

Indoor Climate Agreements in Energy-Efficiency and Renovation

Projects – A Question of Justice?

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Abstract

One of the global dilemmas of our time is the urgent need to reduce energy demand in some parts of the world and at the same time manage to increase and improve energy services in others. This paper calls attention to the importance of also recognizing local energy dilemmas and pockets of more vulnerable groups in energy efficiency and building renovation projects. Interviews with tenants in a Swedish ‘million-program’ housing area are used to illustrate the arguments in the paper. Results show essential variations in male and female thermal sensation. They also show little compatibility between the tenants’ wishes for a comfortable home and the housing company’s energy saving ambitions. The paper argues that the use of generalized indoor climate agreements needs to be taken less for granted and complemented with qualitative investigations of all main actors in a specific local context. Only then can possible disparities become evident, and alternative, more just, solutions be worked out.

Keywords: Thermal comfort, energy renovation, climate justice

1. Introduction

Some authors have used the term ‘climate justice’ to describe the state of the world, although this primarily refers to the uneven impacts of climate change, such as rising sea levels, pollution etc. It may also include the fact that future generations will bear the cost of our current actions or that the norms of minimum standards are escalating in a time when we need to save energy (Simcock and Mullen 2016, Sovacool and Dworking 2015, Walker et al. 2016). However, more specifically relevant for the purpose of this paper is the term ‘energy dilemma’, which has been put forward by Wilhite (2012) to describe the asymmetrical global development of the past century, a development which has, as he says, led to a striking global gap in per capita energy use and, consequently, a situation with huge challenges.

The aim of this article is to contribute to such discussions, but to do so by raising, in particular, the question of how we may handle specific cases of energy dilemma. As Day et al. (2016) have argued, there may seem to be an in-built conflict between the needs of much of the Global South to extend access to energy services, and the global objectives to reduce energy consumption. However, similar energy dilemmas may occur when the levels of energy consumption are raised among certain groups in the richer parts of the world, in spite of this global need to reduce carbon emissions. Walker and Day (2012), in particular, have been clear about the necessity of addressing such issues in an interconnected way.

Results from ongoing research indicate that the aim of saving thermal energy may be incongruent with a just treatment of a vulnerable group of immigrant women. This dilemma has evoked some ideas and questions, and is used to exemplify further arguments and discussions in the paper.

2. Case-study: Thermal comfort in energy-efficient renovation

In the 1960s and 70s, the Swedish ‘million-program’ housing policy gave rise to a boom of growing suburban areas and a fast construction of new residential blocks. Today, most of these housing areas are in considerable need of renovation, and various attempts are being made to render the buildings more energy-efficient. In our case-study, a multi-disciplinary research team is testing cautious ways of renovating three-storey buildings in a mid-Swedish town. An important purpose of the project as a whole is to be able to suggest easy ways of making million-program area buildings more energy-efficient. One of the aspects that was investigated in a test building was the thermal comfort before renovation.

2.1 Combining technical and social scientific methods

Two methods were used to study thermal comfort, one technical and one social scientific. The technical method consisted of indoor climate measurements and evaluations of predicted indoor comfort in accordance with thermal comfort standards, the social scientific methods included qualitative interviewing. Since we were interested in the subjective thermal experiences of these specific tenants, interview methods were preferred to surveys or laboratory studies, which otherwise tend to be more commonly used within the thermal comfort field (Engvall et al. 2009, Leijonhufvud and Henning 2014, Nicol et al. 2012). Men and women in six of the ten interviewed households were immigrants with Somali backgrounds, while householders in the remaining four had Kurdish backgrounds.

2.2 Differing results

Results emanating from these two quite different methodological approaches turned out to be similar concerning certain aspects, such as variations of thermal comfort throughout the day. Thus, interviews showed that all occupants perceive their flats to be coldest in the morning, in the evening, and/or at night-time, while measurements indicated similar results; that the largest number of dissatisfied occupants should be found before eight o’clock in the morning and after four o’clock in the evening.

The results where occupants express thermal discomfort are much less in accord with results where they are merely assumed to experience and complain about this. Consequently, we found that all the interviewed occupants described their flats as either “cold” or “very cold”, and that at least eighty percent of them complained about this. Measurements, on the hand, showed a “predicted percentage of dissatisfied occupants” (PPD) of only twelve to thirty-one percent.

2.3 Gender variation

Even more essential for the discussion here, however, is the fact that interview results indicate that the female occupants tend to suffer much more from thermal discomfort than their male counterparts. A clear majority of the interviewees either stated such a gender difference explicitly, or the women would be the only ones who emphatically expressed how bad the cold made them feel. For example, one of the women stated firmly, and with strong emotion in her voice, that “It is *very* cold!! I am freezing *all the time!*” Another woman complained about her aching feet and how she did not feel well because of the cold. A third example is the woman who described how the cold floor makes her toes go numb, and that, whenever she gets the opportunity, she has to lie down under the bedroom quilt in order to endure it.

Most important to note here, is the fact that the interview results clearly indicate a gendered variation of thermal comfort, while such results are absent altogether in results from the standardized measurements.

3. Are women a 'vulnerable group'?

The stronger sense of discomfort, which we found among our female occupants, fits well into the bigger picture drawn by Karjalainen in his thorough literature review on indoor thermal comfort (Karjalainen 2012). Karjalainen shows that when a large number of laboratory and questionnaire studies are put together, a clear pattern arises. It turns out that, irrespective of outdoor climates, women tend to be less satisfied with indoor climates than men, particularly in cooler conditions. Women are also more sensitive to deviations from an optimal thermal environment and tend to express more dissatisfaction than men in the same indoor thermal environment. All this is clearly in line with our interview results.

3.1 Pockets of vulnerability

According to Bouzarovski (2014), The Scandinavian countries have the lowest degree of domestic energy poverty in Europe, while Southern Europe has the highest degree, due to poorly insulated homes and more income poverty. The Scandinavian countries also have the lowest number of people who are unable to keep their homes adequately warm. Still, we may find pockets of more vulnerable groups everywhere, which is one of the points made in this article. In the case study referred to here, a group of female immigrant tenants emerge as one such pocket of vulnerability.

Until recently, research in the field of 'energy poverty' or 'fuel poverty' has mainly been focusing on certain groups, whose health and well-being is considered to be particularly precarious due to cold and draughty indoor climates. So far, these groups have largely consisted of old or disabled people, of the chronically ill, and, to some degree, also children (Bouzarovski 2014, Day et al. 2016, O'Sullivan et al. 2016, Walker and Day 2012). However, if we should also include all women in these more vulnerable groups and, perhaps, all immigrant families too (Bouzarovski 2014, Fraser 1999 in Jenkins et al. 2016), there would not be many others left, apart from the reasonably well-to-do young and native born men! Women as a whole could hardly be categorized as a 'vulnerable group', despite the differences between men and women in terms of sensitivity to thermal variation.

3.2 Energy justice

Even though the terms energy poverty and fuel poverty overlap to a great extent with the 'energy justice' concept, the increasing use of the latter mirrors a growing emphasis on a just and fair treatment of those who are deprived of certain energy services. In particular, the 'justice recognition approach' seems useful for the arguments of the current article. Articles by Walker and Day (2012) and Jenkins et al. (2016) refer back to the work of Fraser, who at an early stage defined and formulated some categories of misrecognition. Walker and Day (2012) argue that, an alternative to the distributional approach to social justice is to emphasise relationships, and to look upon social injustice as a failure to show certain human beings the same respect as others and to allow them equal rights. "Where there is a lack of recognition", they say (2012:71), "groups may be over-looked or stigmatised". They refer also to an article by Day, who states that certain groups may sometimes have special needs. Older people may, for example, require more home heating than others for physiological reasons, or because they may spend more time at home than those who are working.

Another important point that Walker and Day make, is that not only must special needs be recognised, but they must also be seen in their context, "defined with reference to the society that they operate in" (2012:74). When relating this argument to the empirical example of the current paper, it becomes clear that our concern here does not merely relate to the fact that women in general tend to be more vulnerable than men when it comes to a lack of thermal comfort. The ongoing research among immigrant families also sheds light on a vulnerable group, which may need to be more clearly recognised as such. These are the female tenants with refugee backgrounds, low-income earners or house-wives who tend to spend large parts of their days in draughty, poorly insulated dwellings. This focus should have bearing on many European contexts today. Still, since there may also be a

high risk for immigrant women to be generalised and stereotyped, it seems particularly important to base such studies on context-specific investigations which take native perceptions and experiences seriously.

4. The local energy dilemma

The most recurrent and dominant focus of research on fuel poverty, energy poverty and energy justice has been on problems for those who have difficulty in affording a certain energy service, or who lack access to such service (Bickerstaff et al. 2013, Day and Walker 2013, Walker et al. 2016).

Since the beginning of this research tradition, the larger part of the studies has concerned the many older people, particularly in the UK, who cannot afford to keep their homes warm (Bickerstaff et al. 2013, Day et al 2016). Bickerstaff et al. (2013) have added to this concern a serious dilemma more directly concerned with the global climate threat. In referring to other authors, they state that climate policies in UK are largely funded through electricity and gas bills, which have to be paid by the households. This, in turn, puts an extra heavy burden on the lower-income households.

The local energy dilemma in our case is, however, different. The occupants of this study have heating costs included in the rent. This means that, even though they are not able to influence the temperature and thermal comfort in the flat to any great extent, their discomfort does not have such a direct link to which bills they can afford to pay. The dilemma is still one between energy justice and climate change mitigation. It may be described as an imbalance and state of tension between the occupants' well-being on the one hand, and the housing company's endeavour to save energy and reduce the consumption of thermal heating, on the other.

4.1 Company strategies to save energy

The housing company has two main strategies for saving energy. One is to insulate the buildings and provide them with new roofs and energy-efficient heating systems. The other strategy is to inform the householders about the renovation process and the new heating system, but also to try and regulate their energy consumption through technical means. One such means is to limit the use of hot water through the installation of low-flow devices in kitchens and bathrooms. Another way is to install thermostats where the temperature adjustment can be locked, which means they are able to prevent tenants from increasing indoor temperatures too much.

4.2 Tenant perspectives on a comfortable home – example clothes

While the company strategies mainly concern the energy performance of the building, the tenants themselves struggle to cope with thermal discomfort on an every-day basis and to find ways of making the flat feel less cold.

It was, however, a bit surprising to find most of the interviewees barefooted at the time of the interview. This was even the case with women who emphatically described how their feet would ache or go numb. When one of these women was asked why she did not wear socks as protection from the cold floor, her answer was simply 'I need to be able to feel at home'. The woman made an expressive gesture, letting her hands fall from her shoulders, following the sides of her thin ankle-length dress towards her feet, where her left foot made a light stamp, emphasizing her need to feel connected to the floor. "Besides", she added with slight disgust in her voice, "my feet get sweaty when I wear socks". In the continued conversation with the woman, the interviewer described to her, how previous Scandinavian studies have shown that some can feel it is cosy and pleasant to huddle under a blanket when it feels cold (Henning 2003). This woman was of a completely different opinion. On the contrary, she said, she feels unwell when she has to use a blanket to keep warm. This is something she normally only does when she is ill.

The gesture this woman made to emphasize her wish to wear a thin dress and be bare-footed bears a strong resemblance to results from a study of home-feeling in contemporary Japan (Daniels 2015). Daniels suggests there, that the Japanese habit of removing shoes and sitting or sleeping on the floor, is linked to an experience of

comfort created through this direct bodily contact with the ground. Still, most of all the conversation with this particular woman illustrates how the habit of using socks and blankets to endure a chilly environment may be perceived very differently. The way people dress, as well as whether they wear socks or use blankets had, of course, an effect on how cold they feel in a cooler environment (Amrit 2007). The example points at something else, however, namely the importance of being able to dress in a way that makes one feel relaxed, comfortable, and at home.

The connection between warmth and comfort is obvious in our interviews. Less obvious though, is the degree to which the experience of cold or warm indoor temperatures may be connected to their perceptions of home in more general terms. We know from previous studies in Norway and Sweden that a pleasant home in the Scandinavian area tends to be described as 'warm' in both a literal and figurative sense (Gullestad 1992, Henning 2003). Unless a home in this part of the world is warm enough, the cosy, homelike feeling will generally not emerge, no matter how much effort has been put into home decoration (Gullestad 1992, Henning 2006). Still, most of these studies have been conducted among natively born Swedes or Norwegians, whilst the interviewees in the current study all grew up in Somalia or some part of Kurdistan. It remains to find out more about what these differences in childhood experiences may mean for the link between perceptions of the home and indoor thermal comfort. What we do know, however, is that variations in how a warm or cool indoor environment is perceived and handled not just varies with each individual. It is also culture-specific, as well as adjusted with time and context (Andamon 2005, Daniels 2015, Henning 2003, Wilhite et al. 1996, Wilhite 2008).

5. Discussion

The two main actors in this local energy story have very different ways of relating to the indoor climate of the building. While the housing company management has more of an outsider's theoretical view on the thermal performance of the building, the relationship of the occupants to their respective flats is more personal, emotional and practical. Their ability to keep their privacy and dress as they like, affects whether they perceive their homes as comfortable or not. Since many of the tenants spend a major part of their days in these flats, thermal comfort becomes an important part of their perception of their homes and influences whether they are able to feel at home or not. As with the housekeepers and guides in Leijonhufvud and Henning's article on decision-making among professionals in a historic house museum (2014), the chilly temperature has become an embodied experience.

5.1 Unequal power balance

Another parallel to the Leijonhufvud & Henning article is the reverse relationship between the amount of time each of the main actors spend in the building and how much each of them has to say in terms of determining the temperature of the rooms. Both case studies involve this imbalance, where those who have the least options for making decisions concerning the indoor climate are the ones most affected by a cold environment.

One of the most concrete ways by which this unequal power balance manifests itself in the current case-study, is through the limited possibilities for tenants to regulate indoor temperatures. Some researchers have argued that thermal comfort for all can only be achieved when occupants have effective control over their own thermal environment (Karjalainen 2012, van Hoof 2008). Others argue that the way one experiences thermal comfort in one's home tends to be affected by the extent to which one's free will is being circumscribed (Engvall et al 1997, Henning 2006, Stoops 2001). Both these arguments speak in favour of better opportunities for the householders to adjust the temperature as they like. This is not a problem-free solution, however. The experience among those who work at the housing company is that many tenants in this area have difficulty in handling the thermostat correctly. The occupants also tend to wish for a much warmer indoor climate than the housing company managers consider feasible, and that which is generally recommended. This is the reason why they now install thermostats that can be locked and are as simple and sturdy as possible.

5.2 Thermal comfort agreements

The ambition of the company management is to combine energy-efficiency with cost-effectiveness. They aim at keeping 20,5° C in the building during day-time and 19° C during night, although the actual temperatures vary somewhat throughout the year, tending to be lower in spring and autumn. The experienced temperature (“operative temperature”) among occupants is most probably a few degrees lower than that because of the severe draught from windows and doors. The company is supported in these decisions by the national building regulations. Even though it is more common in Sweden today to keep 22° C in flats, the regulations of the National Board of Housing, Building and Planning (2016) do not prescribe more than 18° C in the “occupant zone” of houses and residential blocks, while 20° C should be kept in care centres, in spaces for children in pre-schools and for old people in service homes.

There is also strong agreement between these national guidelines and international thermal comfort standards. Furthermore, the energy saving ambitions of the housing company are well in line with those of the Swedish Government and the European Union (EU 2012, Hautjärvi & Landfors 2013, SOU 2017, Swedish National Audit Office 2013). Due to this congruity between national guidelines, thermal comfort standards, the national and EU programmes for climate mitigation, as well as the company’s own energy strategies, there is strong legitimacy for the company decisions, and little reason to question them.

5.3 Risks with the taken-for-granted

There are some risks with such strong and taken-for-granted indoor climate agreements, however. One of them is the risk of missing particularly vulnerable individuals. The fact that certain categories, such as children, the elderly, or those in poor health, can be more vulnerable to heat or cold than others, may seem obvious (The Public Health Agency of Sweden 2014). Attention has also been paid to the fact that those who do not have a physically strenuous job need a warmer working environment (Swedish Work Environment Authority 2015). It may be more difficult to detect and recognise those who are unused to cold thermal conditions, those who become vulnerable due to a worrying life situation, or those who simply spend long hours in a chilly home and have little opportunity to do anything about their situation.

Another risk with the ‘near doxa’ ideas of suitable thermal comfort is that it becomes natural to turn to normative solutions, where only those who are affected by cold conditions and complain about them, need to change. Jenkins (2016) has, for instance, described how Government-sponsored programmes in the UK typically have treated the energy poor as suffering from a “knowledge deficit”, which has to be fixed. Also Swedish recommendations to and strategies regarding occupants tend to be limited to information campaigns and the installation of individual metres (e.g. Hautjärvi & Landfors 2013). There is a parallel between such strategies and the current case, where technical devices are used to make the occupants change their ways and stay within accepted temperature limits. However, the question is whether it could be considered a fair treatment when only the energy receivers (just one of the main actors) are supposed to alter their ways. To put it bluntly; how much do those who spend their days in the building have to feel cold in order to save energy? This is actually what this particular energy dilemma is about.

5.4 Recognizing occupant experiences

If, as Jenkins and Fraser recommend (Jenkins 2016), the thermal experiences among these occupants were recognised, and their needs for higher-than-average room temperatures respected, it might be possible to find a better balance in which both the receivers and providers of energy would have to try to contribute. With respect to the fact that many of these women, in particular, spend a large part of their day in the flat and with curiosity as to their specific needs and wishes, habits, experiences and modes of thinking; perhaps it would be possible to save energy and mitigate global climate change without creating energy injustice. Would it, for instance, be possible to allow a few degrees higher temperature and provide the tools to adjust temperatures within certain limits? It may be reasonable to expect the tenants to wear cardigans, but perhaps that should be sufficient. Furthermore, if the possibility of being bare-footed at home is so essential for the well-being of some tenants, perhaps floor heating or better floor covering could be provided? Yet another idea for negotiation could be to provide tenants with more efficient, well-functioning and aesthetic blinds if they, in turn, agree to let the sun in certain hours in the middle of the day in order to help in heating the flat.

These suggestions are merely tentative examples of such a give and take. The important point here is that those who suffer from cold indoor climates should be recognised and respected for what they feel and experience. With too much focus on taken-for-granted thermal climate agreements, it is, as Jenkins says (2016), a risk to miss out on valuable knowledge and insights about marginalized groups.

6. Conclusion

More generalised, generic and quantitative methods and models for investigating energy-efficiency and renovation projects needs to be complemented with models that take into account specific situations and contexts.

Due to the few born Swedes among the studied tenants, we were not able to make any thorough comparison of the impact that background and life situation might have had on their ways of perceiving and handling thermal comfort (or discomfort). However, the interviewees of this research differ from, for example, those of a previous study of thermal comfort, where born Swedes had replaced old heating systems in their single-family houses (Henning 2003). Their way of interacting differed, as did their respective habits and ways of experiencing and handling indoor thermal comfort.

Still, similar for both these two studies was the fact that the women proved more sensitive than the men to temperature fluctuations and cool indoor thermal conditions. There may very well be explanations to such differences related to psychological, situational or culture-specific aspects (see references in Karjalainen 2012: 106f). Or there may be physiological explanation, such as gender variations in body mass, surface area, core temperature, blood flow, sweating etc. The important point, however, is that, irrespective of the reasons for variations in male and female thermal sensation, this gender issue needs to be taken seriously.

The basic goal behind thermal comfort standards – to achieve as few unhappy occupants as possible – is commendable in many ways. The ‘Fanger’s model of thermal comfort’, on which most standards are built, is increasingly criticized, though, and various suggestions for adjustments and complements have been put forward (Leijonhufvud and Henning 2014, Nicol et al. 2012, van Hoof 2008). Most relevant for this article is Karjalainen’s criticism (2012), in which he argues that women have more need for individual temperature control than men, and that thermal comfort standards should be more based on female requirements. If females are satisfied with their thermal comfort, he says, it is highly probable that males can also accept it.

Still, if the aim is to detect differences between categories such as gender or age and understand the meaning of these, it is not sufficient to alter the basis for current comfort standards. The use of generalized predictions and estimations also needs to be complemented with investigations of specific local contexts, including the interaction between some of the main actors and their respective ways of relating to a certain situation (Henning 2015). Only then will it be possible to detect local energy dilemmas, consider the well-being of more vulnerable groups, and avoid energy injustice. In the case-study, the occupants were able to describe their experiences of the indoor climate during interviews. Their wishes for a comfortable home may not fit so easily into the energy saving ambitions of the housing company. Still, their main focus and ways of perceiving and handling the thermal conditions of their flats were, for the first time, fully recognised.

The case also illustrates the importance of being alert to possible imbalances in the ability of different actors to make their voices heard. It was only when focus was shifted away from how the tenants could be made to fit into the frame of dominant, taken-for-granted indoor climate agreements that the energy dilemma came into view. To sum up, it is not until all the main actors of a local energy dilemma are recognised and treated with the same respect, that their respective ways of relating to a particular situation can be compared on an equal basis. Possible disparities can then become evident, and alternative, more just, solutions be worked out.

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