "whether you should change house models or put this in or that in, or… That is when you have to weigh in your feelings". Marketing was one of the bigger posts in investment where he had to make difficult judgments, weighing costs for the best possible exposure against how much house production this presumably could lead to. Different aspects had to be considered: What might the customer see as interesting? How should they market themselves? And where should they choose to be seen and heard? Some information he could get from reading the catalogues of other companies:

"Recently, there has been a lot of focus on energy, so now all the house suppliers have on their website that they have this super-duper energy in their houses. So, we have to do this as well. You have to hook on to everything which is a must. There are some things you just have to show. And then, preferably, you should be a little bit better than the others, or you should be a little bit tougher or a little bit neater or something."

He had to get a good feeling for where the trend was heading, or they could end up selling houses which people were no longer interested in. Now and then, Gunnar takes the car and drives around in areas where new houses are being built, just to get a feeling for what is trendy. Gunnar also spent a lot of time reading interior design magazines and watching relevant TV-programmes. He tried to collect as many impressions as he could from various sources, trying to get a feeling for what was going on. At some point, however, he felt that he had only his own feelings and assumptions to go on:

"You can never feed in enough information to be sure. So at some point you have to say to yourself that time is up, you have to decide. You cannot go around treading water any more (…). The feeling – what I think – that plays a very big part. Because, when I have collected all these impressions, I still cannot know if this is what is going to be the future. I have to go on what I believe it to be."

3. 4. The Interaction

To sum up a bit so far, it is clear that heating equipment is rarely the centre of attention for those who buy pre-fabricated houses and have them constructed. It is also obvious that the same applies to salesmen as well as managers of the housing companies. The salesmen are more diplomatists than energy experts.

They are more dependent on their ability to attract satisfied customers than on taking the risks involved in changing a product and subcontractor. These are the reasons why they tend to turn to the company standard solutions when giving clients advice about their choice of heating system. For the managerial groups of these companies, the way their houses should be heated normally take up very little space in their continuous strategic planning and balancing between change and stability. Among the hardest decisions to make for the managers are those which are based on their intuitive guesses of what kind of houses their presumptive customers may want in a near future.

4. Precondition: The Organizational Structures of Housing Companies

The difference in roles, responsibilities and interests of the interacting individuals (or groups of individuals) is one important aspect of the preconditioning of choice (Boholm, Henning et al. 2013). So far, we have seen how the pre-understanding of decisions concerning the heating of newly built houses differs among the most relevant social actors. Common to all three, however – the purchaser, the seller, and the manager – is the fact that the responsibility for this energy decision is played down and transferred to each other (Henrich 2002, Krzyworzeka 2013, Miller 1995). Another way of investigating the preconditioning of choice is to focus on the characteristics of the more slow-to-change social, material or ideational structures of a particular context. We will exemplify this by turning our attention towards the organizational structures of the housing companies, and the way these tend to precondition decision making among house purchasers.

4. 1. Pre-Fabricated Houses

When planning to buy a new house, one of the first things people have to do is to try and get a good overview of the abundance of existing house companies, and to agree on a company and a house model. These initial decisions will then be decisive for the amount of decisions they will make during the construction process, as well as for the kind of decisions they will make. The majority of companies in Sweden who sell the popular prefabricated detached houses deliver walls, roofs, windows etc. to the building site. These parts are then put together on the pre-prepared site. However, the two companies in which we took a particular interest in this research project, had found their niche on either side of this major path. One of them produces 'volumes', which means that entire houses are built inside a factory. When a house is transported to its destination on two or three lorries, the construction and decoration is already completed down to quite small details. Wallpaper and paint is in place. So are kitchen cupboards, water closet and bath tub. The other company uses an entirely different procedure. This company constructs their houses directly on each building site by teams of carpenters and other craftsmen. Usually, only the sawn timber is prepared in a factory. Those who choose to buy their house from the first of these companies will have a shorter building process ahead of them than those who buy their house from the second company. They will also, for better or for worse, have considerably fewer choices and decisions to make. In both cases, however, the organizations and business concepts of the companies have important impacts on the decision making processes. We will begin with some ways in which house purchaser's decisions are preconditioned by the business idea and organizational structure of the volume house company.

4. 2. The "Volume-House"

The main business idea of this company is to offer their customers well-made and professionally thought-out houses with good quality products at fixed prices. One way to achieve this is by having a limited number of subcontractors, and by completing all negotiations with these before any customer contacts are made. Another strategy is to make the handling of orders as efficient as possible. They do this by planning in advance and trying to envisage and prepare for as much as possible beforehand:

"For example, the customers fill in this last line, this wallpaper will go into this bedroom. Then, of course, we know beforehand how many lengths of wallpaper that particular bedroom needs. And we know how many lengths you get from one roll. Naturally, we have already figured that out. If you buy this type of house, this number of wallpaper rolls is needed. So the only thing we have to fill in is the delivery date from the factory. If we fill in the 28th of January, the wallpapers will arrive on the 21st of January. We have already written this into the system, so to speak." While previously, it would take them three or four days to make an order for a house, it now takes them about an hour. The drawback with this time-saving system is that any change gives them a lot of extra work: "If you want to switch (from a heat pump) to a bio-pellet stove and so forth, we have to change the system".

The fact that even seemingly small changes will add to the overall costs is difficult for their customers to accept:

"Then someone wants to move a window. A window cannot cost that much money, they think. No, but that is when we have to go in and do the drawings all over again. The production drawings are in our printer. The name of the house-type, push a button, out come forty-seven drawings, thirteen descriptions and fourteen lists.(...) Order specifications, production specifications, it takes about an hour with this system. And then, if a customer wants to change something on one of the drawings, then of course everything has to be done by hand instead.(...) This is hard for the customer to (take in)."

Their strategy is to try and steer customers who wish to make some alteration (of the predetermined house model) into a pre-prepared direction. At the time of the interviews, the company had recently produced a leaflet for their salesmen, unofficially called a 'This-is-what-you-also-may-choose-list'. The list contains information about additional choices, which their clients may make if they ask for them specifically. With the help of this unofficial list, the salesmen could address such a client and say; "Yes, of course. We will be happy to make these alterations, but they have to be made in one of these ways". For instance, rather than having a client saying "I want such and such a sauna", the company would already have prepared for a few types of sauna which he or she could choose from. There is a limit to how many alterations to the basic house-models the company can allow, however. The primary strategy for the salesmen is to try and persuade house-purchasers with decided views to be satisfied with fewer changes. On occasions when this strategy fails, they may finally have to advise their clients to go and look for a house elsewhere.

4. 3. The "Multi-Choice House"

Some of the ideas behind the multi-choice house differ radically from those of the volume-house. Both companies sell pre-fabricated houses, and both provide a variety of basic house models to choose among. However, this second company explicitly promotes its business by emphasizing the fact that buyers can tailor each house completely according to their own wishes. Even though customers are offered the possibility of tailoring their house entirely from scratch, this company also has to organize, handle and direct customer options. One of their strategies is to give customers three main alternatives. Firstly, the customers may choose the standard solution for windows, kitchen cupboards etc. Secondly, they may pay extra for one of a certain number of more costly alternatives. Thirdly, the client may want to choose a product that cannot be delivered by any of the company's subcontractors. In that case, they will have to solve these themselves, but will get a cost reduction. "We do not force our customers", as one of the salesmen said. "(We do not say :) You must do this! No, we are flexible. It is important to have a sensitive ear". Also in this company, the salesmen try to make their customers understand why costs are added as soon as they make any personal change or addition:

"It is important to us to explain that if you choose to put in a sauna in your house, well, then this is what the material costs. However, there are other costs as well. The carpenter will have more work; the electrician will have more work, all such things. If it is a bathroom, you may need someone to put up the glazed tiles and someone to install a floor drain in there. So you have to make them understand, if you add this, there may be five more craftsmen who get more work to do. So there will be a cost for all of those."

5. Conclusions

The main purpose of the present paper has been to exemplify and illustrate the different kind of data, or, in Geertz' words (1973), "thicker description", one may achieve when including an interest in the contextual situation, the interaction of social actors, and the preconditioning of energy decisions. It is suggested that this kind of approach can provide a more informed basis for energy and building related policies, regulations and interventions. The current research on how the buyers of detached houses in Sweden choose their heating system has been used as an example to illustrate how focus on situation, interaction, and precondition proved useful for identifying when, and towards whom, energy efficiency interventions should be made in order to be most effective. The results show how the link between seller and buyer comes full circle, and how decision-making tends to fall between two stools. Since house buyers often lack interest in the choice of heating system (given that there are any amount of more interesting decisions they have to make), they rarely choose these in any active sense, but tend to trust the advice of the house salesman. The managers and salesmen of the house, for their part, are reluctant to change, but still try to give the purchasers what they believe the purchasers want.

Models of rational choice build on the axiom that every decision, regardless of its context, is (or should be) the outcome of a rational calculation of alternative choices in accordance with expected utility and estimated risk or economic gain (Boholm, Henning et al. 2013). These models for decision analysis, which have derived from economics and game theory, continue to be highly influential among academics, policy makers and officials (Boholm, Henning et al. 2013). They have, however, been heavily criticized for being idealistic, a priori, and normative, for neglecting the social dimension of human intentionality and action, and for being based on unrealistic assumptions about human cognition (Bunge 1998, Hendry 2000, Gigerenzer 2006). The current research is in line with such criticism, and illustrates the fact that human decision-making, quite contrary to the idea of rational choice, is relational, situational, and also quite emotional.

The research results also give evidence of the fact that the business concepts and marketing niches of house construction companies frame house buyers' decision processes. These frameworks delimit choices in certain ways, and also give certain directions to the decision-making process. The organizational structure of any company constitutes a built-in inertia when it comes to change. This means that even very small alterations in the order system or manufacturing process can have a domino effect with big consequences for the companies in terms of time and money. The fact that salesmen have their own consulting agencies and rely on their good reputation, also make these reluctant to change a winning concept (electric heat pumps). A wish to install a thermal heating system constructed for the use of bio-fuel and/or solar heating rather than electric heating is therefore a demanding request. One of the more interesting results was the realization that the form of the house restricts the house buyers' choice of heating system even long before the house is actually built. The most obvious example emanates from the current trend in Sweden to construct detached houses with big living-rooms and kitchens, but with little space for storage. This trend is problematic for those who wish to install heating with solar or bio-fuel, since these energy carriers require heating systems with enough space for hot water stores (Lorenz 2010). It is also problematic for those who want to have flexibility and be able to combine any energy carrier of their choice, or to easily change their mind when the size and needs of their family changes, or when energy prices are altered. However, to have space for one or more hot water stores of sufficient size is a matter of decisive importance if one is to realize such wishes.

Since the future physical form of a pre-fabricated house is already embedded in the respective company's organizational structure, one of the main conclusions is that energy saving or conversion measures must primarily be directed towards other social actors than energy end-users. They must also be directed towardsa much earlier stage of the decision process. For example, the adjusting of Swedish building regulations in 2010 did not manage to promote more basic interventions, such as well-insulated houses, or houses with options for the use of low quality energy and renewable energies (Perman 2010, Persson and Heier 2010). Even though the regulations were directed towards producers rather than buyers, they merely resulted in a boom in the installation of heat pumps, thereby further consolidating the sole use of electricity for heating purposes. Similarly, the research results strongly indicate that knowledge about energy efficiency measures that have to be made long before a building is constructed, needs to be promoted among policy makers, managements, architects, manufacturers, builders and salesmen. These research results illustrate the fact that energy end users most rarely (or never) act as isolated individuals, as economically rational consumers, or as the sole change agents (Wilhite 2012). Since decisions are always taken in a certain context and situation (Henrich 2002, Mehlwana 1997), it is less rewarding to study decisions as something which have been reached in a social vacuum. Decisions are usually negotiated and discussed (Gullestad 1984, 1992, Miller 1995, Sjölander-Lindqvist and Cinque 2013, Wilk 1987). Furthermore, culturally embedded pre-understandings of choice and decision-making tend to precondition specific decisions (Boholm, Henning et al. 2013:108, Krzyworzeka 2013). These three aspects - the *situations, interactions*, and *preconditions* of choice - need to be taken more seriously if one wants energy sources to be used in a more sustainable way, and energy consumption in buildings is to be reduced in any substantial degree.

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