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Energy Efficiency in Tenant-owners' Residences: The Process of Going from Objective to Implementation

Abstract

This article focuses on how Sweden's largest tenant-owners' organization, HSB, deals with energy efficiency. The aim is to examine HSB's energy goals, how they are determined, and how they should be implemented at four levels: the national association, the regional office, the local housing co-operatives, and the tenant-owners. Representatives of all four levels were interviewed.

Achieving energy goals calls for common strategies involving all levels of HSB. The analysis indicates that ambitious energy goals have not been followed up with similarly ambitious implementation plans by the organization. Champions in HSB mobilize support for energy efficiency at the regional and co-operative levels, but have no effect on household engagement. The lack of interest in energy efficiency on the part of households was partly due to the collective metering of energy, but also because energy constitutes only a small part of household life.

Introduction

Energy efficiency has become a central political objective in the EU. The EU member states have agreed that they must achieve a 20% reduction in their primary energy consumption by 2020. Sweden also has the objective of reducing its total energy consumption per heated area unit in homes and premises by 20% by 2020 and by 50% by 2050 relative to consumption in

1995 (SOU 2008:10). The Swedish Energy Efficiency Committee, which produced the national action plan for achieving the EU's established targets, stated in its report that there is still much to do where energy use is concerned and that there is substantial potential for energy savings, particularly in the housing sector. In Sweden, the domestic and service sectors represent approximately 35% of total energy use (SEA, 2009). In the housing sector, certain trends are evident. Since 1970, the heated area has doubled while the added energy for heating has remained constant, district heating largely having replaced individual dwelling heating systems and the use of electrical heating has increased (Kellner & Levin, 2002). We are moving towards a larger living area per person while households are obtaining an increasing number of electrical devices, such as household appliances and computers (Holmberg & Nässén, 2005; Palm, 2010). When discussing energy efficiency in the housing sector, it is useful to look at the existing buildings as, in most western countries, they will continue in coming decades to represent most of the buildings people live in. Reaching the goals already determined calls for action in existing housing stock leading to reduced energy consumption. As well as establishing ambitious energy efficiency goals, housing organizations must also work to create efficient implementation processes. Sustainable energy goals will only have value if they are adopted and applied in the organization.

This article focuses on how Sweden's largest housing co-operatives HSB (the Swedish Tenant-owner Cooperative Housing Association), deals with energy efficiency. In Sweden, members of a housing co-operative formally own the right to inhabit their respective apartment for an unlimited time. This right can be bought and sold on the open [real estate market](#). Membership in a housing cooperative is the same thing as owning (as opposed to renting) an apartment. The most usual legal form is a block of flats owned freehold by a cooperative. Members of a local housing co-operative can vote at the annual meeting and

elect a board. The monthly housing fee is determined jointly at the annual meeting; this fee finances mortgage loans and common maintenance expenses.

Tenant-owners' residences are becoming an increasingly usual form of household tenancy. Statistics Sweden (SCB) states that the number of tenant-owners' residences in apartment blocks has increased by 41% in Sweden since 1990, while the total number of residences increased by only 4% over the same period (SCB, 2008). In total, approximately 33% (800,000) of all apartments are tenant-owners' residences.

This increase makes tenant-owners dominant actors in the housing sector, and makes their environmental strategies important for achieving energy goals in the housing sector. HSB has established ambitious energy efficiency goals. The way in which their far-reaching objectives are regionally and locally anchored in the association is crucial when it comes to action to achieve the targets, and this will be analysed below.

HSB: A Tenant-owners Association

HSB was formed in 1923 with the aim of building and managing good, value-for-money homes for its members. HSB as an organization is structured as a federation of independent organizations comprising:

- members (the tenant-owners)
- the local housing co-operatives
- the HSB Regional Associations

- the HSB Swedish Tenant-Owner Cooperative Housing Association (HSB National Association).

The base consists of approximately 540,000 tenant-owners, each of whom is a member of one of the approximately 3900 local housing co-operatives. The local housing co-operatives are linked to 33 HSB Regional Associations. These Regional Associations and the local housing co-operatives function as separate legal persons and therefore make their own decisions. The National and Regional Associations can make recommendations to their local housing co-operatives, which then make decisions on matters such as what energy efficiency objectives and measures to address.

Tenant-owner residency represents a mixture of tenancy rights and home ownership. The apartment owner is usually responsible for interior maintenance while exterior maintenance falls under joint responsibility. Exterior maintenance covers elements such as façades, supporting walls, and painting exterior doors to achieve a uniform building appearance. Joint decisions are also made regarding heating systems, ventilation systems, and the building envelope (including windows and insulation). Interior maintenance covers fixtures and fittings in apartments, interior walls, kitchen equipment, etc. This distribution of tasks is regulated in the local housing co-operative's statutes (cf. Ruonavaara, 2005).

Aim

The aim of this article is to examine HSB's energy and environmental goals and visions, how they are established, and how they should be implemented at the four levels, i.e. the national association, the regional office, the local housing co-operatives, and the tenant-owners. HSB

has established ambitious environmental targets at the central level that are well in line with those established by the EU. The goals are formulated as: a 20 % reduction in primary energy consumption by 2010; a 50 % reduction of CO₂ by 2023 with 2008 as starting point, and that the HSB enterprise should be self-sufficient with regard to energy consumption in the housing estate by year 2050. However, the question remains as to how far HSB can centrally influence the energy objectives that local housing co-operatives choose and implement. What opportunities and obstacles exist, according to the actors, at the central, regional, local, and membership levels, when it comes to influencing energy consumption and achieving established efficiency targets? These questions will be discussed below.

Implementing Objectives in a Divided Organization

Action by housing associations to address climate change exemplifies the “greening” of a business. Both external and internal contextual issues have been identified as motivating such greening (Bansal, 2003; Ball, 1999; Prakash, 2001). Legislation is a key external driver in many cases, but in other organizations, stakeholder influences have been identified as principal causes of this behaviour (Reeves, 2009). Ball (1999) states that most studies of home building have focused on the market context in which firms operate and on the market constraints and profit-maximization motives that explain what homebuilders can do regarding design, quality, and innovation. However, as Ball also demonstrates, firms are not helpless and do formulate strategies and profit from them. So far, environmental issues and sustainability reportedly exert little influence on housing association strategies and activities in both the Netherlands (Straub, 2004) and the UK (Hall & Purchase, 2006). Both Egmond *et al.* (2006) and van Hal & Femenías (2009) claim that environmental issues and energy efficiency are higher on the agenda among Swedish housing associations than among, for example, Dutch ones. In an international perspective the Swedish energy stock is also quite

energy efficient. Even so, earlier studies in Sweden emphasized the need to focus on sustainability issues in the housing sector and the huge potential for energy savings (Holmberg & Nässén 2005; SOU 2008:10).

HSB in Sweden has intensified its work on the “sustainable transformation” by adopting ambitious environmental and energy goals, as will be described below. However, energy goals only have value if they are implemented. Earlier studies have discussed barriers to successfully implementing sustainable solutions in general in the built environment (see Crabtree & Hes, 2009). These studies have found that it is difficult to promote the widespread adoption of innovation in the housing industry because the market is fragmented and seen as conservative (Crabtree & Hes, 2009; Glad, 2006).

Regarding the implementation process of individual housing organizations, several general categories of factors influencing housing associations have been identified and discussed. Egmond *et al.* (2005), in an analysis of the determinants of housing association action on energy conservation, identified three factors: *predisposing factors*, *enabling factors*, and *reinforcing factors*. *Predisposing factors* provide the motivation for behavior and are found in the socio-psychological and cultural domain of organizations. This includes cognitive and affective dimensions such as awareness, knowledge, norms, attitudes, and the organization’s perception of its own capacity to improve its energy efficiency. Other predisposing factors are size and financial resources, also mission statements and organization codes. For a tenant-owner organization such as HSB, the acceptability of energy efficiency intervention to both staff and members is vital. The increased focus on climate change is likely to create support for energy efficiency. The acceptability of particular measures is likely to be influenced by staff perceptions and feelings regarding their effectiveness and ease of use (Linton, 2002). A

common perspective in implementation studies is that those implementing the systems have the best knowledge of local conditions and therefore also of how decisions should be made (see, e.g., Lipsky, 1980). Of interest in this regard is the organization's degree of independence relative to the strength of central governance when considering the implementation process. Other factors that should belong to this category are the support of an influential person who attracts interest and creates confidence (Palm, 2009) and a decentralized structure that enables teamwork and individual commitment. Under predisposing factors I also include the involvement of innovation champions, who are often mentioned in the literature (Linton, 2002; van Hal & Femenías, 2009).

Enabling factors relate largely to external contextual issues supporting action, such as expert advice and subsidies (Egmond *et al.*, 2005). In the case of energy efficiency, economic advantage is regarded as a major factor motivating Swedish housing associations (Boverket, 2008). When it comes to the individual level, owner-occupiers must decide to invest their own funds. Lacks of funding and other internal resources have been identified as key barriers to sustainability action by landlords (see, e.g., Clinch & Healey, 2000; Reeves, 2009). Making additional funding available often means cutting back on existing planned expenditures. Another often highlighted barrier to energy efficiency is the demand for short payback periods, commonly five years or less (Thollander *et al.*, 2010).

Reinforcing factors relate to feedback from external stakeholders, such as peer organizations and customer reactions or rewards. The feedback can be given in several ways, through social benefits, recognition, status etc (Egmond *et al.*, 2005). These factors are important but will not be discussed further here, but I will mainly focus on predisposing and enabling factors.

We also need to recognize the interest of owners or residents. Energy costs still constitute only a small part of the total cost of living: in Sweden, that figure is 3–5% of total household expenditures (Lindén *et al.*, 2009). Household energy consumption is also influenced by various social practices not linked to energy (or the environment), such as cosiness or cleanliness (Shove, 2003). Residents' attitudes to technologies also affect their decisions, and they may prefer less-efficient heating systems such as gas fires (Bell & Lowe, 2000). Implementing energy efficiency measures in homes is not a straightforward process.

An important tool when it comes to influencing household energy consumption is information provision (Palm, 2010). According to the EU directive on energy efficiency (EC Directive 2006/32) and to the national Energy Efficient Commission (SOU 2008:25), information and education are basic and necessary preconditions for achieving more efficient energy use. From their perspective, information can influence knowledge, attitudes, and behaviour. However, Lindén *et al.* (2006) discuss how knowledge, values, and attitudes – in that order – do not always lead to behavioural change. More or less random behaviour can also lead to changed values and/or attitudes or strengthen existing ones (cf. Biel, 2003). The use of information touches on the moral aspects of household energy behaviour, rather than strictly economic ones, as households will need to become more aware of and involved in their energy consumption (Oikonomou *et al.*, 2009; Palm, 2010). Households will then need to start reflecting on their energy consumption (Palm & Ellegård, 2011).

Energy conservation can also be improved by changing people's motivations, for example, by increasing their environmental awareness or sense of moral obligation to reduce energy consumption (Oikonomou *et al.*, 2009). In this sense, we can see individuals and households that take a broader perspective than a purely egotistical one, people who abstain from profit in

the short run to benefit society in the long run (Berglund and Matti, 2006; Hirsh and Dolderman, 2007; Palm & Tengvard, 2011). Stern (2000) emphasizes that the driving forces of significant environmental behaviour are complex. One's general environmental attitude is influenced by specific behavioural norms, such as how to act in the social sphere and other people's expectations regarding one's behaviour. Research indicates that simply providing advice to households is relatively ineffective (Palm, 2010). Bahaj and James (2007) demonstrated, for example, a drop in energy consumption immediately following advice, which was not sustained over the long term.

Another way to influence household energy consumption is to provide physical improvement instruments, such as smart meters, which provide immediate feedback. Research into the impact of feedback indicates that it is both a valuable complement to other energy saving interventions and can lead to energy savings in itself of the order of 15% (Darby, 2006). In Sweden, all meters were changed in 2008 and 2009 to "smart meters" that let utility companies provide more accurate bills and energy use data to householders. Through these meters, it is possible to enable residents to receive both direct and historical feedback on their electricity consumption.

I will now discuss HSB's energy efficiency goals and how these are implemented throughout the organization. First, I will describe the semi-structured interviews on which the empirical analysis is based.

Interviews with HSB Officials and Members

Semi-structured interviews were carried out at various levels of HSB with officials who have overall responsibility for energy and environmental matters. At the national level, the Head of Energy was interviewed. At the regional level, the HSB Östra Regional Association was

chosen and there the Head of Energy and the Managing Director (MD) were interviewed. At the local level, the chairs of two local housing co-operatives belonging to HSB Östra were interviewed. I was not interested in co-operatives that had big refurbishment plans incorporating energy reduction measures, but in co-operatives that for the coming 10 years would need to meet the energy efficiency goals by means of ordinary maintenance activities. Given this premise, I chose one co-operative that has worked actively on energy efficiency and one that has not involved itself to the same extent (i.e. the Viggen and Matchen co-operatives).

I also interviewed 10 tenant-owner households, five in Matchen and five in Viggen. I obtained contact information for the households from the co-operatives' chairs. I had information about how many people were in each household, their ages, and how long they had lived in the co-operatives. I tried to find households in each co-operative that differed according to these known variables. In Viggen, only retired couples were willing to participate, which reflects the fact that it is mainly retired couples that live in Viggen. In Matchen, I recruited more varied households: one single-member household, one young couple with no children, two families with children, and one retired couple. Households in Matchen are hereafter referred to as M1–5, while households in Viggen are referred to as V6–10; A and B are used to indicate which of two household members are speaking (only adults were interviewed).

The interviews were semi-structured. I started by interviewing the HSB National Association Head of Energy. I used an interview guide covering the following matters: 1) background data; 2) environmental and energy goals and visions – who initiates them, when and how, via a bottom–up or top–down process; 3) energy-related measures – who determines what measures, how and why to prioritize measures, and the legitimization process; 4) how are

responsibilities divided between the national, regional, and local levels – who does what, who is responsible for what, how to support the regional and local levels, and sanctions for non-compliance; 5) who chooses the heating system – how to prioritize between heating systems; 6) energy efficiency/reduction – how to deal with these, what measures are prioritized, barriers to and enablers of implementation, how to help implement the goals; 7) perceived support for energy visions and goals in the organization – how to support both forerunners and laggards; and 8) any other issues the interviewee wants to raise.

I used the same basic guide for the interviews at all levels, although I adjusted it to match informant role and knowledge (Yin, 2003). I also refined the guide during the project as I learned more about HSB and its energy activities. I therefore asked the regional- and local-level interviewees more detailed questions about, for example, individual metering, which I learned from the first interviewee was an HSB priority.

The interviews were recorded using an MP3 recorder/player and then transcribed. The interviewed householders are anonymized in this paper, while the professionals are presented by their job title.

HSB's National Association: Energy Objectives and Visions

As mentioned above, HSB has adopted ambitious climate targets. One of these is for the HSB National Association, along with the regional offices, to reduce emissions of carbon dioxide equivalents by 50% by 2023 (relative to 1995 emissions), which is when HSB will also be celebrating its centenary.

HSB encourages individual local housing co-operatives to sign a climate agreement. This agreement states that the co-operative undertakes to reduce its emissions by 40% relative to a flexible comparison year, which means that co-operatives that have already implemented measures can take these into account. Signing a climate agreement is voluntary for the local housing co-operatives and the primary contact is between the regional office and the local co-operative. The role of the regional office may include assisting with maintenance planning, i.e. identifying the co-operative's climate emissions and planning how the co-operative can reduce its emissions.

At the same time, HSB's Head of Energy identified various problems that the Association, as a tenant-owners' organization, encounters when attempting to realize its energy goals. The local housing co-operatives' form of tenancy makes it difficult to implement measures and achieve objectives, according to him. Among other factors, HSB is dependent on personal commitment, property status, and the co-operatives' finances to achieve set targets. The Head of Energy also believes that there is a lack of incentive to improve energy efficiency in the housing sector, and to counter this, he called for soft loans, i.e. temporary funds to drive the change process. The lack of investment capital for local housing co-operatives has a delaying effect on the implementation of energy efficiency measures. The Head of Energy thought that the critical point is that there is a lack of economic motivation for the implementation of energy efficiency measures.

Agreements and Individual Metering

The regional offices are free to sign independent electricity agreements, but they also have the option of becoming party to the National Association's agreement with Storuman Energi AB.

HSB's most common form of heating is district heating, i.e. supplying heat from a central source to a group of buildings.

Centrally, HSB recommends the individual metering of electricity and heating, seeing this as a natural step in improving energy efficiency: "It goes without saying that individual metering is part of this and can reduce energy use" (HSB's Head of Energy). HSB's recommendation is that new builds and co-operatives that carry out major renovations should introduce individual metering. At the same time, it is impossible for the National Association to demand this, as it is a decision made by the local co-operatives themselves.

How Does HSB Try to Exert Central Influence on the Regional and Local Levels?

The primary way the HSB National Association can influence the regional and local levels is by providing information on technical solutions and the importance of behavioural change. Centrally, HSB offers energy services and provides training courses, information, and seminars. The National Association does not communicate directly with the tenant-owners. Instead, the communication takes place through the regional offices and the local housing co-operatives. The boards of the local housing co-operatives drive the issue of implementing energy efficiency measures for the tenant-owners.

The Head of Energy thought that the Association had support from the 33 regional offices to address energy efficiency, though energy reduction measures are voluntary for the regions. The Regional Associations are separate legal persons and there are always one or more Associations that do not wish to join in proposed common activities.

HSB's Regional HSB Östra Association: Energy Objectives and Visions

HSB Östra has affiliated itself with HSB's national climate agreement. During the introductory phase, only the regional office's own operations are covered by the climate agreement. The idea is for HSB Östra to gradually induce the local housing co-operatives in the region to sign their own agreements. As far as the regional office is concerned, the climate agreement means that HSB Östra should actively address established targets, monitor and report reduced emissions, assist with financing, and carry out compensatory measures if the targets are not achieved. The Head of Energy said that provision of energy data was a basic tool for reducing energy consumption. At the time of the interview, HSB Östra lacked up-to-date data and was working intensively on this deficiency. Earlier, when the electricity market was regulated, the Regional Association received the information from the utility company, but they currently lacked a good system for this.

A main problem encountered in achieving the goal of reduced energy consumption was that it required that local housing co-operatives make investments, such as insulating exterior walls or changing heating systems. This leads to an *increase* in the cost to the co-operatives and therefore an increase in the monthly cost to the households, which members do not perceive as unequivocally positive. Further, no concrete energy objectives have been set for the existing property holdings in the region. The Head of Energy and the MD said that this was because the co-operatives themselves determine what environmental and energy measures they wish to implement:

They [the local housing co-operatives] can do exactly what they like and they can use us as they wish. They can disregard our advice. We cannot control them. We have no such power. (the Head of Energy for HSB Östra)

They also thought that the form of tenancy has both advantages and disadvantages for HSB Östra's energy work. The advantage is that the members truly "own" the issue, which means that if a co-operative involves itself in energy issues and adopts objectives, these are often also implemented. The disadvantage is that energy-efficiency measures are not implemented if the co-operative is not interested. Personal commitment and knowledge on the part of board members is often what determines the scope of the action programme. One problem that HSB Östra's Head of Energy encountered was that co-operatives felt that all measures undertaken should be financially motivated, the effect of which is that energy measures are sometimes assigned a low priority. Interest rates on loans often constitute an overriding part of the co-operative's costs and also become the issue on which the local housing co-operatives choose to focus:

If we take the total cost of a new property, the energy issues may be 10% [of capital cost] since the absolutely overriding cost is interest on loans. This depends on how old the properties are. In new properties, the loan issue is almost the only factor they can bring themselves to think about. In old properties, the operating costs are the ones that figure to a greater extent – they have proportionally smaller loans. This is therefore why there is sometimes too low an incentive to do anything. That is the problem we have. (HSB Östra's Head of Energy)

In connection with new builds, however, HSB Östra can exert greater control over how energy-related investments and measures are implemented. Among other things, HSB Östra has concentrated on installing demand management with the help of presence detectors in new developments. Demand management is also something that HSB Östra recommends for existing and older properties.

Individual Metering

Despite HSB's individual metering goals, most local housing co-operatives in the HSB Östra region buy their electricity collectively. Nearly all associations share the electricity according to an apartment-based quota where bigger apartments pay more than smaller ones, while only some share the cost of household electricity through internal metering. The advantage of collective electricity purchases is that it is possible to negotiate beneficial terms (the discount can be up to 10 % on electricity); the disadvantage is that their electricity use is often not apparent to the households.

In connection with the introduction of collective electricity purchasing, HSB Östra was able to study energy use before and after, and the Head of Energy was surprised that consumption had not increased with the introduction of collective electricity:

We know the amount it took before and we know the amount it takes afterwards. It is interesting to see that there has been no increase in spite of collective electricity.

At the same time, HSB's Östra's Head of Energy thought that smart metering could be the tool that would make people aware of their costs. The Head of Energy was following developments and said that the Association might consider the smart metering of hot water,

for example, but that there were currently no financial incentives. However, both the Head of Energy and the MD believe that there may be a legal requirement for smart metering in the future. This is being taken into account in connection with new builds, so HSB is preparing its properties for the possible installation of metering equipment.

How Does HSB Östra Try to Influence Local Housing Co-operatives?

HSB Östra provides the tenant-owners with written information through the members' magazine, *Hemma i HSB*, and publishes the *HSB Revyn* supplement four times a year. There is also a newsletter that is distributed to those elected to the Association boards. Verbal communication takes place primarily through the local housing co-operatives. One HSB Östra representative is on the board of each tenant-owners' co-operative. This person, who is selected by HSB Östra but is a full board member, constitutes a resource person bringing competence and continuity to board work. The member also becomes a link between HSB Östra and the tenant-owners' co-operative. Both the Head of Energy and the MD believed that information and a change of attitude were important parameters in reducing future energy consumption.

The Local Housing Co-operatives, Matchen and Viggen

The Matchen tenant-owners' co-operative in Norrköping consists of three residential buildings containing a total of 52 apartments first occupied in the late autumn of 2005. The buildings are connected to district heating, are modern and equipped with lifts and glazed terraces, and each apartment has a washing machine, tumble dryer, and storage space.

The Viggen tenant-owners' co-operative in Finspång was built between 1968 and 1969. The area consists of seven buildings, six two-storey buildings and one single-storey building, all

connected to district heating. Today, there are 79 apartments, two shared laundries, and a storage area.

Energy and Environmental Targets and Visions

At the Matchen tenant-owners' association, energy use has remained largely unchanged since the homes were occupied in 2005. According to the board chair, the housing co-operative has not worked on energy-related matters because financial matters have occupied all its resources. Since Matchen is newly built, it bears comprehensive loan and interest costs. Over the years, construction faults have also been discovered, including faults in the buildings' district heating system, which led to an expensive renovation. It has also been an effort to get all the individuals who are part of a newly started co-operative to pull together, and Matchen's board chair therefore said that environmental and energy matters were not the top priority. However, Matchen has undertaken certain energy efficiency measures, for example, garage lighting that automatically turns on when someone enters, block heaters controlled by timers, and the ongoing replacement of exterior lighting with low-energy bulbs.

The other studied co-operative, Viggen, which was built in the 1960s, has been able to focus more on energy and environmental matters. As the buildings have aged, they have needed renovation and, in connection with this, energy efficiency measures have been implemented on façades and inside the apartments. As well, Viggen has always had someone on its board who is interested in environmental and energy matters and who pursued these matters in connection with renovations (interview with Viggen board chair). Viggen had also changed over to thermostatically and timer-controlled engine heaters for its outdoor parking, which meant a considerable drop in electricity consumption; because of this experience, the co-operative is also considering implementing this in the cold garage.

Viggen's board had drawn up an action plan containing proposals for future energy measures, including supplementary insulation of façades and attic joist floors as well as a lighting review. However, there was no concrete schedule for these measures and the chair responded, slightly evasively, that plan implementation depended on "economic incentives" and on how the buildings' exteriors and interiors were affected. Viggen's board chair was also critical of the lack of opportunity for local housing co-operatives to claim tax deductions for renovations, reconstructions, and extensions:

You can only do so in your own apartment, but the association cannot. We would certainly advance our current energy projects, like the one I mentioned on supplementary insulation, if we could start now.

This was seen as a barrier to collective action and something that put more pressure on individuals in the co-operative to make "sustainable decisions".

Individual Energy Metering

Both Matchen and Viggen meter electricity collectively, which is divided between the apartments according to quotas based solely based on apartment size. Matchen is equipped with individual electricity meters, but when the buildings were finished, HSB decided that it would be more cost effective to supply collective electricity. Matchen's board chair told us:

When we moved here, none of us knew that there would be collective electricity. It came as a bit of a shock to us.

The board chair thought that HSB should have informed them better about the collective metering, and that he was shocked indicates the negative impact he thought collective

metering had on the possibilities to reduce electricity consumption. However, converting all electricity meters to individual electricity would cost Matchen around EUR 22,500 with an annual maintenance cost of EUR 2500. A computer system would also be needed to handle invoices, which is currently an unknown cost:

That issue [individual metering] has come up a bit lately, but there are as yet no instruments for this that can read every meter to a certain computer centre. (Matchen's board chair)

An investment in individual metering at Matchen is not relevant since it is considered to constitute far too great an investment.

Viggen changed from individual to collective electricity metering in 2005. Collective metering meant that the association could prevent the power grid company's fixed grid charge from affecting individual households. Viggen's chair was aware that the issue might be controversial, however, and was not completely sure of his point of view:

I essentially believe that we, the Viggen co-operative, as a collective should be able to handle our energy consumption in the same reasonable way that we would as individual consumers.

Since the introduction of collective metering, the co-operative has not noticed any increase in electricity consumption, according to the board chair (I have not been able to verify this because of lack of data). The most likely explanation to that is that the co-operative during the same time has done some energy efficient investments and for example changed the exterior

lighting to more energy efficient. This might have outweighed the negative effects of the introduction of collective metering. However, the board chair had noticed that since the introduction of collective metering, households have bought their own washing machines. Viggen's chair did not think that this had affected the electricity consumption because the households "hang out their washing rather than using a drying cupboard or a tumble dryer".

Information and Communication

The board distributes Newsletters to households, *Matchen-bladet* and *Viggen-bladet*, around four times a year, which often deal with energy matters. Both Matchen's and Viggen's chairs said that it was difficult to directly influence household energy consumption. Matchen's chair assumed that households would keep up with contemporary issues and also said that public media had a responsibility to provide information. Viggen's chair emphasized that they could not barge into people's homes.

The Tenant-owners' View of Energy Efficiency

Households in both Viggen and Matchen thought that they could greatly influence their own energy use. Most households also said that they, for example, turned off lights or had changed to low-energy bulbs. Even when the households could influence their energy use, however, this was not always a high priority:

Interviewer: Do you think there is any way that you can influence your energy use?

M1: Of course, but I'm really bad at doing it. I can certainly do it if I put my mind to it, but we don't care.

The explanation for the lack of interest was often the household's good finances and the collective electricity metering, which meant that they did not need to think about their

electricity consumption. One household also thought about the difference between living in an owner-occupied residence and a single-family house:

When you live in an apartment, you become very complacent in that you do not care in the same way that you would if you lived in a house. A house is the next step in our lives, and that's when energy, water, and electricity will be completely different from what they are at the moment. It's taken so much for granted – it just comes into this apartment.

This quotation exemplifies the view that it is not the tenant-owner's responsibility to reduce energy consumption, but that it is a matter for HSB – the Association. This can be connected to the fact that both electricity and heating are paid for collectively, “releasing” the members from individual responsibility.

Individual and Collective Energy Metering

Matchen has metered electricity collectively since it was first occupied, whereas Viggen introduced it in 2005. All households were satisfied with the collective electricity metering, mainly because it resulted in lower monthly electricity costs for the households.

The households in Viggen also noted that most people purchased their own washing machines when collective electricity metering was introduced, however:

When I moved here, it was almost impossible to get into the laundry, but now there's free access because the households have bought their own machines so they don't need to trudge around. And I think that's wrong because it uses power. (V7)

Collective metering was continuously discussed between neighbours and at the annual meetings, and this was not perceived to be a completely positive experience:

People go on about it at every single annual meeting, and every time you meet a neighbour they go on about all this business about electricity. (M4)

One household said they felt divided about collective metering. Though they would very much like to see data on their family's use, they suspected that they did benefit from the collective system:

Interviewer: Would you be interested in individual metering of electricity, water, or heating?

M3: Yes and no. It could be good to know but, from a purely financial point of view, I think we would lose out by being individually metered versus "Doris, aged 85, who lives in a two-room apartment".

Interviewer: So you're satisfied then?

M3: We're very satisfied with things as they are now with this type of ... yes.

The ten households expressed no particular interest in individual energy metering for either water or heating.

Information and Communication

Most households did not actively seek information on energy consumption. They said that HSB as an organization worked on energy reduction but they did not relate that to their own energy consumption or habits. Energy and energy efficiency were not things that the

households paid particular attention to and none of them actually had any desire to reduce their energy use or planned any investments that would reduce the household's use.

Discussion and Conclusions

As stated in the introduction HSB National Association has enacted ambitious energy targets, which now await implementation. On national level, HSB work with energy visions and objectives, while HSB works operationally at the local level and with the actual financial conditions and commitment of members. When housing is being built or is under major refurbishment, the central and regional levels have more influence on energy-related investments than in the period between these big investments. It is the period between these major changes that is studied here. When it comes to maintenance and everyday investments, such as changing to more energy efficient light bulbs, the central organization has, as we have seen, no influence. To achieve the ambitious goals set by HSB nationally, the whole organization needs to embrace the goals and commit to energy-efficient choices whenever possible. The case identifies a difference in the opportunities and barriers for action at central and local levels. These differences will here be discussed in relation to the predisposing and enabling factors that have been identified in earlier research

Predisposing factors include cognitive and effective dimensions, socio-demographic factors, opinions of other organization, mission statements and organization codes. The case study shows that for the central and regional levels plans and codified energy efficiency goals were important factors influencing energy efficient activities, but not on the local and member levels.

The ambitious goals set by HSB's central organization were also supported by influential people in the organization, which in earlier research were found to exert a positive influence on implementation. This, however, does not seem to be relevant to the present study. The goals were well supported at the national and regional levels, but that support faded at the local level. The fragmented organization of the implementation process puts heavy demands on the working through of decisions. All measures that depend for their success on the collective decisions of many, and, not least on other actors not directly involved in the decision-making, run the risk of failure.

On the local level and among the households the organization codes and mission statements had no significant importance. For the local housing cooperatives the presence of a champion, i.e. someone who pushes for increased energy efficiency in the organization, was an important factor for implementation of energy efficient measurements. In Viggen, there had always been someone who was willing to drive the implementation of energy efficiency measures, so this housing co-operative had implemented some energy efficiency measures and had a plan for such investments in the future. No such person was present in Matchen, so this co-operative had done less in relation to energy efficiency. However, we also found that, in relation to the households, there were no differences between Viggen and Matchen, so in that perspective the presence of a champion did not make any significant difference. So, when it comes to exterior investments determined jointly by the co-operative, a champion is important, but not in relation to interior investments determined by individual members.

The challenge for HSB is to provide motivation to implement energy efficient measurements in the whole organization, also in the households i.e. the members' homes. We know from earlier studies that information is an important tool when it comes to influencing household

energy consumption. The use of information touches on the moral aspects of household energy behaviour, rather than strictly economic ones, as households will need to become more aware of and involved in their energy consumption. In this case, we saw a need for householders to start reflecting on their energy consumption. Both the Head of Energy and the MD also believed that information, training, and changed attitudes were important factors influencing HSB's efforts to reduce future energy consumption. However, looking at the collective action taken, they are headed in the wrong direction, as we saw in the case of collective metering. In addition, proactive strategies concerning information provision were lacking in the organization.

If we turn over to the enabling factors, these factors were most interesting in relation to the household level. Enabling factors include resources such as external financial, technical and organizations resources as well as for example new skills that might be needed to acquire. Technology can be an enabling factor but in this case the collective metering was an obvious barrier to energy reduction on a household level. The households thought that they could certainly modify their energy consumption, but energy was not a key issue in their everyday lives and they did not really care much about reducing their consumption of it. One explanation for this was the collective metering of energy. Both co-operatives meter collectively for cost reasons, although this goes against HSB's expressed targets. The organization knows about the potential to reduce energy consumption if smart metering is introduced, but even so, this issue was not debated in the organization.

The decision to implement collective metering focused mainly on reducing the members' costs rather than their energy consumption. A split incentive appears to exist here. For a local housing co-operative, it is cheaper to buy the electricity collectively. The advantage of

collectively purchasing electricity is that it is possible to negotiate beneficial terms, while the disadvantage is that electricity consumption is often not obvious to the member households. Apparently, the cost savings were seen as more important than the opportunity to provide feedback on individual consumption. In this sense, the case confirms earlier findings that financial incentives can be an important barrier to energy efficiency.

Enabling factors can also be access to resources possibility to finance energy efficient investments. It is also important to note that the financial rationale is a social construct, used in various ways to legitimize the non-implementation of energy efficiency measures. The Matchen co-operative claimed that it could not focus on energy efficiency because of the *high* cost of loans and because they lacked the financial resources to focus on another issue. The householders said that the energy represent such a *small part* of their total cost of living that they did not need to care about efficiency. Both these ways of reasoning were seen as legitimizing non-action in the energy area, even though they tended to operate in completely opposite directions.

Ambitious energy and environmental objective work in HSB needs to be followed up with similarly ambitious implementation plans for the organization. However, this has not been done. As we saw from earlier research, the whole organization needs to have the appropriate knowledge and attitude, as well as willingness, to reach the goal of reduced energy consumption. We saw the example of the tenant-owner who thought that the responsibility for reducing energy consumption belonged to the association HSB rather than to individual members. Achieving energy goals calls for common strategies involving all levels of HSB. It requires the dissemination of information on objectives and measures as well as champions at

all levels who enrol members so they feel that they are participating in and responsible for achieving established targets.

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References

- Bahaj, A. S. & James, P. A. B. (2007) Urban energy generation: the added value of photovoltaics in social housing, *Renewable and Sustainable Energy Reviews*, 11(9), pp. 2121–2136.
- Ball, M. (1999) Chasing a snail: innovation and housebuilding firms' strategies, *Housing Studies*, 14(1), pp. 9–22.
- Bansal, P. (2003) From issues to actions: the importance of individual concerns and organizational values in responding to natural environmental issues, *Organization Science*, 14(5), pp. 510–527.
- Bell, M. & Lowe, R. (2000) Energy efficient modernisation of housing: a UK case study,

Energy and Buildings, 32(3), pp. 267–280.

Berglund, C. & Matti, S. (2006) Citizen and consumer: the dual role of individuals in environmental policy, *Environmental Politics*, 15(4), pp. 550–571.

Biel, A. (2003) Environmental behaviour: changing habits in a social context, in A. Biel, B. Hansson & M. Mårtensson (Eds) *Individual and Structural Determinants of Environmental Practice*, pp. 11–25 (London: Ashgate Publication).

Boverket (2008) *Nytan med allmännyttan: Utvecklingen av de allmännyttiga bostadsföretagens roll och ansvar*. Available at www.boverket.se, accessed May 2008.

Clinch, P. J. & Healy, J. D. (2000) Domestic energy efficiency in Ireland: correcting market failure, *Energy Policy*, 28(1), pp. 1–8.

Crabtree, L. & Hes, D. (2009) Sustainability uptake in housing in metropolitan Australia: an institutional problem, not a technological one, *Housing Studies*, 24(2), pp. 203–224.

Darby, S. (2006) *The Effectiveness of Feedback on Energy Consumption* (Oxford: Environmental Change Institute).

EC Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services and repealing Council Directive 93/76/EEC. (Brussels: EC).

Egmond, C., Jonkers, R. & Kok, G. (2005) A strategy to encourage housing associations to invest in energy conservation, *Energy Policy*, 33(18), pp. 2374–2384.

Egmond, C., Jonkers, R. & Kok, G. (2006) A strategy and protocol to increase diffusion of energy related innovations into the mainstream of housing associations, *Energy Policy*, 34(18), pp. 4042–4049.

Glad, W. (2006) *Aktiviteter för passivhus : en innovations omformning i byggprocesser för energisnåla bostadshus*, Ph.D. thesis, Linköping University, Linköping, Sweden.

Hal, van, A. & Femenías, P. (2009) Sustainable Housing Transformation: The Housing Association as a Change Agent for Environmental Innovation and Social Regeneration – Two case studies. Proceedings of the International European Network for Housing Research (ENHR) conference, “Changing Housing Markets: Integration and Segmentation”, Prague, July 2009.

Hall, M. & Purchase, D. (2006) Building or bodging? Attitudes to sustainability in UK public sector housing construction development, *Sustainable Development*, 14(3), pp. 205–218.

Hirsh, J. B. & Dolderman, D. (2007) Personality predictors of consumerism and environmentalism, *Personality and Individual Differences*, 43(6), pp. 1583–1593.

Holmberg, J. & Nässén, J. (2005) Energy efficiency: a forgotten goal in the Swedish building sector?, *Energy Policy*, 33(8), pp. 1037–1051.

Kellner, J. & Levin, P. (2002) Kan styrmedel utformas för energihushållning i byggande, renovering och ombyggnad?, in Boverket Energimyndigheten and Naturvårdsverket (Eds.): *Effektivare energianvändning i bostäder* (Eskilstuna, Sweden: Swedish Energy Agency).

Lindén, A.-L., Carlsson-Kanyama, A. & Eriksson, B. (2006) Efficient and inefficient aspects of residential energy behavior: what are the policy instruments of change, *Energy Policy*, 34(14), pp. 1918–1927.

Lindén, A.-L., Jörgensen, E. & Thelander, Å. (2009) *Energianvändning: Konsumenters beslut och agerande*. Research Report in Sociology 2009:02 (Lund, Sweden: Lund University).

Linton, J. D. (2002) Implementation research: state of the art and future directions, *Technovation*, 22(2), pp. 65–79.

Lipsky, M. (1980) *Street-Level Bureaucracy* (New York: Russell Sage).

Oikonomou, V., Becchis, F., Steg, L. & Russolillo, D. (2009) Energy saving and energy efficiency concepts for policy making, *Energy Policy*, 37(11), pp. 4787–4796.

Palm, J. (2009) Placing barriers to industrial energy efficiency in a social context: a discussion of lifestyle categorisation, *Energy Efficiency*, 2(3), pp. 263–270.

Palm, J. (2010) The public–private divide in household behavior: how far into the home can energy guidance reach?, *Energy Policy*, 38(6), pp. 2858–2864.

Palm, J. & Ellegård, K. (2011) Visualizing energy consumption activities as a tool for developing effective policy, *International Journal of Consumer Studies*, 35(2), pp. 171–179.

Palm, J. & Tengvard, M. (2011) Motives for and barriers to household adoption of small-scale production of electricity: examples from Sweden, *Sustainability: Science, Practice, & Policy*, 7(1), pp. 6–15.

Prakash, A. (2001) Why do firms adopt beyond-compliance environmental policies?, *Business Strategy and the Environment*, 10(5), pp. 286–299.

Reeves, A. (2009) *Achieving Deep Carbon Emission Reductions in Existing Social Housing: The Case of Peabody*, Ph.D. thesis, Institute of Energy and Sustainable Development. De Montfort University, Leicester, UK. Available at:
<https://www.dora.dmu.ac.uk/bitstream/handle/2086/2629/Reeves,%20%20Andrew.pdf?sequence=2>

Ruonavaara, H. (2005) How divergent housing institutions evolve: a comparison of Swedish tenant co-operatives and Finnish shareholders' housing companies, *Housing, Theory and Society*, 22(4), pp. 213–236.

SCB (Statistiska centralbyrån) (2008) Stor ökning av antal bostadsrätter i landet.
Pressmeddelande från SCB 2008-05-22,
http://www.scb.se/Pages/PressRelease_236908.aspx.

SEA (Swedish Energy Agency) (2009) *Energistatistik för flerbostadshus 2007*. Report ES 2009:02 (Eskilstuna, Sweden: SEA).

Shove, E. (2003) *Comfort, Cleanliness and Convenience* (Oxford and New York: Berg).

SOU 2008:10 (Swedish Government Official Reports) *Vägen till ett energieffektivare Sverige. Slutbetänkande av Energieffektiviseringsutredningen* (Stockholm: Fritzes).

SOU 2008:25 (Swedish Government Official Reports) *Ett energieffektivare Sverige. Delbetänkande av Energieffektiviseringsutredningen* (Stockholm: Fritzes).

Stern, P. C. (2000) Toward a coherent theory of environmentally significant behavior, *Journal of Social Issues*, 56(3), pp. 407–424.

Straub, A. (2004) Housing associations and maintenance practice of Dutch housing associations. Paper presented at the International European Network for Housing Research (ENHR) conference, Cambridge, 2–6 July 2004.

Thollander, P., Palm, J. & Rohdin, P. (2010) Categorizing barriers to energy efficiency: an interdisciplinary perspective, in J. Palm (Ed.) *Energy Efficiency*, pp. 49–62 (Rijeka, Croatia: Sciyo).

Yin, R. K. (2003) *Case Study Research: Design and Methods* (Thousand Oaks, CA: Sage Publications).