Climate change and energy use

The role for anthropological research

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Fig. 1. Melting ice? The issues of climate change call for in-depth research by social scientists in collaboration with technical researchers and professionals outside the academic world.

The expression 'global climate change' no longer designates merely a discourse on possible future risks; today it is used as a shorthand for specific ongoing events that are having a serious impact on the lives of people around the world (Appenzeller et al. 2004). In the light of this change and consequent efforts to limit carbon dioxide emissions, contributions from social scientists are increasingly in demand within the study of energy use.¹ My concern here is not whether intervention is a proper role for anthropologists, but rather with *how* we may position ourselves within energy- and climate-related research.²

My anthropological interest in energy-related issues was sparked when I recognized the marked ambiguity in the perception and treatment of solar collectors in Sweden (Henning 2000). Since that time, my research has focused on heating systems using solar or bio-fuel. Such heating systems and fuels may replace oil or electricity for heating purposes.³ Furthermore, a wider use of pellet stoves or boilers with pellet burners⁴ in single-family houses previously heated by oil or wood can reduce emissions of flue gases. Solar systems heat water for general domestic use and for heating purposes⁵ without using any additional energy, except possibly an insignificant amount of electricity for running a pump. In the more densely populated areas in Sweden, district heating is very common: hot water is produced efficiently in larger plants, which are increasingly run on waste or bio-fuel rather than oil, and distributed to individual homes by pipeline.

Like any other artefact, an energy system could be used simply as a basis for the study and description of a specific cultural context. However, I believe anthropological theories, methods and research approaches are urgently needed, not only for the study of how humans around the world adapt to climate change,⁶ but for studies that might actually contribute to climate change mitigation. Some countries such as Sweden are committed to reduce use of fossil fuels and nuclear power.⁷ If our global resources of less polluting fuels are to suffice, we clearly need to reduce demand for energy. A massive use of solar energy is one way of accomplishing this. Anthropologists and other social scientists can contribute by helping us understand how solar heating systems are perceived, handled and implemented in specific contexts. Comparative studies of such processes and structures are needed, as well as close collaboration with manufacturers, installers and technical researchers. Here I discuss some of the challenges for social scientists involved in, or tempted to enter, energy research.

Expectations of the 'people experts'

With the exception of economics and psychology, the social sciences began to be marginalized within energy-related studies in the early 1980s (Wilhite et al. 2000). Since then social scientists have been further marginalized when setting the research agenda. An anthropologist, sociologist or political scientist working in energy-related research very often ends up as just 'a helper' in research environments dominated by engineers, physicists and economists or in technically and economically focused energy efficiency programmes (Shove et al. 1998, Wilhite 2000). It is vital that we remain aware of these circumstances and the hegemonic cultural ideas of which we, as energy researchers, become a part.

Social scientists tend to be invited to contribute to energy analysis as the 'people experts'. In this role, we are expected to study the aggregate effects of the action of individual energy end-users (Shove et al. 1998). In my experience these individuals may be expected to have 'habits', but are otherwise stripped of their cultural context, including the meaning of physical artefacts such as houses or heating systems.

At a recent workshop for the various professionals involved in solar and bio-pellet heating systems, I spent some time trying to convince fellow participants that not only do individual end-users have 'habits', so also do retailers and tradespeople such as wholesale dealers and plumbers, and that the interaction between these actors is equally important for the implementation process. I also argued that the physical properties of each kind of heating system have certain cultural consequences. A solar collector is a comparatively large and visible artefact normally installed on the roof of a single-family house, while a pellet burner is hidden in a boiler-room or basement, in contrast to a pellet stove situated in the socially important living-room. District heating, on the other hand, is delivered to the single-family house by pipeline. Power and gender relations are only two of many cultural aspects which are seriously affected by such differences. To any anthropologist it is obvious that this complexity needs to be addressed.

Another task commonly assigned to social scientists within energy studies has been to find out why people do not purchase energy-efficient devices (Shove et al. 1998, Wilhite et al. 2000, Wilhite 2000). This approach is prompted largely by technical professionals' surprise at realizing that many people choose not to purchase an item that may save energy and thus money. The assumption that

1. For reviews on earlier periods of social scientific energy research, see for example Lutzenhiser, Harris et al. (2002), Rosa, Machlis et al. (1988).

2. For other discussions and suggestions concerning the role of the social sciences within energy studies, see for example Lutzenhiser, Harris et al. (2002), Shove, Lutzenhiser et al. (1998), Wilhite (2000).

Fig. 2. Photovoltaic cell (PV) panels producing electricity for library lamps at the Karagwe Solar Training Facility, Tanzania.

3. In the mid-1970s and early 1980s a large number of Swedish single-family houses were constructed with electrical panel heating systems. This was largely due to a dramatic rise in oil prices, while at the same time the price for electricity and electrical equipment was low. It was also due to extensive construction of nuclear power plants in Sweden from 1970 onwards, resulting in the largest per capita nuclear power programme in the world (Summerton 1994).

4. Bio-pellets are small pieces of compressed bio-fuel, often sawdust and other by-products of the timber and paper industries.

5. Swedish houses are normally heated by hot-water radiators or by electric panel heaters usually mounted on a wall. Solar heating systems in Sweden are hot water systems. Contrary to popular belief in Sweden, solar heating systems are much more dependent on a clear sky than on high air temperature. They are also particularly useful in high northern latitudes as houses in these areas have to be heated throughout most of the year.

6. So far, social anthropologists seem to have been involved mainly in studies of climate change adaptation: see for example Roncoli et al. (2000).

7. In 1997 the Swedish government agreed on a strategy for adjusting the national energy systems (Swedish Energy Agency 2003b). This energy programme comprised two parts: one aimed at reducing carbon dioxide emissions, the other at replacing electricity produced by nuclear power.

Appenzeller, T. and Dimick, D.R. 2005. Global warming: Signs from earth. *National Geographic*, September.

Birdwell-Pheasant, D. and Lawrence-Zúñiga, D. 1999. Introduction: Houses and families in Europe. In Birdwell, D. and Lawrence-Zúñiga, D. (eds) *House life: Space, place and family in Europe*. Oxford, New York: Berg, pp. 1-35.

Carrier, J.G. and Miller, D. 1999. From private virtue to public vice. In: Moore, H. (ed.) *Anthropological theory of today*. Cambridge & Oxford: Polity Press, pp. 24-47.

energy demand is affected mainly by price also has a strong impact on the content and direction of solar energy research in Sweden, as those involved in energy research and policy (from technical assistants to professors, administrators, businessmen and politicians) agree that low cost is what will draw people to buy solar heating systems.

These a priori assumptions concerning consumption and the lives and motives of 'people' largely seem to emanate from academic economics. I agree with the concerns expressed by Carrier and Miller (1999) that economists have acquired such influence in public thought and debate, and that they are increasingly able to shape government policies and procedures. In a study of cultural processes surrounding the introduction of solar heating in Sweden (Henning 2000), I found that economic arguments were perceived as indisputable fact and used to legitimize a questionable purchasing decision. The decisions of others were discredited on the grounds that they were 'emotional'. Thus, while solar collector owners themselves usually emphasized the practical, useful or economic sides of their motives, others would impute their purchase to philosophy and idealism, or sheer whim.

According to Carrier and Miller (1999), anthropologists who carry out research on aspects of economics face two powerful potential audiences: academic economists and the general public. Few of these listen or care, however. Similarly, to be an anthropologist concerned with energy and climate means repeatedly having to address an audience which has assumptions concerning energy consumption and the habits, experiences and modes of thought prevalent among certain groups of people.

Commissioned research – an example

A commissioned research project I undertook offers an example of how preconceived notions of the role of 'people experts' may affect a research project, and how such restraints may be reformulated. The project was co-financed by the Swedish Energy Agency, a state body, and Svensk Fjärrvärme, the private confederation of the majority of Swedish district heating companies. It was part of a wider programme aiming at reducing company costs for extending district heating pipes to the outskirts of cities. One way of reducing these investments is to increase the number of households willing to have their houses connected to district heating in a given area at a particular point in time. The main aim of the project was to investigate how this could be achieved.

My earlier research had indicated that the choice of heating system made by households living in Swedish single-family houses is based largely on a desire for 'independence' and 'flexibility' (Henning 2000, 2003). Statistics seemed to confirm these results (Swedish Energy Agency 2003a, Statistics Sweden 2001). At the same time, technical research at my department provided a way of reconciling the seemingly contradictory interests of district heating companies and householders by making it possible to combine district heating with home-based heating systems, and I proposed a possible research project to look at these issues.

My proposal was initially rejected by the steering committee of district heating company representatives, on the grounds that 'there is no such need for flexible energy solutions'. However, at a second meeting, the general idea had become accepted, and the work was commissioned.

Two tasks were assigned to the project. One centred on 'customer categories' and on price as their prime motivating force: I was to find out which customer categories would be interested in combining district heating with other heating systems, what their motives were (if any) and what they would be willing to pay for it. A second task was to plan for demonstration and tests of the technical solution suggested by one of my colleagues. A very tight time limit was imposed on the project.

My solution to the limited focus and time frame was to use my previous research to discuss economic thinking, and to collect empirical material concerning household perspectives indirectly through telephone interviews with municipal energy advisers and with employees of district heating companies who had direct contact with customers. At first my employers were critical of my choice of studying 'experts' rather than 'customers', a view indicative of their taken-for-granted focus on end users and unrealistic ideas of the outcome of various methodological approaches, as well as the time needed for them.

The interviewees were asked (among other things) to describe the extent to which households that are offered district heating reject this offer, and their opinion concerning the reasons for this rejection. I also used reports and research studies as a basis for brief statements on the perspectives of the two other main actors involved here – government agencies and the district heating companies themselves.

The telephone interviews strongly indicated that one of the two most common motives for households not wishing

- Carsten, J. and Hugh-Jones, S. 1996 (1995). Introduction. In: Carsten, J. and Hugh-Jones, S. (eds): *About the house: Lévi-Strauss and beyond*. Cambridge: Cambridge University Press, pp. 1-46.
- Henning, A. 2000. *Ambiguous artefacts: Solar collectors in Swedish contexts – on processes of cultural modification*. Stockholm Studies in Social Anthropology, 44. Department of Social Anthropology, Stockholm University. Stockholm: Almqvist & Wiksell International.
- 2003. *Tio hushåll om elkonvertering: Hem och hård, del II*. Borlänge: Solar Energy Research Center SERC, Dalarna University.
- 2004. Social anthropological and interdisciplinary research on the conversion of electrically heated single family houses to heating by combined pellet-solar systems. *Biomass & Bioenergy*, 27: 547-555.
- 2005. Equal couples in equal houses – cultural perspectives on Swedish solar and bio-pellet heating design. In Guy, S. and Moore, S. (eds): *Sustainable architectures: Cultures and natures in Europe and North America*. New York, London: Spon Press, pp. 89-103.
- and Lorenz, K. 2005a. *Flexibla fjärrvärmelösningar – en tvärvetenskaplig studie*. Borlänge: Solar Energy Research Center SERC, Dalarna University.
- 2005b. *Flexibla lösningar som strategi för ökad anslutningsgrad*. Värmegles 17. Stockholm: Svensk Fjärrvärme.
- Kaijser, A., Mogren A and Steen, P. 1988. *Att ändra riktning: Villkor för ny energiteknik*. Stockholm: Allmänna förlaget.

Fig. 3. Installers lift a solar collector onto the roof of a Swedish house. A solar heating 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 collecting 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.

to be connected to the district heating grid was mistrust of the district heating companies and a determination not to become dependent on them. Fears of 'dependence' consist of more than merely a worry that the company will suddenly raise the price or discontinue its service. Being connected to the grid gives a feeling of loss of control, of having freedom of choice circumscribed. By combining several heating systems or fuels, many of these households try to insure themselves against ever having to be without heat. They also try to make themselves less vulnerable to increasing costs by making it possible to switch between two or more fuels. The second most common motive for households not wishing to have their houses connected to district heating was that they had recently installed a new heat-pump or boiler.

Rather than focusing on customer categories fixed in time, I chose to emphasize the importance for energy companies of better understanding of the relation between the life cycles of households, houses and heating systems. I described how a household consisting of a middle-aged couple may, in only a few years time, consist of one aging woman with much less interest than her late husband in handling the old boiler. A young, low-income couple who prefer to use firewood may some years later be middle-aged with a higher income, less time, and hence a motive for turning to district heating. As each and every household is offered the chance of connecting its house to district heating only at a specific moment in time and within a particular phase of life, the timing cannot simultaneously be perfect for all households in a given area.

Thus, I could confirm the existence of contradictory interests held by households and district heating companies. While presumptive district heating customers may hesitate to make a long-term commitment to one large deliverer of energy, to the district heating companies this long-term commitment means economic security (Kaijser et al. 1988). And while households would prefer to change their heating system when this suits their situation and stage in life as well as the condition of their earlier system, the aim of the companies is to connect as many customers as possible at once.

Our suggestion to Svensk Fjärrvärme (Henning and Lorenz 2005a, 2005b) included a technical solution that would make it possible simply to make preparation for district heating supply to a house, in anticipation of the day when the boiler should break down or the family structure change. Through these 'flexible modules', as we came to call them, it would also be possible to combine district heating with a boiler or a solar heating system, thereby preserving a feeling of independence and control for individual households.

I see the project as partially successful. A restraint was put on it, but it turned out to be possible to reorient the agenda to a certain extent and to squeeze the project into the six-month limit. Despite protracted negotiations and criticism from members of the steering committee, most of them increasingly came to accept the idea that many households in Sweden look for heating solutions that may preserve control and flexibility. Even so, they were not convinced that the 'flexible solution' would help them extend the district heating network to new areas. They did not find it easy to accept our proposed technical solution, nor did they wish to finance any further studies or demonstration projects. However, since our suggestion would mean that they would have had to give up their local monopolies, this came as no surprise to us.

Interdisciplinary research – an example

The case above illustrates some of the limitations of a project directed mainly by district heating company representatives, and my attempts to impose an anthropological

angle on the project. My second example describes the process of positioning myself in collaboration with researchers trained as engineers.

This research project (Henning 2003, 2004, 2005) took place against the background of the Swedish government's efforts to reduce the amount of oil and electricity used for heating. The task was to find out what it would take (and if it would be at all possible) to convert heating systems in single-family houses partially or completely to combined solar-pellet systems. Among other things, the project dealt with the question of how combined solar and bio-pellet heating systems should be constructed in order to fit in with the everyday lives of householders. It also dealt with the problem of fitting such systems into the substantial number of Swedish single-family houses that had been constructed without a basement, boiler room or other suitable space for locating a house-based heating system.

I saw my task essentially as the study of how houses are built and used by ordinary people (Carsten and Hugh-Jones 1996, Birdwell-Pheasant and Lawrence-Zúñiga 1999), and to a large extent I was inspired by Carsten and Hugh-Jones (1996), who argued for a sharper focus on the building itself. My research came to deal with cultural representations of the Scandinavian house, home and household. I looked at public and private space, male and female spaces and responsibilities. I also dealt with male and female representations of heat and the association between physical warmth and the idea of 'cosiness', men's and women's opinions of various heating systems, and the process involved in a change of heating system. A third area of interest was the organization and representation of household economy and larger investments. I based my results on literature studies and a series of interviews with both husband and wife in ten households.

At first, the usefulness of having an anthropologist in the project was seriously questioned by some of the research team members, as was my choice of methods. Large-scale surveys would be a lot more useful than in-depth interviews, was one of the arguments. My holistic perspective and aspiration to grasp the project as a whole was interpreted as an attempt to 'take over'. In this situation, I became determined to prove that anthropology can definitely be of use. My efforts to reach the rest of the team included writing a literature study as a popular text, making 'multiple-choice' presentations, and writing

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Fig. 4. In some countries (e.g. Greece and the United States), solar collectors are often mounted on stands and placed on top of flat roofs. In Sweden they are now commonly integrated into the roof itself. Solar energy technology became a focus of debate in the context of the nuclear power referendum held in 1980.

Lutzenhiser, L., Harris, C.K. and Olsen, M.E. 2002. Energy, society, and environment. In: Dunlap, R. and Michelson, W. (eds): *Handbook of environmental sociology*. Westport, London: Greenwood Press, pp. 222-271.

Roncoli, C. and Magistro, J. 2000. Global science, local practice: Anthropological dimensions of climate variability. *Practicing Anthropology* 22(4): 2-5.

Rosa, E., Machlis, G. and Keating, K.M. 1988. Energy and society. *Annual Review of Sociology* 14:149-172. Statistics Sweden (SCB) 2001. *Statistiska meddelande*. EN 16 SM 0201.

Shove, E. 2003. *Comfort, cleanliness and convenience: The social organization of normality*. Oxford, New York: Berg, pp. 291-325.

Shove, E. et al. 1998. Energy and social systems. In: Rayner, S. and Malone, E.L. (eds): *Human choice and climate change. Vol. 2: Resources and technology*. Ohio: Batelle Press.

Fig. 5. Solar collectors on top of a flat roof at Ashram Pratishthan, outside New Delhi. The collectors produce hot water for health baths.

internal reports with short preliminary answers to their questions.

Through discussions and collaboration with the research team over the first year, my approach came to be reformulated as five questions: Can people afford this? Are they interested? Have they got the space? Have they got the time? Do they have the knowledge it takes? At the request of the team, the interviews also came to include rather specific questions concerning fire, light and sound, heat comfort, ashes, smoke and smell, aesthetics and other questions of design, as well as space and location and the technical system as a whole.

These collaborative efforts got results. Combinations of computer simulations and anthropological information on how people perceive the warmth and various spaces of their home (including whether they tend to keep internal doors open) were used to suggest possible locations for heating systems. We made connections between people's tendency not to clean their pellet stoves or burners as often as recommended and the results of lab tests showing a clear relation between the contents of the flue gases and the frequency with which the accumulated ashes are

cleared. Technical developments included a combined pellet-burner, boiler and hot water store that would suit mainly women's considerations by fitting into small areas and by being clean enough to co-exist with laundry. And after listening to my description of the living room as one of the most public spaces of the house and a space which many people like to keep clean, attention was also focused on the development of a pellet transport system which could be used for living-room stoves.

Even so, somewhere along the line I realized that I had accepted a position where my task was mainly to support the other researchers. Worse, the project had lost a lot of its potential, as anthropological research was not being performed in its own right. I now saw more clearly that my repeated efforts to popularize my results and come up with quick answers was an attempt to make the anthropological research process fit into the time axis of a technical research process. Compared to the technical researchers, who focused on specific details and presented frequent reports in the form of figures and graphs, my research process was apparently slow and imprecise.

In order to reformulate my position in the team, I told my fellow researchers that some part of my research had to be performed in its own right, just like some parts of their technical research. We would continue our collaboration, but confine these efforts to certain defined issues. I presented my tasks as divided into one part dealing with details of design, performance and location, in which I would serve the others with information, and one part concerned with issues of implementation, in which they would serve me. After this discussion, my part in the project came to oscillate between a focus on making the collaboration and mutual understanding work, and a clearly defined focus on my anthropological research.

During the project the technical researchers gained a growing understanding and respect for what anthropology may contribute – a change which has been beneficial not only for this project, but also for subsequent projects. I also believe the interdisciplinary collaboration was an important way of forcing anthropological knowledge into being more 'applied'.

Taking back the initiative

The research agenda outlined and proposed by the

Fig. 6. Cooking on open fire in Tanzania. In order to reduce consumption of solid fuels, energy studies need to be more ethnographically focused.

Swedish Energy Agency
2003a. *Värme i Sverige 2002: En uppföljning av värmemarknaderna*. Eskilstuna: Energimyndighetens förlag.

— 2003b. *Energiläget 2003*. Eskilstuna: Energimyndighetens förlag.

Summerton, J. 1994 (ed): *Changing large technical systems*. Boulder and San Francisco: Westview Press.

Wilhite, H. 2000. Energy research on consumption and lifestyles: International experiences and new directions. In: Gundelach, P. and Huehn, S. (eds): *Energi og livsstil*. Copenhagen: Sociologisk Institut, pp. 61-72.

— et al. 2000. The legacy of twenty years of energy demand management: We know more about individual behaviour but next to nothing about demand. In: Jochem, E. et al. (eds): *Society, behaviour, and climate change mitigation*. Dordrecht, Boston, London: Kluwer Academic Publishers, pp. 109-126.

sociologists and anthropologists Wilhite, Shove, Lutzenhizer and Kempton in an important article on energy demand (2000) is an excellent example of how broader and more basic research questions may be formulated when social scientists are allowed (or allow themselves) to think freely. The main claim made by these authors, and subsequently elaborated by Shove (2003), is that a primary challenge for social scientists is to better understand the dynamics of energy demand and the ways in which this demand is embedded in society. They point out that during the last 20 years, energy demand has been steadily increasing in the United States and most European countries. Despite this, we now know little more about the complex processes of which energy demand is a part than we did two decades ago (Wilhite et al. 2000).

Wilhite et al. (2000) suggest a break with the prevailing narrow view of socio-cultural issues and put in its place a research agenda which makes fuller use of social scientific perspectives. I agree that a deeper understanding of processes surrounding an increasing demand for energy may be one of the most important (and also intriguing) tasks for social scientists within energy- and climate-related research. As Wilhite put it, understanding the dynamics of energy demand might even be 'the primary challenge' (ibid.).

To a large degree, the strong emphasis these authors place on consumption of energy seems to be formulated in contrast to the previous and still dominant focus on the supply of energy and energy-efficient devices by governments and others (see e.g. Shove 2003). However, among energy users there is no clear dichotomy between the supply of energy and the demand for services provided by energy. For instance, a decision to install an electrically driven heat pump rather than another kind of heating system may be described as a demand for 'comfort and convenience'. Nevertheless, this decision is dependent on a complex of interrelated factors, the opinion of neigh-

bours and the situation of the selling companies being only two of them. Thus, the question of why one kind of heating system is chosen instead of another needs to be integrated into the question how expectations of comfort and convenience are developed.

Also, with the focus on demand rather than supply, we miss other opportunities of understanding how the amount of energy used in the industrialized parts of the world could be reduced. This focus does not tell us why people prefer to use one source of energy rather than another for a particular service, for example heating. People use more and more energy, as well as more polluting fuels, not only because of their changing habits but because of their choice of heating system or fuel. It is therefore essential to study cultural processes surrounding energy systems such as solar collectors (for the production of hot water), wind power or photovoltaic solar panels (for the production of electricity), none of which use fuel in the usual sense of the word.

Whatever our focus, the importance of a more united stance among social scientists is clear, as are the positive consequences of anthropologists and other social scientists taking back the initiative. In order for us to produce results that stand a good chance of actually contributing to climate change mitigation, we must have the opportunity to use our full range of theoretical and methodological tools. Energy studies need to be more based on ethnographic studies of individuals who are part of larger cultural contexts, and less influenced by economic models where economic processes are seen as merely a consequence of how an aggregate of individuals are presumed to act (Carrier and Miller 1999).

Positioning ourselves

In order to position ourselves better within energy studies, we need to counterbalance the influence of economists on politics and public thought and debate. Carrier and Miller (1999) argue that anthropologists must do more than simply rearticulate models of economic processes through the lives of economic agents. Anthropology is likely to be judged by how well it deals with the relationship between the actions of individuals, households and small groups on the one hand, and the behaviour of transnational and global institutions and forces on the other. They suggest the investigation of commodity chains and commercial institutions as two ways in which anthropologists may directly address such a relationship.

However, at the same time as redefining the contribution of the social sciences to energy research, we need to adapt to and deal with the limitations of ongoing energy projects. With my two examples, I have tried to show how difficult it is to have an anthropological approach taken seriously in energy projects. But if we persist, it can be rewarding for everyone. In order for us to make a serious contribution to mitigating climate change, we must also be prepared, and equipped, to collaborate and communicate with other than our own charmed circle of social scientists.

I hope here to have contributed a glimpse of how, as the effects of global warming become more apparent, anthropology becomes all the more relevant in a world increasingly shaped by the way we produce, distribute and consume energy. Through my own experiences of interdisciplinary collaboration, I am now convinced that anthropologists need to focus both on inter-disciplinary collaboration and communication — even popularization — on the one hand, and on performing anthropological research 'in its own right' on the other. Similarly, we need both to participate in energy research projects formulated by those who are not social scientists and to design such projects ourselves. Let us seize the moment. Anthropology can have an impact on energy studies. ■