

# The Environment and the Home

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*Draft Paper for Environment and Human Behaviour Seminar*

*23<sup>rd</sup> June 2003, Policy Studies Institute, London*

In the proposal for the Environment and Human Behaviour programme our attention was drawn to specific question: how to avoid future responses to global warming, including the increased uptake of air-conditioning, which promise to exacerbate rather than mitigate CO<sub>2</sub> emissions (Ekins, 2002). Addressing this question requires engagement with a diverse range of cross-disciplinary debates variously concerned with the built fabric and technologies of the home, changing domestic practices and the relationship between the indoor and outdoor environment. Our ambitions in this paper are to trace lines of argument developed by psychologists, economists, architects, building scientists, anthropologists and sociologists and to consider the theoretical resources they have enrolled in order to conceptualise and explain building-human-environment interactions. We begin by sketching out three broad lines of debate (about individual behaviour, consumption practices and systems of provision) relevant to understanding the relations between the home and the environment noting the scope and limitations of each approach. We then consider more closely the case of thermal comfort as a means of appreciating important differences in current ways of thinking about the processes involved in creating sustainable domestic environments.<sup>1</sup> Finally, we discuss how different ways of conceptualising the environment and the home support different sorts of policy directions and outcomes, again with comfort as a point of reference.

## Three lines of debate about the environment and the home

### *Individual behaviour and improving efficiency*

Much environmental research on the home has focused on questions of how to technically transform buildings and/or change the behaviour of occupants so that houses and the people within them might operate or act more efficiently without any detrimental social effects (Boardman, 1991). Addressing such concerns, the aim of many environmental economists has been to try and figure out exactly how resources are used by households and to track responses to variations in prices and other market (and non-market) conditions. Through such methods, a variety of barriers to the development of more efficient practices have been identified and various technological, market or information-based solutions tested out. Another approach, favoured by environmental psychologists, has been to painstakingly catalogue difference and variation in the range of factors that shape human behaviour, rejecting models that focus only on a narrower set of market-based barriers and signals (Stern and Aronson, 1984). Although environmental economists and psychologists each have distinct concerns and priorities, we suggest that they are built on the same underlying assumption – that individual consumers drive demand and that changing household behaviour is the key to environmental improvement. The aim is to find ways of meeting demand for resources more efficiently whilst maintaining certain standards of service

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<sup>1</sup> The ideas discussed relate to our current project on "Future Comforts: re-conditioning urban environments" funded under the ESRC Environment and Human Behaviour programme.

provision and quality of life.<sup>2</sup> Although such approaches tell us a great deal about human preference and behaviour – addressing important questions about why people behave as they do and how they might be persuaded to behave differently, they tend to overlook other elements that may be just as important in shaping sustainable domestic practice. Here we turn to a second line of debate underpinned by sociological and cultural research that offers a different interpretation of relevant environment-home interactions.

### *Consumption and the transformation of domestic practice*

Although the home and domestic practices have long been issues of interest to sociologists it is only more recently that the focus has been explicitly environmental.<sup>3</sup> For example, debates about ecological modernisation have only recently taken into account the potential for transforming processes of consumption as well as those of production (Spaargaren, 1997; van Vliet, 2002). These studies are a useful addition to more individualistic debates about the scope for environmental innovation and change in that they connect individual behaviour to concepts of lifestyle and social practice. Ultimately, however, much work in this vein is still fixed on the notion that consumers are key to achieving sustainability and to the idea that creating environmentally knowledgeable citizen-consumers will result in the widespread greening of domestic practices and lifestyles.

For others the scope for making domestic consumption practices more sustainable depends on the ability to influence long held conventions and expectations that are collectively shared and culturally contingent (Shove et al, 1998). Although ploughing distinct methodological furrows, anthropologists, sociologists and historians share an understanding of what goes on in the home (and their environmental implications) as inextricably connected to culturally shared norms and wider social and political contexts. Anthropological studies, for example, have shown how environmentally significant social practices in the home (e.g. heating, bathing or cooling) exhibit a considerable degree of cross-cultural variability that relates to different interpretations and values concerning comfort or cleanliness (Wilhite et al, 1996). Meanwhile historical studies of changing domestic practice have described how technologies and social expectations co-evolve, sometimes creating new service expectations (e.g. for cooling and air-conditioning) that are ultimately unsustainable (Cooper, 1998; Nye, 1990; Rybczynski, 1988).<sup>4</sup> From such perspectives, understanding relations between the environment and the home requires interpretation of a problem that is collectively not individually defined and which is connected to societal level transformations (for example, processes of globalisation, nationalisation or privatisation). Instead of meeting the existing needs of households more efficiently the aim is to consider how current practices became normal, how needs are constructed and how deeply embedded service expectations might be transformed.

Continuing on the theme of socio-cultural understandings of environment-home relations for a moment it is useful to consider Per Otnes (1988) contribution to the sociology of consumption. Otnes describes the portrait of a day following the practices

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<sup>2</sup> Although not discussed here, questions concerning how to define quality of life or to distinguish between needs or wants have been the subject of extensive debate between sociologists and economists (see, for example, Jacobs 1999, Slater 1999).

<sup>3</sup> Shove et al (1999) *Consumption, Everyday Life and Sustainability*, ESF Summer Study reader, provides a useful overview of recent interdisciplinary research on such themes (available at <http://www.comp.lancs.ac.uk/sociology/esf>).

<sup>4</sup> The role that domestic technologies play in shaping the consumption of energy and water resources and in fuelling escalating standards and expectations of service is currently being investigated by in an ESRC Sustainable Technologies programme project (see <http://www.sustainabletechnologies.ac.uk>).

of waking, washing, cooking and so on and considers the interactions involved. As well as revealing the routine and habitual character of many day-to-day activities, Otnes argues that much of what we do in our homes depends on now taken for granted socio-collective material systems (e.g. water, electricity and waste networks). Hence the activities of households are dependent on those of all others attached to the network and on the provider groups that operate these networks.<sup>5</sup> Developing this point we consider a third line of environment-home debate which focuses not only on individual consumers or the shared and collective practices of households but on the role of infrastructures and institutions in structuring everyday life.

### *Systems of provision and the construction of demand*

A key theme for sociologists and political economists has been to consider how consumption practices are framed by their attachment to specific systems of provision (Fine and Leopold, 1993; Lee, 1993). For Fine and Leopold, patterns and practices of consumption are intimately related to the systems through which particular services or resources are produced, delivered, distributed and used and cannot be explained in terms of consumer demand alone. Although Fine and Leopold's investigations of food and clothing systems of provision are not environmentally motivated the issues they raise are relevant in that they acknowledge the capacity for providers to influence the intensity and pattern of resource use. Developing such ideas in the context of energy, water and waste provision, we have considered how demand for critical household services is not only generated by consumers but is structured by the utility companies, manufacturers and regulators involved in specifying technologies and systems, managing loads and modifying resource flows.<sup>6</sup> The critical point here is that individual choice or household decision making is inextricably tied up to the decisions made by interdependent chains of organisations involved in house building, utility provision and so on.

So far we have taken into account the collective and institutional structuring of demand but what of the role of material infrastructures in shaping consumption practices? From Otnes' perspective domestic technologies are viewed as 'terminals' – the sensitive fingertips of an infrastructure network that reaches far and wide. From an analytical perspective understanding household-infrastructure interactions is a much more difficult task than they would have been centuries ago (e.g. from local systems of wells and buckets to national and regional grids). We now live with extremely complex large technical systems, many constructed more than a century ago, the workings of which are largely black-boxed (Hughes, 1983; Winner, 1993). What is clear is that domestic technologies and large technical systems play an important role in structuring the resource intensity of everyday life. Taking this into account, attempts to change household behaviour or transform social convention must be seen in the context of their "systemic" consequences along highly interdependent socio-technical networks.

In tracking different lines of environment-home debate we have considered conceptualisations of the home as a facilitator for more efficient individual action or as somewhere for consumers to express their green identity or construct lifestyles. Drawing into view the hinterlands of consumption and provision that frame domestic

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<sup>5</sup> An exception might be "autonomous" homes – but our own research suggests that it is often very difficult to get "off grid" entirely and even if technical connections are severed there are still social norms, rules and regulations that can influence how water and energy are produced and consumed (Chappells et al, 2000).

<sup>6</sup> These issues are investigated in our work on the Domus (Domestic Consumers and Utility Services) project (EU DGXII, 1998-2000) and my thesis (Re-conceptualising energy and water: Institutions, infrastructures and the construction of demand, submitted March 2003).

practices inside the home we have considered the social and collective conventions and socio-political contexts that frame domestic practice and routine. Going further still we have contemplated the role that institutions and infrastructures play in configuring indoor environments, the intensity of resource flows and the activities of domestic users. We now take a closer look at how environmentally significant practices within homes might be conceptualised using the case of comfort.<sup>7</sup> We argue that this focus is warranted because creating comfortable and sustainable conditions indoors is one of the most critical challenges that researchers and policy-makers face – given predicted climatic change and rapidly converging expectations of heating and cooling across the world.

## **The case of comfort**

When one talks of comfort in the context of the home a number of visions of cosy contentment spring to mind – of warming toes by the fire on cold winter days, of snug evenings spent watching the TV curled up on the sofa etc. Such visions might change with the time of the year and depend on where we live. On a hot summers day we might think more of cool breezes, swimming pools and ice-cold drinks or perhaps if we lived in the United States of flicking on the air-conditioning unit.<sup>8</sup> What is important to appreciate from the outset is that connotations and realisations of comfort are culturally, historically, technically, seasonally and climatically contingent.

It is also useful to pause for a moment to think about who and what is involved in the construction and reproduction of comfortable conditions indoors. House designers and architects have a key role to play in specifying homes that are comfortable, affordable, aesthetically pleasing and sustainable. Manufacturers of heating and cooling devices are concerned to create and promote certain forms of warmth or ‘coolth’. Utility managers aim to balance electrical loads on their networks and to offset peak winter heating or summer cooling demand. Finally, not to forget the role of human occupants and of their “tactics and tinkering” in alleviating discomfort (Heerwagen and Diamond, 1992).

Our point is that the ability to make oneself comfortable involves an incredible amount of effort, much of which involves processes outside of the home itself and is not reducible to an individual effort. Further the provision of comfort draws in a cross-disciplinary array of experts each focusing on different aspects of human-environment-building interactions – including physiologists, psychologists, architects, engineers and anthropologists. We now consider the ways in which this medley of thermal comfort researchers have conceptualised comfort and reflect back on how their different approaches relate to underpinning assumptions about the environment and the home. Further we consider the implications of different approaches in terms of tackling the problem of creating comfortable conditions indoors whilst ensuring that this does not create unbearable and unsustainable conditions outside.

### *Comfort as a fixed and ‘natural’ condition*

For many technical researchers comfort is understood as a fixed condition, something that exists, can be striven for and ultimately achieved. Comfort chamber experiments

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<sup>7</sup> Elsewhere we have argued that focusing on services such as “comfort” is a more relevant than on resources, such as energy per se in the sense that this captures the multiple and varied qualities and experiences that energy use affords and is a more meaningful terminology (Shove, 1997).

<sup>8</sup> Although domestic air-conditioning has yet to take hold in the UK many US and Japanese manufacturers are now setting up in the UK with an eye to creating a domestic market for their own forms of indoor weather.

(outside of real-life environments like the home) have been conducted by physiologists since the 1920s. Designed to test the responses of human bodies to a range of thermal parameters (including humidity, air flow and temperature), the aim of such experiments has been to define an “optimal” comfort zone in which most people are comfortable most of the time (Fanger, 1970). Building on such scientific understandings of bodies and how they work, it is now commonly accepted that the average human being is comfortable at around 22°C. Such static or set point temperature standards have guided international building practice and are now enshrined in the codes of the American Society of Heating and Refrigeration Engineers (ASHRAE) and the Chartered Institute of Building Services Engineers (CIBSE). As a consequence many homes and workplaces around the world now provide standardised, statistically optimal, indoor environments whatever the weather outside. Although providing a useful basis for building design decisions this ‘fixed’ paradigm of comfort is problematic from an environmental perspective. Conceived of as “environmental fortresses” or “artificial bubbles”, homes and workplaces are increasingly designed not to modify the weather but to exclude it by artificial and energy intensive means. At the same time, more climatically sensitive methods of vernacular construction adapted to local conditions and traditional ways of dealing with climatic variation, such as the siesta, are in decline. In short, if responses to global warming continue to support standardised concepts of comfort, and hence the increased diffusion of artificially cooled environments, we may be in trouble.

#### *Comfort as a process of adaptation*

A second set of ideas also regards comfort as a condition to be met but not as one that is fixed within the narrowly defined limits of laboratory research. Traditional comfort chamber experiments fail to consider how people act in real-world environments or to appreciate the extent to which comfort is a dynamic and socially negotiated exercise involving both building designers and users. Extensive field studies of occupant experiences in buildings by physiologists and psychologists record a wide degree of variation in human perceptions of comfort over time and in strategies of adaptation and discomfort alleviation (Oseland and Humphreys, 1994). Rejecting set point standards, the adaptive paradigm of comfort focuses on questions such as how to provide “adaptive opportunity” – contexts in which end-users can control and self-regulate their own thermal environment rather than leaving it up to designers (Baker and Standeven, 1996). As such, the achievement of more sustainable living and working environments is seen to depend on extending consumer choice so that comfort and efficiency requirements can be met through a variety of means. Often this is seen as more achievable in naturally ventilated buildings where there are more options for decentralised control. For many adaptive researchers, the aim is to explore socially acceptable and practical design solutions and standards that incorporate natural as well as artificial means of achieving comfort. Although extending and refining understandings of the ‘comfort zone’, such efforts to modify indoor environments are still focused mainly at the individual level. In this sense, arguments about adaptation tend to overlook important questions about the societal and collective structuring of end-user choice.

#### *Comfort as socially constructed*

What might be seen as a third paradigm of thermal comfort research concerns the social and cultural construction of comfort. Globally, anthropologists and historians have recorded significant differences in conventions of comfort – with people of different cultures reporting being comfortable in a range from 6 to 31°C (Goldsmith,

1960; Nicol, 1999). A study by Wilhite et al (1996) of practices of heating, cooling and washing among households in Japan and Norway reveals deeply embedded cultural understandings of comfort and their implications for energy use. For example, Norwegians choose to heat the whole house creating a thermally consistent building envelope, whilst the Japanese use an array of technologies to heat individual bodies not surrounding spaces. Critically, such studies reveal how comfort is culturally relative and is framed by issues of social convention, symbolism and status that cannot be reduced to thermal physiological or psychological parameters. In acknowledging such diversity of meanings, the aim is to avoid unwanted convergence in notions of comfort that might erase cultural difference and prove less sustainable (e.g. the importation of western standards for heating, cooling, clothing).

A related set of ideas concerns the socio-technical construction of comfort and the role of wider systems of provision in shaping domestic thermal norms. According to Cooper (1998) comfort can be viewed as a commercial rather than a physiological or psychological issue. She describes how air-conditioning manufacturers were instrumental in turning comfort into a mass commodity by defining an environment that would sell and could be actively marketed, promoted, desired and delivered. Although manufacturers initially set out to create more customised modes of air-conditioning designed to meet a variety of needs in the end it was standardised models that were favoured enabling manufacturers to extend their markets, in the process easing out geographical variation in expectations of comfort. Such historical accounts tell of the co-evolution of comfort technologies and conventions, but less attention has been paid to the systemic construction of comfort and to how domestic thermal practices (both individual and collective) are structured and made by institutions and infrastructures that together construct a complete comfort regime.

Using comfort as a case reveals a variety of ways in which human thermal need (and as a consequence energy demand and CO<sub>2</sub> emissions) might be made, met or managed and how different lines of enquiry are based on quite distinct understandings of human-building-environment relations. We have also explained why traditional physiological approaches that give rise to inflexible set point temperature standards and support global thermal convergence are now considered as an unsustainable basis for comfort-related policy and practice. In discussing alternative directions in thermal comfort research (adaptive, socio-cultural and socio-technical) our intention has been to show the variety of theoretical resources now available for making sense of one of the most environmentally significant services associated with the home. We now consider how the distinct approaches discussed might frame different policy directions designed to create more sustainable indoor environments.

## **Policy frameworks for the environment and the home**

To date, much environmental policy directed towards the home has focused on changing the behaviour of end-users and on overcoming barriers to the uptake of greener practices utilising a mix of market and information-based instruments and technical fixes. In the field of thermal comfort research this individualistic orientation resonates with the idea of comfort as a fixed condition the demand for which can be met by more or less efficient means. An adaptive school of thought sees domestic sustainability as dependent on the creation of carefully constructed opportunities for people to exercise control over their thermal environment and for choosing natural as opposed to artificial means of heating and cooling. Here account is taken of the dynamics of comfort and of variations in consumer expectation but the underlying assumption is still one of finding ways of achieving comfort and meeting needs rather

than questioning the basis on which current norms of heating or cooling are constructed.

More socio-culturally inspired understandings of relations between the environment and the home require approaches that explore opportunities for the long-term transformation of expectation, convention and need. This is perhaps more tricky in terms of policy-making, but a good starting point is to look both forwards and backwards. One useful exercise is to examine and catalogue different (thermal) expectations between cultures and contexts and explore their origins. This will ensure that localised but sustainable ways of making or maintaining comfort needs are retained and do not lose out as understandings of comfort converge globally. Another approach is to think ahead about how the future of comfort is being specified today by planners, building scientists, architects, utilities and manufacturers.<sup>9</sup> Here the aim is to find ways to stop unsustainable expectations taking hold (e.g. in the context of the UK avoiding the escalation of domestic air-conditioning as a response to global warming).

Finally we have argued that more attention needs to be paid to the ways in which domestic practices are structured by institutions and infrastructures (especially in the case of resources like energy or water where networks actually enter the home). Rather than understanding the social and cultural practices of consumers, the aim here is to investigate institutional cultures – how they evolve, develop and become entrenched and might change to incorporate more sustainable organisational principles. Taking a more systemic overview, the possibility of more joined-up regulation that takes into account the entire comfort regime (incorporating heating and cooling systems, utility load management, clothing practices or the daily scheduling of the siesta) may be warranted.

## **Conclusion**

Research on the environment and the home has been dominated by individually oriented work on improved end-user efficiency. In this paper we have extended understandings of the issues at stake, looking at how environment-home relations might be envisaged from the perspective of different disciplinary standpoints. In showing how collective conventions, social institutions and technical infrastructures frame practices of sustainable consumption in the household new policy options open up. As a case study of sustainable practice comfort works well and helps to show the interplay of the issues at stake and the research and policy challenges ahead.

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<sup>9</sup> This is the objective of the “Future Comforts” research, which involves interviews with representatives of the key groups currently involved in the specification of the indoor environment.

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The environment comprises all of physical and social conditions that surround us and can influence our health. Our environment includes both our outdoor and indoor surroundings. The quality of air we breathe, the water we drink, the food we grow and eat are important to our health. Driving a car, using electricity to light and heating our home, and throwing away garbage; all effects environment and lead to greenhouse gas emissions. We can reduce emissions through simple actions like changing a light bulb, powering down electronics, using less water, and recycling. By taking preventive measures at home and workplace, we can protect the environment, reduce air pollution, and save money. When the home environment was unstable and continued to lack sufficient intellectual stimulus and guidance over time, a cumulative learning deficit occurred. This echoes the issues of constancy and consistency cited in the earlier work of Bloom (1964). Other early research showed a correlation between family socioeconomic status and children's performance on mental tests (Deutsch, 1973; Hess, 1970).