Sustainable Architectures
Cultures and Futures in Europe and North America
Edited by Simon Guy and Steven A. Moore
Simon Gay would like to dedicate this book to Joel, Verity, Guy and Olivia.

Steven Moore would like to dedicate this book to Ian and Nova, Jenny and Vince.

First published 2005 by Spon Press
270 Madison Ave, New York, NY 10016

Simultaneously published in the UK
by Spon Press
2 Park Square, Milton Park, Abingdon, Oxon OX14 4RN

Spon Press is an imprint of the Taylor & Francis Group

© 2005 Taylor & Francis

Typeset in Akzidenz Grotesk by Bookcraft Ltd, Stroud, Gloucestershire
Printed and bound in Great Britain by TJ International, Padstow, Cornwall

All rights reserved. No part of this book may be reprinted or reproduced or utilised in any form or by any electronic, mechanical, or other means, now known or hereafter invented, including photocopying and recording, or in any information storage or retrieval system, without permission in writing from the publisher.

British Library Cataloguing in Publication Data
A catalogue record for this book is available from the British Library

Library of Congress Cataloging in Publication data
Guy, Simon
Sustainable architectures : cultures and nature in Europe and North America / Simon Gay and Steven Moore. --1st ed.
p. cm.
Includes bibliographical references and index.
NA2542.38.G69 2005
729.47—dc22
2004008320

ISBN 0-415-70045-0 (pbk)
Equal couples in equal houses
Cultural perspectives on Swedish solar and bio-pellet heating design

Annette Henning

Knowing how to design a heating system that will work mechanically is quite different from knowing how to design a system that users perceive as responsive to their domestic practices and values. In this chapter, social anthropologist Henning argues that the challenge for designers involved in the development or marketing of green buildings with heating systems that are based on renewable sources of energy is to see things from the perspective of those who are supposed to live in these buildings. The chapter focuses on three culture-specific aspects of Swedish households and single-family houses: perceptions of house and home, of private and public space, and of male and female space. Through these three angles, some clues are given as to how design, performance and location of solar and bio-pellet heating systems could be made to resonate with predominant experiences, habits and ways of thinking among both men and women.

Introduction

Scandinavia is inhabited by 'kitchen-people' (Gullestad 1984). They are a people who dwell in well-built, well-insulated houses with pitched roofs; a people who love spending time with family and friends in the kitchen, and who put a lot of effort into making their homes warm and cozy. They are a people who tend to emphasise similarity as a sign of equality and who, consequently, tend to de-emphasise the gender division of household responsibilities (Gullestad 1989).

Professionals engaged in the development and construction of sustainable buildings and renewable energy systems could contribute more actively to the reduction of CO₂ emissions, were they to take a wider interest in culture-specific ways of living. In a recent design handbook for solar combi-systems, Bergmann et al. (2003) focus to a large extent on the aesthetic taste of architects and argue for a better collaboration between engineers, architects and planners. My argument here, however, is that it is important not only for the implementation of solar heating that the design and planning of buildings are coordinated with research and development of solar collector components; even more important is to put the presumptive users considerably more into focus than is the case today. This means that cultural variation has to be taken into consideration and that it is not enough to consider climatic conditions or the traditional form of the house to understand how and why solar heating has been put into use at different times and in different parts of the world (Butti and Perlino 1984; Henning 2000). Questions also have to be asked concerning the priorities and everyday lives of specific groups of people.

This chapter provides an illustration taken from Swedish single-family houses and the households that inhabit them. I have chosen to focus on three culture-specific aspects:
perceptions of house and home, of private and public space, and of male and female space. From these three angles, I give some clues as to how the design, performance and location of solar and bio-pellet heating systems could be made resonant with predominant experiences, habits and ways of thinking among both men and women. The chapter also gives clues as to how the marketing, design and possible locations of such heating systems may have an impact on household installation decisions.

Part of the background to this chapter is the Swedish government’s aim to reduce the amount of oil and electricity consumed for heating. Another part is the fact that a substantial number of single-family houses in Sweden have been constructed without a basement, boiler room or other space suitable for a house-based heating system. Wider use of solar and pellet heating systems is one way of reducing the amount of fossil fuels used for heating purposes, and the chapter deals with the question of how such systems could be fitted into single-family houses that do not have a basement or boiler room. (Pellets are small pieces of compressed bio-fuel, often sawdust, a byproduct of the forestry industry. The use of this fuel is increasing rapidly in Sweden. It is easy to transport and handle, and because of its effective combustion, emissions that are dangerous to health are reduced.)

Methods and theoretical approach

I have drawn upon material from two research projects. In the first, I studied attempts to implement solar heating systems in various Swedish contexts. Conclusions and examples used here were collected during an extensive field study conducted over a period of four years (Henning 2000). In the second, a multi-disciplinary project, I focused on the conversion of Swedish single-family houses from electric resistance heating to heating systems that combine solar heating with the burning of bio-pellets (Henning 2001, 2003a, 2003b, 2004). My conclusions from this project are based on literature studies and supported by results from series of interviews with both husband and wife in ten households.

Social anthropologists have tended to focus either on the house as a local idioms for lineage-like groupings or on households and economy (Hugh-Jones 1996: 248). However, Carsten and Hugh-Jones (1996) have asked not only for a greater anthropological interest in how houses are built and used by ordinary people in their day-to-day affairs, but for a sharper focus on the building itself. The anthropological approach chosen here takes as one of its starting points culture-specific ways of using and perceiving various spaces of the dwelling. However, I also attempt to combine the cultural meaning of the Swedish house and home with culture-specific ways of perceiving solar collectors and pellet-fuelled stoves and boilers.

There can, of course, never be an objective opinion about the appearance of a heating system or part of such a system, for example a solar collector. When material, form and size are taken into account in anthropological research, this is always done with an awareness of there being no simple connections between, for example, the size of an artefact and its role as a cultural representation. It is even seen as one of the major tasks of social anthropology to convey to a broader public the crucial importance of cultural context for understanding the meaning of artefacts and habits. When Appadurai (1990) proclaimed his interest in the artefacts per se, his primary intention was to point out that a commodity is not in the first place a special kind of artefact, but an artefact in a certain situation. We find a similar approach to material objects in Thomas’s book Entangled Objects (1991). With the possible exceptions of archaeological anthropology

and anthropologists who, in nately can have Both these ap...

Background

Partly because largest consumption of electricity a great breakthrough of new houses for heating delivery and 1980 (SOI and accelerate heating, largely for electricity a contruction of largest nuclear power plants, one aimed by nuclear power in single-family houses.

At present, electric heating systems in Sw (Energimyndigheten) houses have it as around 40 p are connected 2002). Many c heat exchange for which a new h

The ‘equal’ h

Most commonly one of individ...

through 1850 firms making pr allowed to build climate, which snowfalls are a roofing tiles, to

However, th...
and anthropologist of art, I believe Miller (1992) to be one of the few social anthropologists who, in recent years, has explicitly argued that the physical forms of artefacts definitely can have a complicated, albeit fully analysable, connection to the cultural context. Both these approaches are considered in this chapter.

Background

Partly because of the long, cold winters, the buildings and housing sector is the single largest consumer of energy in Sweden. The heating of buildings has gone through much change since the beginning of the twentieth century. In the late 1940s, there was a great breakthrough in waterborne central heating, which was installed in the majority of new houses. District heating was introduced at the beginning of the 1950s, and heating delivered through waterborne district heating increased rapidly between 1965 and 1980 (SOU 1995: 140–2, para. 10f). The next big change began in the mid-1970s and accelerated in the early 1980s. This was the conversion to electric resistance heating, largely a result of a dramatic rise in oil prices, while at the same time the price for electricity and electric equipment was low. The change was also due to extensive construction of nuclear power plants in Sweden from 1970 onwards, leading to the largest national power programme in the world, per capita (Summerton 1984).

In 1987, the Swedish government agreed on a strategy for adjusting the national energy systems (Energimyndigheten 2003b). This energy programme comprised two parts, one aimed at reducing CO₂ emissions, the other at replacing electricity produced by nuclear power. The use of oil-only boilers has been steadily decreasing for some time in single-family houses. Also district heating is increasingly using bio-fuel rather than oil.

At present, interest is increasing among house owners in replacing or combining electric heating or oil with bio-fuel, and at least 460,000 of the 1.5 million single-family houses in Sweden now have some kind of combined solution for heating (Energimyndigheten 2003a; Overland and Sandberg 2003). Yet, many single-family houses have little space in which a home-based heating system can easily be installed, as around 40 per cent of the houses are electrically heated, and more than 10 per cent are connected to the district heating system (Overland and Sandberg 2003; SCB 2002). Many of these houses were constructed for electric resistance radiators or a heat exchanger alone. They do not have a basement, boiler room or any other space in which a new heating system could easily be fitted.

The ‘equal’ house

Most commonly, the Swedish single-family house displays an ethos of equality rather than one of individuality and hierarchy, and it does so in a double sense of the word. Very similar single-family houses may be seen throughout Sweden, from the very north down through 1850 kilometres to the south. Orders from building contractors to a few large firms making prefabricated houses, and the number of regulations concerning how one is allowed to build a house, are two explanations for this similarity. Another reason is the cold climate, which makes solid, well-insulated houses a necessity. The sometimes heavy snowfalls are also one reason why most single-family houses have pitched roofs, clad in roofing tiles, to allow the snow to slide off the roof and thus not weigh too heavily on it.

However, there is also in Sweden an ideology of equality that contributes to this similarity. All over the world houses are usually treated just as a commonplace setting for
92. Responding design

living (Henning 2000). They should not draw attention to themselves by appearing in some way wrong or inappropriate (Henning 2000; Miller 1992). This is true whether houses display wealth and power, as they tend to in south east Asia (Waterson 1996), or similarity and equality, as in Sweden (Henning 2000). Nevertheless, because of this ideology of equality, house owners in Sweden generally try to make sure that the appearance of their houses does not differ too much from neighbouring houses.

As the exterior of the house can be observed by every neighbour or person that passes by, it is the most public part of the home. The identity that it lends the household may get widely spread. Furthermore, the possibilities of controlling the ways in which others perceive the house and (thereby) its inhabitants, is primarily restricted by economic resources when choosing a house or by the ability to work upon the façade (Carsten and Hugh-Jones 1996; Waterson 1996). Therefore, the fact that a solar collector installed on top of the roof singles out a house from its neighbours has a bearing on interest in solar heating systems, as described below.

Public and private space

Unlike, for instance, the Mediterranean region (Booth 1999; James and Kalaposis 1999; Lawrence 1987), in Scandinavia there is often a sharp boundary between outdoor and indoor activities. This is particularly obvious during the cold months of the year, when people do not leave their houses so much and when most activities are carried out indoors. People also meet more often at home, at work or through recreational courses (the popular ‘study circles’) than in restaurants, pubs or cafés (Böhl 1988; Gullestad 1992; Sjögren 1993).

Much more than the outside of the house, the interior conveys detailed information about the house owner’s age, gender, family history, taste, lifestyle and feeling for order (Blanton 1994). Primarily, the inside of the house is a meeting place for relatives and close friends (Birdwell-Pheasant and Lawrence-Zúñiga 1999; Sjögren 1993). The front door marks a social boundary, and one that allows control over how the boundary operates. However, as Miller (2001a) and Clarke (2001) have also pointed out and demonstrated, there is no clear dichotomy between private indoor and public outdoor space. Gardens surrounding Swedish single-family houses are, for instance, considered very private, despite their often invisible boundaries (Björklund 1983; Sjögren 1993). And inside the house, certain zones are more public than others. It is in these more public indoor spaces that members of the household socialise with friends and relatives who do not belong to the household (Birdwell-Pheasant and Lawrence-Zúñiga 1999; Gullestad 1992; Junkala 1998).

The hallway of the house works like a floodgate or checkpoint, where people may either be turned away or invited into the house (Gullestad 1992; Junkala 1998). It is therefore one of the most public zones of the interior and the first space you enter when coming through the front door. One of the women in the study by Lövgren and Ramberg (1997) commented that her apartment must have been planned by a man, since ‘no woman would put the entrance directly into the living-room without a hallway in between’.

The social multi-functional kitchen

Booth’s description of how entire housing areas were reconstructed after a big earthquake in Sicily in 1968 clearly illustrates the importance of cultural awareness in...
s and Kalisperis undary between 1d months of the 1st activities are 1 through recre-s or cafés (Blid tiled information feeling for order or relatives and (1993). The front boundary oper-cut and demon-outdoor space. considered very ren 1993). And ise more publie d relatives who -Zürgia 1999; p people may 998). It is there- or when coming asberg (1997) ice 'no woman etween'.

6.1 The hallway of a Swedish house – a boundary between public and private space.

architecture and the importance of architects and planners not taking too much for granted, even when building for people in the same country (Booth 1999). When reconstruc-structing these housing areas in Sicily, planners from northern Italy made well-equipped but fairly small kitchens located at the back of the houses. They took for granted a desire for privacy as well as a general desire for ‘modern’ kitchens for people working mainly outside the home. However, a majority of the Sicilian women saw the new kitchens as both inconvenient and limiting, and many of them used a substantial part of the house-hold income for changing their new home. The solution was to transform the garage into a traditional kitchen. Here, the women could again both work and socialise with neigh-bours and friends.

Similarly, studies from Sweden, Finland and Norway show how displeased people get when they are stuck with a small kitchen. A Scandinavian kitchen should be cosy,
warm and pleasant, and it should be big enough to fit at least all the members of the household around the kitchen table (Gullesstad 1992; Junkala 1998; Lövgren and Ramberg 1997). The kitchen is the primary dining area and the space in which household members have most of their meals (Lindqvist et al. 1980; Londos 1993; Lövgren and Ramberg 1997).

But the kitchen is also a public space of the house used by male and female household members of all ages, not merely when socialising with one another, but when socialising with friends and relatives as well. The kitchen and living room could be described as complementary social rooms that are used in a flexible way. If one couple comes to see another couple, for example, the women may go into the kitchen to be able to chat more intimately with each other, while the two men go into the living room. Furthermore, the complementary function of these rooms makes it possible to manipulate a situation and to choose how it should be defined. Thus, showing a guest into the living room could either be a way of honouring him or her or be a way of creating a distance (Gullesstad 1992). These are some of the reasons why many people do not want an open-plan solution with no door and wall between living room and kitchen.

Kitchens may have several other functions besides cooking and socialising. A study from Finland shows that important papers such as household bills are kept in this space (Junkala 1998). And a Norwegian study shows that women even keep cosmetics, hair brushes and combs in the kitchen and describes how they sit there when putting on their make-up and arranging their hair (Gullesstad 1992). A parallel could be drawn here between the modern Scandinavian kitchen and the many functions that used to take place around the open fire in houses in the countryside up to the end of the nineteenth century (Junkala 1998; Palmqvist 1999).

The Scandinavian kitchen, a social space with many functions, differs completely from the idea of the kitchen in other countries, for example the Indian kitchen. Unlike in Sweden, in many parts of India the kitchen is considered a private zone by many middle-class families. Guests are seldom invited into the kitchen, and in some cases even the entry of children or other members of the household may be restricted during cooking.

**The tidy, decorated living room**

The living room has a greater importance than other parts of the house. It is often kept very clean and tidy, so that a visitor may understand that those who live in this house are orderly people. This space usually contains the best furniture, lamps and paintings. Clothes and ornaments decorate tables and other furniture, and flowers and patterned curtains decorate the windows. The room is almost never used for work, and children are seldom allowed to play in here. In this room you will find wedding photos and family portraits, along with other artefacts giving evidence of the lives and social positions of the household members (Gullesstad 1992; Londos 1993). At night, household members gather in the living room to relax. Usually this means drinking coffee and watching TV or listening to music. Someone might read or possibly sew or knit.

As ever before, people in Scandinavia take an interest in making their houses into homes. Although most people no longer spend time on making clothes or jam, they spend more and more time, money and energy on decorating their homes. They do not just renovate their homes or rearrange their furniture when they move or when things get worn out; they do it for the sake of renewal itself (Garvey 2001; Gullesstad 1992; Wallensteen-Jaeger 1976). Or rather, they do it in order to express values, lifestyle,
identity and social standing (Daun 1974; Junkala 1998; Miller 1992). And they do it to prove to themselves, their friends and their relatives that they are a ‘real’ family (Gullestad 1989).

The equal couple

Scandinavian couples tend to see themselves as teams that share household tasks and responsibilities. They do, however, also tend to believe they follow that principle more than they actually do. The culture-specific and predominant ideals of sharing and equality defined as sameness imply that traditional gender roles can no longer be fully taken for granted. Household tasks are often negotiated, even though some tasks more than others have accumulated and retained symbolic value as belonging to one gender or the other (Gullestad 1992). People more or less consciously tend to perceive, side by side with the ‘do it together’ ideology, certain tasks as more male and others as more female (Gullestad 1984; Kugelberg 1999; Nordenmark 1997).

Home decoration and reconstruction projects are popular joint husband-and-wife tasks. In these projects, as in other parts of everyday life, men are expected to be handy and good at construction work and repairs, while women are seen as aesthetic and emotional specialists, having the main responsibility for the creation of a cosy and tasteful home. At the same time, home improvement projects are perfect ways of creating and maintaining the ideals of togetherness and equality, and for many women they provide a tangible symbol of the man’s interest in the home and thus in her and the rest of the family (Gullestad 1984, 1992; Rosengren 1991).

Male and female space

Certain zones of residential buildings are treated as more male or female than others (Ardener 1997). Even if men and women in Sweden normally do not themselves think of the home as anything but gender neutral, the woman is usually responsible not only for coordinating activities of the household members (Mårtensson et al. 1993) but for the overall planning of the interior of the house (Almqvist 1993; Friberg 1990; Gunnemark 1998; Jakobson and Karlsson 1993). This responsibility does not merely mean taking the initiative as to when the vacuum cleaner should be used; it also means that she, at least to a certain degree, controls where objects and people should be located. Certain areas, however, are treated as male spaces in which few women would take an interest. The boiler room and the garage are examples of such male zones of the interior (Gullestad 1984, 1992; Gunnemark 1998).

A study by Rosengren (1991) describes how young Swedish couples build a house of their own. Here, the gender division of tasks is clearly associated with the inside and the outside of the house. Rosengren describes how both spouses were committed to a house building project in the initial stage and how they discussed it and made decisions together. Nevertheless, as the construction work continued, their different decision responsibilities became more and more detailed and separated. Craftsmanship was more his responsibility; aesthetic thinking more hers. The main dividing line was drawn between the outside of the house, which was his area, and the inside of the house, which was considered her sphere of interest and competence. Sometimes one spouse would have opinions on matters considered more the responsibility of the other, although in such cases he or she easily gave way to the other person if they did not
agree. One of the most interesting findings of this study, I believe, is that the only time a husband and wife really argued was on issues where the outside and the inside met, such as the colour of the window frames or whether the area in front of the main entrance should have asphalt or stone. The meeting point of outside and inside was, thus, also the meeting point of the male and female spheres of interest, competence and decision.

**A male heater in a male space — the pellet burner success**

To begin this section, here are some definitions. A stove is an enclosed space for combustion, designed for use in the living quarters; it may or may not have a water jacket connected to the hot water system of the house. A boiler is similar to a stove, typically larger and designed to be placed in a separate room; it usually contains a small hot water storage tank for domestic hot water and is always connected to the house's heating system (in Sweden generally a waterborne system). A burner consumes a fuel and is part of, or connected to, the boiler. A heat store is a hot water storage tank, typically 500 litres.

Despite the fact that the pellet stove was introduced in Sweden prior to the pellet burner, the burner has been a far greater success so far. Only a sixth of the pellet heating systems sold have been stoves. It seems clear that the introduction of the burner has been more successful in several respects. Firstly, single-family houses where pellet burners are installed normally have a basement and a boiler room. This means there are few problems with fitting the heating system into the house. Secondly, the boiler room is a male space, as handling a boiler with its burner and hot water store is primarily considered a male task. Women in Scandinavian households would rarely question the opinions of the men in such clearly traditionally male areas (Gullestad 1984; Londos 1993; Mårtensson and Pettersson 1998; Mårtensson et al. 1993). Thus, in several respects, the decision to purchase a pellet burner is a straightforward one and could be taken by the man alone.

Thirdly, no radical change to the previous heating system is needed. About half of the pellet burners have been installed in boilers previously run on oil, the other half in boilers previously run on logs of wood or heated by electricity (Energimagasinet 2003; Fiedler 2004). Also, there are few other special requirements for the design of the burner and boiler; as the boiler room is constructed solely for the purpose of housing the boiler. The burner, boiler and heat store do not have to be neat, small, clean and presentable to guests. The challenge lies rather in fitting boilers and hot water stores into single-family houses that lack basements and boiler rooms. A short discussion on technical requirements for smaller systems can be found in Kovacs and Welsa (2003).

**A male heater in a female space — conflicting interests**

For single-family houses with no basement or boiler room, the laundry might be used for a boiler or hot water store connected to a solar heating system or waterborne pellet system. We might, however, expect to find conflicts of opinion within the household concerning the coexistence of boiler and washing machine in this location. Certain household tasks (such as laundry), and tasks perceived as technical (like handling a boiler), are more than many others marked as female and male, respectively (Nordenmark 1997; Londos 1993; Mårtensson and Pettersson 1998).
6.2 Pellet burner in a boiler-room.

In such cases the equipment would have to be substantially smaller, cleaner and neater in appearance than is standard in Sweden. Integrated pellet boilers with automatic cleaning, similar to products in the Austrian and German markets, would have to be used (Fiedler 2004). Even so, whether or not boilers and washing machines can share space depends not only on the design of the boiler but also on the ability of husband and wife to come to an agreement concerning their respective interests and responsibilities.

A heater in a public space – cosy, tidy and aesthetically appealing.

The hallway, the kitchen or the living room may all be possible locations for a pellet stove. Since the hallway is the first room a guest enters, the style and cleanliness of a stove or boiler in this space is of utmost importance for its acceptance. Most probably, the stove...
would also have to be quite small to fit into this room. From a technical point of view, the
hallway would make a perfect spot for a pellet stove, since it would then be located in a
central position in the house with close connection to several rooms. Also, the hallway
could be kept at a higher temperature than other rooms, as household members do not
usually spend any length of time there. This way, the heat would be used and distributed in
the most effective way (Persson and Nordlander 2003). Bedrooms, often located on the
top floor, would be cooler, which is well in line with the wishes of most Swedish house
owners in the hall.

In the made with these into accord when p attractive on the kitchen location location class (C)
predominant world.

How stove, a open fireplace
needs to. One of the similarity of basements.

If the
their living room arrangement Repetition keeping thousand, w the kitchen.

The located
market (Hennig and Oren to spare cosmoses)

The (Hennig owners which b Swedes it is for flowers welcome stove c-
owners (Gaunt 1985; Henning 2003b). These reasons for locating a heating system in the hallway do not apply, however, to a boiler or water-jacketed stove.

In the projects on which this chapter is based only a few interviews have so far been made with members of households with a stove, boiler or open fire in the kitchen, but those interviews show very pleased reactions to the location (Henning 2003b). Taking into account the multifunctionality of the kitchen and the desire for warmth and cosiness when people are gathered there, it should be possible to make pellet stoves or boilers attractive enough to be fitted in this space. The popularity of spending time and money on the reconstruction of kitchens and of interior design magazines featuring pictures of kitchens with an open fire should also contribute to this location being accepted for this location. Most probably it would be women who would mainly be interested in this location, even though gender responsibility for the kitchen varies with age and social class (Gullestad 1992; Junkala 1998), and female responsibility in the kitchen does not predominate in northern Europe to the extent that it does in many other parts of the world.

However, the living room might be the most obvious space in which to place a pellet stove, as this is where members of the household would prefer to gather around an open fire – if they had room and could afford one, that is. A pellet stove in the living room needs to be silent so that it can operate at the same time as a television or CD player. One of the women in my interview study (Henning 2003b) complained about the peculiarity of a small, green, attractive stove that ‘sounds as if it belongs in a boiler room in the basement’. In their household they had to shut down the stove when they wished to watch television.

If pellet stoves are to be more widely accepted, the fact that many people try to keep their living rooms clean and tidy has to be taken into account. To decorate, furnish and arrange a home in the right style is a lot about placing the right objects in the right spots. Representations of dirt and cleanliness are very much about this sense of order: about keeping everything in the right place in a way that is culturally understood (Douglas and Isherwood 1988). This means that a sooty boiler would not be a problem in a boiler room, which is meant to accommodate exactly such an artefact. Such a boiler or stove in the kitchen, bathroom, laundry, hallway or living room, however, would be quite another thing.

The aesthetic consideration is even more important when a stove, or even a boiler, is located in the living room. Although one of the impediments in the introduction to the market of solar heating systems has been an extremely strong focus on installation costs (Henning 2000), I am sure that such concerns will not be the case with pellet stoves. One reason for my making such an assertive prediction is Swedish people’s willingness to spend money on furniture and other artefacts that may improve the feeling of cosiness and a homelike atmosphere.

The design of a pellet stove has to achieve a balance between several requirements (Henning 2003b). Stoves need to be easy to handle and should not prevent their users from keeping the living-rooms tidy. However, when contemplating ways in which to increase the popularity of pellet stoves, one should also consider the fact that a Swedish home is seen as attractive, comfortable and ‘cosy’ (hemtrevlig, mysigt) when it is perceived as ‘warm’ in both a literal and figurative sense. Ornaments, curtains, flowers and other decorations enhance the perception of the home as warm and welcoming, as do candles and the warmth from a stove or open fire. A decorative pellet stove could contribute to this perception of a ‘warm’ home. Most probably, it could also
be made to resemble an open fire, which not only engages the senses but evokes positive memories of togetherness, childhood experiences and culture-specific dreams of a 'red cottage by a lake'.

The insecure solar collector

I also begin this section with some definitions. A solar thermal system for the single-family house in Sweden consists of a solar collector, a heat store in the form of an insulated tank filled with water, and connecting pipes, a pump and a heat exchanger. In Sweden, small systems produce domestic hot water from May through to September. More common, however, are the larger combi-systems, which also provide hot water to the house heating system from early spring to late autumn. An auxiliary heat source is needed for periods of little or no sunshine.

In Greece and the United States, solar collectors are often mounted on stands and placed on top of flat roofs. In Sweden, they have instead become more and more integrated into the roofs, thus becoming more fully part of the buildings. One of the most characteristic features of Swedish solar heating systems for individual homes is the extreme visibility of the collectors. This visibility is partly due to the importance put on the look of the building, as described earlier, but also to the unfamiliarity of solar collector-covered roofs.

To many people it is not clear how the solar collector should be classed (Henning 2000). It is obviously a part of the house and most often a part of the roof, but it is more noticeable than the chimney, for example, in spite of its less prominent form. The chimney just sits there like it always has; house owners do not need to wonder about what it might look like. With the solar collector, things are different. People seem to wonder their flat windows have a surface.

How wonderful we introduce Sweden to our friends. In the surrounding debate on issues of solar collectors and potential structural change (Ehn 1976, Johansson 1978), cultural connotations are small, people with whom the signal of installing stuff in the thing the collectors

Solar di

As with the world, the ugly, as Sweden heating, home or uncertain. So, a collector
wonder how this artefact really appears: if it is all right to have it on their house, and what their friends and neighbours will say. The glass of the collector makes it shiny like a window. It is, however, much bigger than a skylight or a dormer window, and it does not have a little roof above it as the dormer window usually does. Neither, with its flat shiny surface, does it look like roofing tiles.

However, to a large extent the visibility of the solar collector is a result of the ambiguous way in which it has been perceived and discussed in Sweden since it was first introduced in the 1970s (Henning 2000). On the one hand, the solar collector in Sweden is a strong positive symbol for an environmentally benign future. On the other hand, there is a lingering insecurity concerning its present feasibility. One of the reasons for this ambiguous position is the role solar energy technologies played in the discourse surrounding the nuclear power referendum in 1980. This was a time when heated debates and conflicts concerning national energy policy tended to split families and friends all over Sweden.

Today, solar heating systems are increasingly treated in less ambivalent ways, as issues of climate change and CO₂ emissions gain legitimacy, and as roof-integrated solar collectors gradually become a more common sight. Still, implicit conflicts in opinions and differences in how these artefacts are culturally understood tend to leave potential owners of solar collectors uncertain as to how they will be looked on by others were they to decide to install one (Henning 2000). There is also an insufficient social structure of producers, installers and promoters with enough economic resources to change this situation and fully carry through the process of introduction and implementation (Edqvist and Edqvist 1980; Henning 2000; Shove 2003).

Not just solar collectors but their users as well are perceived differently in different cultural contexts, and cultural variation does not stop at the national border but extends down to the habits, experiences and modes of thought that individuals share to a larger or smaller extent with certain others (Henning 2000). In some places and situations, people can feel pretty certain of what their closest neighbours and friends will think of them, while in other places people may show a great concern and uncertainty about how others will react. In a place such as Orust (the third largest Swedish island), which has become an area dense in solar collectors, people no longer stand out as different or signal anything special if they put collectors on their roofs. But in a village with only one installation, people might start talking: ‘He has always been a little odd. He has all that stuff in his barn, so whenever someone in the village needs a special acrow or something they go to him. So when he put that solar collector on his roof, that was so typical!’ (Henning 2000).

Solar design, marketing and cultural values

As with all artefacts, the ways in which solar collectors are perceived differ across the world. They may lend prestige, as in Poland or Central America. They may be seen as ugly, as in southern Italy. Or they may just be seen as functional, as in Greece. In Sweden, the combination of conflicts surrounding the initial introduction of solar heating, the extremely public location on the roof and the importance put on house and home and on having an ‘equal house’, in the double sense of the word, has produced an uncertainty about solar collectors.

So, which design strategy would be best suited to the purpose of marketing solar collectors in the Swedish situation of uncertainty and insecurity? Perhaps it would be
best to pay attention to concerns about what other people might think about how collectors look and to strive to make this a less salient factor? Or perhaps a better strategy would be to try to subvert the insecurity by making solar collectors very conspicuous? Or maybe the strategy should be based on the fact that solar collectors are very differently perceived in different neighbourhoods and among different groups of people? Such a strategy would, I presume, lead to a much greater variety in solar collector designs than we see in Sweden today.

My personal favourite, however, is the idea of making better use of the fact that solar collectors, through innovative design thinking, can be made into really good advertisements for combined pellet and solar heating systems. The promotion of such combined heating systems would also be a perfect way of avoiding a difficult pedagogic problem in the marketing of solar heating systems in Sweden, a problem actually caused by the experience people have of their climate. To produce hot water, solar collectors primarily need a clear sky, not a warm outdoor temperature. This is the reason why they are able to produce heat in the autumn and the spring, when there is a great need for heating Swedish houses. However, men and women who grow up in Sweden link sunshine with warm summers. It is hard for them to understand that indoor heat can be produced by sunshine when, outside, cold northerly winds sweep over their houses (Henning 2000).

Motives, responsibilities and decision-making

Male or female motives, responsibilities and interests connected with different heating systems vary with (among other things) the space in which the system is placed. The location of the heating system also influences household negotiations in deciding on a change of heating system.

We have seen that in couples in Swedish households the woman would rarely question the opinions of the man in such clearly traditionally male areas as the boiler room and the task of handling a boiler with its burner and hot water store. Any man interested in installing a pellet stove in a hallway, kitchen or living room, on the other hand, would most probably have to come to an agreement with his wife about his wishes, as the general understanding is that it is the woman who has the main interest and responsibility for creating a pleasant home in the right style.

However, while in the case of the stove the man would have to come to an agreement with his wife, the gender situation is reversed in the case of solar heating systems. Women who wish to have a system installed in their home tend to act indirectly through their husbands (Henning 2000). One explanation of why they do not themselves act in a more direct way can be found in the dominant and, of course, culture-specific gender role division of household responsibilities and interests. Despite the fact that many women value solar heating systems highly, not merely for the hot water they provide but for their ability to reduce CO₂ emissions, for the most part they do not have the main responsibility for construction work or for the outside of the house. These are the husbands’ responsibilities. A household decision on a solar heating installation depends either on the wishes of the man or on the woman’s ability to persuade her husband (Henning 2000).
Conclusions

Important in the background of writing this chapter was the Swedish government’s aim to reduce CO₂ emissions produced through the heating of residential buildings. One way of realising these aims would be to cut down on the burning of fossil fuels (which increases the production of CO₂ overall) through wider use of efficient stoves and boilers for bio-fuel combustion (which adds no more CO₂ emissions to the atmosphere than if the plants or trees had just decomposed) (Fryk 1999). Another way of realising the aim would be to cut down on the use of any fuel through increasing the proportion of direct use of solar energy, a solution that seems increasingly necessary for a sustainable global energy future (Weiss 2003).

Culture is not inherent nor given once and for all. Even so, the primary task for social scientists engaged in energy research should not be to persuade individuals to change their habits in order to accept renewable energies and sustainable architecture (as has often been the case) but rather should be to help making such artefacts resonant with the habits and interests of both men and women (Carlsson-Kanyama and Lindén 2002; Henning 2003b; Nordell 2003; Shove 2003; Wilhite 2000).

For planners, architects, building contractors, engineers, designers or salesmen, the challenge is to see things from the perspective of those household members who use the building or heating systems. Knowing how to design a heating system that will work is quite different from knowing how to design or market a system that users can perceive as responding to their domestic practices and values.

The importance of socialising in a large and cozy kitchen and the importance of decorating the home so that it is experienced as warm and welcoming are only two examples of how various spaces of a dwelling are culturally perceived and used in this part of the world. When combining culture-specific ways of using and thinking of various spaces of the building with the ways in which certain heating systems are handled and looked on, we may get some clues as to what should be expected of the appearance, performance and marketing of such technologies. Thus, a ‘male’ boiler located in a ‘female’ laundry, a duety but ‘cosy’ (mysig) stove located in a tidy, decorated living room and an ‘insecure’ solar collector located on the publicly visible roof tell us something about the kind of interest or lack of interest men and women in Swedish households have in these heating systems.

One of my arguments has been that cultural variation in people’s perception of heating systems that are based on renewable energies could inspire design thinking. Cultural analysis is, I argue, an important way for architects, engineers, designers and others involved in the development of sustainable buildings and heating systems based on renewable energies to be actively involved in setting the course towards a sustainable energy future.