

Energy Consumption Practices and Social Inequality

The Case of Low-Income Households

KARL-MICHAEL BRUNNER, ANJA CHRISTANELL, MARKUS SPITZER

“Energy [...] penetrates significantly into almost all facets of the social world. Life-styles, broad patterns of communication and interaction, collective activities, and key features of social structure and change are conditioned by the availability of energy, the technical means of converting energy into usable forms, and the ways energy is ultimately used.”¹

This quotation clearly shows that energy is a basic requirement for social integration and social life, and that it is also tightly linked to social structure and power relations. Energy consumption is a manifestation and part of social stratification, and social inequalities often become evident in energy practices. Today’s industrialised, high-tech societies – as opposed to societies of the past – are characterised by their energy-intensive ways of life.

Current lifestyles include patterns of consumption based on a high level of consumption of (finite) resources. For a long time, excessive consumption of energy was equated with social progress and modernisation. This equation, however, is increasingly being questioned as an effect of the rising awareness of the side-effects of the modern industrial era (climate change and exploitation of finite resources, for example). Meanwhile, a consensus about the non-sustainability of present energy systems has been reached, and the need for a transition to a ‘low-carbon-society’ is being affirmed.

1 | Eugene A. Rosa/Gary E. Machlis/Kenneth M. Keating: “Energy and Society”, in: *Annual Review of Sociology* 14 (1988), 149.

However, this transition can not only consist of ecological dimensions, but also has to include the social part of sustainable development and the question of “environmental justice”², which plays an important role here.

In this context, analyses of the social differentiation of energy consumption are crucial because they shed light on patterns of social distribution and ways of appropriating the use of resources. This becomes relevant, especially politically, in the context of strategies for sustainability and fighting climate change (keyword: environmental justice). Up to now, connections between energy consumption, poverty and climate change have mainly been discussed in the context of global inequalities.³ Regarding the development worldwide, a trend towards imitation of Western lifestyles and consumption patterns can be identified in many developing societies, entailing an increase of energy consumption.⁴ It has to be kept in mind though, that massive global inequalities regarding energy still persist. On a global level, 1.4 billion people have no access to electricity, and another billion only has unreliable access. 3 billion people are dependent on biomass and coal for satisfying their basic needs. Each year, 2 million people (mainly women and children) die from indoor air pollution by household use of solid fuels, burning dung, wood, crop waste and coal in unventilated kitchens. For this reason, the UN defines energy access for the poor as a development priority.⁵

But also in industrialised countries, considerable differences in energy consumption exist to some extent. Although the industrialised lifestyle could generally be considered high in energy consumption, this generalisation disregards the social differences of energy consumption within this lifestyle. While (unlimited) availability of energy is the norm for some social groups in industrialised countries, other parts of society are faced with the problem of not being able to afford energy in sufficient

2 | Horst-Dietrich Elvers/Matthias Gross/Harald Heinrichs: “The Diversity of Environmental Justice: Towards a European Approach”, in: *European Societies* 10:5 (2008), 835-56.

3 | Anthony Giddens: *The Politics of Climate Change*. Cambridge, UK: Polity Press, 2009.

4 | Norman Myers/Jennifer Kent: *The New Consumers. The Influence of Affluence on the Environment*. Washington, DC: Island Press, 2004.

5 | United Nations Development Programme: *Fast Facts. UNDP and Energy Access for the Poor*. New York: UNDP, 2010.

quantities or having to limit their use of energy services. To give an example: Even in European countries, deaths related to energy causes are not the exception because some people are not in a position to keep sufficiently warm in winter or to protect themselves from heat in summer. In the UK, for example, almost 30,000 people died from cold-related illnesses in 2007/08.⁶

In recent years, the analytical focus has shifted towards inequalities and vulnerabilities in the Northern countries, bringing forward evidence that financially weaker households are more vulnerable to climate change (e.g. in periods of extreme weather conditions) than better-off households, although – compared to the more affluent – their contribution to climate change is usually lower (e.g. due to lower mobility rates). Different lifestyles are characterised by different impacts on the environment.⁷ In a study conducted in the UK, Angela Druckman and Tim Jackson point out empirical relations between lifestyles, energy consumption and carbon emissions. Referring only to income, they show that “[t]he poorest 10% of households use, on average, only 43% of the energy used by the richest 10% of households [...] The poorest 10% produce, on average, 45% of the carbon dioxide generated by the richest 10%.”⁸ With regards to individual groups of lifestyles, Druckman and Jackson distinguish “fuel-rich” and “fuel-poor” households. The latter includes the socially deprived group of lifestyles which are “constrained by circumstances”, who are most likely hit by fuel poverty, lying 21 percent below the UK mean for energy consumption and 20 percent below the mean for carbon dioxide emissions. Although socially less privileged groups in general have a lower consumption of energy (which actually could be considered as positive on the way towards a low-carbon society), their position on the energy market is feeble, i.e. in most cases they have to spend more on energy than households on a higher income (e.g. due to reminder fees because of delays in the payment of their bills). Moreover, they profit less from a liberalisation of the energy

6 | Brenda Boardman: *Fixing Fuel Poverty. Challenges and Solutions*. London: Earthscan, 2010, 168.

7 | Fritz Reusswig: *Ökologie und Lebensstile*. Frankfurt/Main: IKO, 1994.

8 | Angela Druckman/Tim Jackson: “Household Energy Consumption in the UK: A Highly Geographically and Socio-economically Disaggregated Model”, in: *Energy Policy* 36 (2008), 3183.

market because they change their energy providers less frequently than households on a better income and thus often keep paying higher rates.⁹

In addition, socially less privileged groups are notably more frequently hit by fuel poverty. The definition of a fuel-poor household generally includes those which have to spend more than 10 percent of their income on energy to heat their home to an adequate standard.¹⁰ In the face of the complex interplay of rising energy prices, stagnant or decreasing incomes, high levels of unemployment, processes that multiply casualisation and the slow rate of redevelopment of residential buildings in terms of improving energy efficiency, the problem of fuel poverty has become increasingly urgent in recent years. Low-income and/or fuel-poor households are frequently incapable of satisfying basic needs such as heating their homes adequately. These groups of energy consumers are vulnerable to the consequences of insufficient or insecure access to energy.

It has been estimated that within the EU, between 50 and 125 million people are living under conditions of fuel poverty, and these figures are predicted to rise further in the near future. Social and political awareness for this problem, however, is still relatively low and varies considerably.¹¹ From a scientific viewpoint, it is particularly obvious that there is a lack of studies investigating the matter from the perspective of the people concerned, focusing on their energy practices, conditions for action, and coping strategies.¹² The project NELA (German acronym for “Sustainable Energy Consumption and Lifestyles in Poor and at-Risk-of-Poverty Households”) takes exactly this stance, shedding light on energy consumption in low-income and fuel-poor households in the Austrian capital Vienna.

Before discussing the results of the research project in greater detail, the following paragraphs shall elucidate the theoretical basis of the project, providing an outline of the understanding of energy consumption in social sciences.

9 | Boardman: *Fixing Fuel Poverty*, 90.

10 | Druckman: “Household Energy Consumption in the UK”, 3178.

11 | Sergio Ernesto Santillán-Cabeza: *Opinion of the European Economic and Social Committee on Energy Poverty in the Context of Liberalisation and Economic Crisis*. Brussels: EESC, 2010.

12 | Boardman: *Fixing Fuel Poverty*, 174.

SOCIAL SCIENCE PERSPECTIVES ON THE COMPLEXITY OF ENERGY CONSUMPTION

For at least 40 years now, social sciences have been investigating energy consumption from various angles. In the 1970s, the energy crises raised awareness of questions about the development and the determining factors of energy consumption and efficiency. Consequently, the increased relevance of these questions also had an effect on energy consumption research; a scientific field which until this date had predominantly adopted a technical stance focusing on optimising efficiency. In the wake of the crises and subsequent to the discovery that identical households sometimes showed considerable differences in energy consumption, research started to include behavioural factors as well. It became increasingly evident that it is the people who consume energy, not their dwellings or devices.¹³

While research in this field had been dominated by psychological and economic approaches in the 1970s and 1980s, a genuinely sociological perspective started to prevail from the 1990s onwards. The emphasis thus shifted to the socially mediated nature of energy consumption and its socio-technical and infrastructural embeddedness.

Analyses rooted in economic approaches usually centre on income and energy prices, resulting in the finding that income and energy expenses are directly related. In absolute numbers, increased income entails increased expenses for energy, while at the same time, the share of energy expenditure in the total consumption expenditure decreases. Low income households consequently spend a larger part of their income on energy. If the energy prices increase, therefore, this could have an accelerating effect on the development of energy efficient technologies or stimulate higher demand for and investment in energy saving devices and measures. However, this does not necessarily hold true for households on a lower income, which tend to answer increases in energy prices with changes in behaviour (e.g.

13 | Elizabeth Shove/Loren Lutzenhiser/Simon Guy/Bruce Hackett/Harold Wilhite: "Energy and Social Systems", in: Steve Rayner/Elizabeth L. Malone, eds. *Human Choice and Climate Change*. Vol. 2. Columbus, OH: Battelle Press, 1998, 293.

reduced room temperature) rather than by investing in more efficient (but probably expensive) technologies or facilities.¹⁴

Along with income, other socio-demographic factors matter when it comes to evaluating energy consumption: For instance, a larger number of residents in a household signifies an increased energy consumption in total, while, at the same time, the per capita energy consumption decreases with growing size of the household. In fact, it has been stated that energy expenses also increase with the size of the dwelling. In terms of the differences between town and country, it has been shown that energy expenses are generally lower in urban areas with a higher population density.

(Socio-)psychological approaches offer insights into the relevance of factors other than economic ones, especially attitudes and values. However, it is debatable to which extent attitudes influence behaviour, as a large number of studies only discover small correlations between the two.¹⁵

From the point of view of sociology, individualist models of behaviour within different economic and psychological theories are often critically judged, as they disregard the social embeddedness of actions, thus understating the intrinsically social nature of energy behaviour. The starting point for sociology when analysing (energy) consumption is always a social contextualisation of different states of consciousness and behaviour. In contrast to individualist theories derived from the fields of economy or psychology, these approaches do not limit explanations for the agents' behaviour and actions to conscious choices but also include preconscious and unconscious behaviour and routines. There is a variety of social practices in households (e.g. cooking, heating) which strongly determine energy consumption but which are based on the 'performance'

14 | Don D. Dillman/Eugene A. Rosa/Joye J. Dillman: "Lifestyle and Home Energy Conservation in the United States", in: *Journal of Economic Psychology* 3 (1983), 299-315.

15 | Karl-Werner Brand: "Social Practices and Sustainable Consumption: Benefits and Limitations of a New Theoretical Approach", in: Matthias Gross/Harald Heinrichs, eds. *Environmental Sociology: European Perspectives and Interdisciplinary Challenges*. Dordrecht: Springer, 2010, 217-35.

of largely embedded everyday routines rather than being the result of conscious choices.¹⁶

It has frequently been pointed out in sociological research how deeply human behaviour is rooted in social milieus and lifestyles, and how social groups increasingly differentiate in the course of social change according to socio-cultural features they have in common. Attitudes and behavioural orientations should therefore be taken into account when analysing energy consumption, although this should not necessarily include a culturalistic de-valorisation of distinguishing social features. Orientations towards efficiency can differ widely among lifestyle groups, just as energy saving behaviour does. Therefore, different technologies can acquire various meanings, depending on their respective social contexts. According to their lifestyles, households thus display different behavioural patterns which can be termed distinctive “energy cultures.”¹⁷

Energy use, in most cases, is invisible and not discussed, silently accompanying everyday actions and routines. Therefore, awareness for the factors determining energy consumption can only be raised if lifestyle-specific ideas about what ‘home’ means (what is understood by comfort, a cosy atmosphere or hospitality), as well as their consequences in terms of energy (the ‘right’ lighting, a ‘pleasant’ room temperature) can be identified.

Apart from the internal social structure of a household, it is also the embeddedness of consumer behaviour in everyday life that needs to be investigated. The pragmatic, workaday life calls for viable solutions to the coordination of lives within time and space.

Patterns of consumption are also embedded in and influenced by social discourses about energy, the environment and poverty, just to name a few. These discourses, to a smaller or larger extent, determine the role models of our society, which in turn feed back into the legitimisation of certain patterns of consumption (cf. for example the public discussion about advantages and disadvantages of the prohibition of common light bulbs). In addition, it should be stressed that the scope of consumption could be limited, but also stretched by macro-structural trends in society (as, for

16 | Alan Warde: “Consumption and Theories of Practice”, in: *Journal of Consumer Culture* 5 (2005), 131-53.

17 | Margrethe Aune: “Energy Comes Home”, in: *Energy Policy* 35 (2007), 5457-65.

example, individualisation), political, legal and economic frameworks, the structures of production and supply, or technological developments.¹⁸

Thomas Berker rightly points out that the technical aspects of energy use are frequently neglected in analyses originating in the fields of social sciences.¹⁹ One possible remedy could be a socio-technical approach, focussing on the dynamic interrelations between technology and everyday energy use and including the constructed environment and infrastructural and institutional frameworks as well.

All in all, it can be said that energy practices are influenced both by resources and restrictions determined by the respective living situation (e.g. income, size of dwelling, facilities) as well as by attitudes, values, social and cultural norms, ways of leading everyday life, technologies, the built-in infrastructure of homes, and the complex interrelations between all of these factors, which are in turn influenced by discourses, infrastructure, institutions and social trends.

THE NELA PROJECT

The aim of the project NELA is to investigate energy consumption in low-income households in the Austrian capital Vienna.²⁰ The core of NELA is a comprehensive survey including qualitative interviews in 50 Viennese households afflicted by poverty. For purposes of comparison, ten more interviews were additionally conducted in better-off households. Research is based on the methodology of “Grounded Theory”, which focuses on the systematic development of theories directly from the

18 | Karl-Michael Brunner: “Ernährungspraktiken und nachhaltige Entwicklung – eine Einführung”, in: Karl-Michael Brunner/Sonja Geyer/Marie Jelenko/Walpurga Weiss/Florentina Astleithner, eds. *Ernährungsalltag im Wandel. Chancen für Nachhaltigkeit*. Wien: Springer, 2007, 1-38.

19 | Thomas Berker: “Energienutzung im Heim als sozio-technische Praxis”, in: Corinna Fischer, ed. *Strom sparen im Haushalt*. München: ökom, 2008, 175-92.

20 | The project is funded by the Austrian Climate and Energy Fund and is being administered by the Austrian Institute for Sustainable Development, in cooperation with the Institute for Sociology and Social Research at the Vienna University of Economics and Business, and the Wuppertal Institute for Climate, Environment and Energy.

data.²¹ The interviewers used an open interview guide, complemented by a questionnaire for eliciting socio-demographic data and information on equipment and infrastructure of the households. The criteria for the selection of interview partners were based both in socio-demographic characteristics and in their adherence to significant groups at risk of poverty. The interviews were transcribed and analysed according to hermeneutic methods and computer-based, qualitative data analysis. On the following pages, selected results of the project will be described, focusing on energy-related housing and living conditions as well as on energy consumption practices.

HOUSING AND LIVING CONDITIONS

A large number of households display conditions of more or less severe austerity because of their low income. Often, debts, lack of provisions and economising as a way of life are the order of the day. Adopting a modest lifestyle in various dimensions is frequently a necessary long-term strategy in order to cope with the situation. Asked about desired changes in their housing conditions, the interviewees often show low demands in their responses. Answers include, for example, an additional room which can be used as a bedroom so as not to have to spend the night in the living room. This could be interpreted as a manifestation of their habitus of necessity or modesty, respectively.²²

In recent decades it could be observed in numerous spheres of everyday life that the standards of what is considered normal with reference to energy consumption in our society have gradually increased (e.g. higher room temperatures, more marked hygienic standards, doing the laundry more frequently). Faced with these developments, many of the low-income households included in the survey react to the burdens they bear with a clear lowering of their living standards, adapting successively to conditions below the level of what would commonly be considered a 'normal' lifestyle. This becomes especially obvious in the case of people who have experienced a radical descent on the social ladder but are still trying to keep

21 | Anselm L. Strauss/Juliet Corbin: *Basics of Qualitative Research: Grounded Theory Procedures and Techniques*. London: Sage, 1990.

22 | Pierre Bourdieu: *Distinction*. London: Routledge, 1984.

up their former standards of normality. On the long run, however, this venture is bound to fail. A comparative analysis shows that financially well-situated households do not even think about some of the things that poor households already consider a luxury (e.g. heating all rooms of the house or taking a full bath). We will subsequently show that the subjectively perceived well-being is frequently adapted to a room temperature that is regarded as (apparently) financially affordable, not the other way round.

What is characteristic for many households is an attitude that already anticipates shortages and hardships. An unexpectedly high supplementary payment for energy costs, for instance, could severely exacerbate the often quite delicate financial planning – as much as a broken household device could cause great problems in coping with everyday life. Those who are tightly embedded in social networks (friends, family, social organisations) have less difficulty in managing their lives in precarious conditions and shortage of resources than those who cannot draw on these resources. Having recourse to supportive people or organisations is of immense importance as this can prevent grave consequences of any shortages that might occur (e.g. eviction or power cuts). However, feelings of shame frequently inhibit the activation of social networks.

The limited financial resources of most of the interviewees are also evident in their dwellings. The majority lives in blocks of council flats or similar blocks of flats for rent, in buildings that are often very old, badly insulated or not at all, with leaky windows and doors. Adverse conditions have a particularly strong impact when the flats cannot profit from ‘co-heating effects’ of the neighbouring flats because of their location (ground floor, external walls). Altogether, the scope of action regarding energy-saving practices is limited. Redevelopments of the housing stock are often delayed for years, especially in the case of private landlords, who see little need for immediate action. When redevelopments do take place, they are often welcomed by the residents, but also met with doubts and fears concerning possible rises in rent and running costs.

Income does not only limit the free choice of dwelling, but is frequently also reflected in household equipment and appliances. The furnishings and devices in most households at the lower scale of the income spectrum are often a mix of things – largely of a lower quality – that came with the flat, were acquired new or used, or were received as a present (mostly used). No matter how important a supporting social network may be, when it comes to household equipment it can help out in matters of basic fittings and the

replacement of broken devices. Often, old or out-of-use devices are given to households with a low income. From an energy point of view, however, these are unintended 'Greek gifts', as they are often defective or prone to defects and energy intensive. Old household devices could even represent a safety hazard: If they are defective but are not replaced due to financial straits in the near future, makeshift solutions or workarounds representing a health hazard are opted for in some cases. Makeshift solutions also have to be accepted even in the case that functioning appliances cannot be used because of power cuts. 69-year old Ms Reisinger²³, for instance, was forced to do the cooking with a gas camping cooker and 'lighting' her flat with a cheap, battery-driven camping torch for several months, as gas and electricity had been cut off in her flat. Short-term makeshift solutions, however, in some cases turn into long-term ones and become normality. When financial resources do allow the acquisition of new appliances, it is frequently the cheapest option that is purchased, implying less energy efficiency. In many cases, used devices are bought in second-hand shops or at flea markets, making the household fully functional again, but, on the other hand, also entailing diminished quality or additional repair expenses because of higher rates of failure.

For many households, high energy expenses or unexpected additional payments can cause tremendous difficulties. Even though different strategies are adopted in order to keep energy costs at a minimum and exploit every potential for economising, doubts always remain about whether the actions taken are really relevant to the problem. Frequently, they are due to a lack of feedback systems, as many of the people interviewed complained about the inability to evaluate their own attempts at saving energy. It is exactly in those households, however, that the interest in behaviour-related saving measures is particularly high, despite often already having reached the limits of their saving potentials. What remains as a source for feedback is only the annual statement, which often comes as a shock to the people interviewed – first and foremost in those cases where high additional payments jeopardise the already fragile financial management of the household. One of the major problems here is the large time gap between energy saving initiatives and the potentially resulting cost reduction. In fact, it is in most cases only the annual statement which shows whether the

23 | To safeguard the anonymity of the interviewees, fictitious names are used here.

saving measures taken have been fruitful. Moreover, it is difficult to relate single practices to the energy consumption they entail. In some cases, a lack of monitoring in terms of consumption could even cause people to refrain from using some of the appliances in the household, trying to avoid estimated high energy expenses, and opt for a service provider instead. The following example of one interviewee serves to illustrate this point: Instead of washing his shirts at home, he engaged the services of a dry cleaner since the singular payment for this service seemed more reasonable to him than the accumulated energy use of his own washing machine.

Since the liberalisation of the energy market one possibility for lowering costs is changing the energy provider. But even though some of the interviewees considered such a change it was ultimately rarely carried out. Changes of this nature demand certain defined conditions, and therefore are considered to be high-involvement decisions. Apart from actively procuring information (some households are not equipped with internet access), physical and mental resilience as well as a systematic approach to the matter are required. However, these conditions are not always sufficiently present in low-income households. Moreover, considering the market power of some energy providers, some people doubt that an unproblematic change of providers is possible. Accounts by acquaintances about difficulties in switching the provider confirm this worry, and many interview partners complained about the lack of transparency of service charges.

Disconnections are the order of the day for some of the interviewees: More than a quarter of the people interviewed reported having been disconnected, sometimes more than once, from the power supply due to non-payment of arrears. Frequently, the debts are settled within a few days after disconnection and the services are restored. Sometimes, however, the financial crisis continues, and the household remains cut off from energy services. In the most extreme cases this situation could even last for several years. The problems disconnections cause are manifold: Besides the obvious direct consequence of having to cope without electricity and/or heating, a number of additional direct (e.g. fines and charges) and indirect (e.g. spoilage of foods) expenses resulting from this have to be taken into account in households which are considered poor or at risk of poverty. Subjective consequences like “feelings of shame”, roused by the inability to afford a life in dignity with access to basic services, should be kept in mind here, too.

The analysis of housing and living conditions yielded a number of contextual factors which affect energy behaviour in poor and at-risk-of-poverty households. In the following paragraphs, empirical results focusing on two crucial energy practices will be discussed: heating and lighting. The central concern here is to describe the coping strategies²⁴ the interviewees adopt in order to satisfy the basic needs for warmth and light in their constrained situation of limited financial resources and restricted housing and living conditions (which could even be aggravated by rising energy prices).

HEATING PRACTICES

From an economic perspective, people at risk of poverty should be saving on energy costs because of their financial situation. This would be a rationally replicable measure in reaction to rising energy prices concomitant with stagnant welfare benefits or incomes. But the real heating costs for any type of dwelling depend on a number of factors that are often beyond the reach of the interviewees, as, for instance, the cladding of the building and its windows, the heating system, the location of the flat within the house, the size of the living space, but also the severity of the winter season. Households at risk of poverty characteristically have drastically limited possibilities for investing in improvements, which is why coping strategies here mostly consist of user behaviour.

Within the sample of 50 interviewees, a large number of different coping strategies could be identified and divided into strategies for efficiency and strategies for sufficiency, both of which are characterised by low investments. Therefore, what could be termed efficiency strategies are low-cost investments which allow for increasing the efficiency of the dwelling (e.g. windows) or appliances (e.g. water-saving taps). They include sealing leaky windows and/or covering them with thick protecting curtains, or installing window blinds, all aimed at preserving heat.

All actions geared towards reducing energy consumption through cutbacks and sacrifices can be considered sufficiency strategies. Among

24 | The concept of ‘strategy’ is not used in the sense of a purposive-rational action in the following, but mostly to indicate more or less reflected ways of dealing with the matter.

these strategies feature, for example, heating only the main living area or heating as little as possible during seasonal transition periods. Some of the people interviewed sat directly in front of the radiator in order to avoid loss of warmth. There were even cases of dwellings which had not been heated for several years.

In 21 of the 50 households included in the survey, the heating is turned on in only one room of the flat. This was found to be the most common coping strategy in order to reduce costs, especially in smaller flats, but was also observed in the case of larger ones. It mostly occurs when some of the rooms are not being used, or if the bedrooms are adjacent to the living room, and it is therefore sufficient to open the doors at night in order to facilitate heat circulation. This strategy is particularly popular because it permits to reduce the heating costs while at the same time still having one heated room.

In one third of the households, the cold part of the year also signifies having to put on various layers of clothing inside the house – that is, in most cases, at least two pairs of warm socks, sometimes even long underpants, and several layers of clothes on the upper part of the body. Being dressed like this provides warmth to people within the limits of their financial resources; however, it is rarely sufficient to reach the personal comfort temperature.

Another related strategy for coping with the cold inside the flat is ‘slipping under the covers’. Six of the people interviewed claimed this to be part of their practices for enduring cold temperatures. As with all the coping strategies quoted, there are many different possibilities of interpreting these practices: For some, the thought of slipping under their favourite blanket is a pleasant idea; others might feel considerable mental strain having to accept that going to bed is their only choice for fighting the cold.

31 out of 50 households adopt one or more of these three strategic options aimed at lowering the heating costs.

Including technological factors into the analysis expands the horizon of a socio-economic point of view considerably. Frequently, households are not able to generate a pleasant room temperature despite the fact that they possess the necessary equipment. Ms Leitinger, for instance, is forced to regulate her storage heating meticulously in order to evenly distribute the accumulated heat throughout the day. On extremely cold days, turning up the heating would result in a cold flat later in the day because the heating

would no longer be available after 4 p.m. Turning the heating down, on the other hand, would mean suffering from the cold during the day, but could at least stabilize the temperature at a lower level until the evening. Therefore, the heat stored by the technology used here is the determining factor for heating practices and coping strategies. Assuming that heating practices are not merely the result of individual rational decisions but are also influenced by processes of appropriation of the technologies in question, it can be asked how people actually reach an understanding of the functioning of the technology in place (e.g. heating, thermostat).

How this is dealt with shall be illustrated using the example of the accounting procedure for long-distance heating. The basic procedure here is as follows: Each radiator is equipped with an evaporimeter which measures evaporation. After the period of a year, the annual heat consumption is calculated on the basis of this data. Usually, this billing method does not influence heating practices. However, a number of the people interviewed try to comprehend this technology and the corresponding accounting method in more detail. Believing that the calculation is made for each radiator, even if it is not used, they deduce that their rate of fixed costs is too high. The truth is that fixed costs are calculated according to the size of the flat in square metres. Thus, in extreme cases, it can happen that radiators are dismantled or that the apartment is heated using only the minimum number of radiators in order to avoid evaporation on the others. This is based on the logic that fewer radiators produce lower heating costs. In the most extreme case, represented by Ms Milich, the flat is heated up to 28° C using two radiators in one room but none in the other rooms. This is thought to be an economical practice of heating, as several radiators remain turned off. What seems to be rationally justifiable from a subjective point of view though, can result in excessive energy costs. Often, reasoning and ideas other than economic ones can determine how people understand and appropriate technologies. Lay concepts about energy-related technology can play a major role in this.²⁵

Heating practices are also affected by social norms. This was corroborated by the interviews, particularly regarding one point: the norm which decrees that nothing should be wasted. Regarding heating, this norm is largely binding for the majority of interviewees: If heating the entire

25 | Willett Kempton/Laura Montgomery: "Folk Quantification of Energy", in: *Energy* 7 (1982), 817-27.

apartment is regarded as wasteful (or a luxury) it is often avoided, even if it would be technologically and economically feasible. Concentrating the heat in one room is an indication of a habitus that centres on avoiding waste, which often had already developed in the interviewees' original family or has been acquired over years of living in conditions of poverty.

Apart from cost calculations, individual approaches to technology and habitual dispositions, it is also people's attitudes which influence heating practices. If, for instance, low income and high ecological awareness coincide, the chances are high that energy saving is a target, and it could even occur that ecological motives predominate. A comparative analysis of the 10 interviews conducted in households with a higher income (more than 6,000 Euro monthly) reveals that sufficiency is clearly not an issue for them and that efficiency strategies are markedly less developed here. The heating is left on until an agreeable comfort temperature is reached throughout the whole flat. Warmth represents the norm in these households and does not receive special consideration. For many households with a lower income, however, heating is an issue omnipresent in everyday life, at least during wintertime. Incertainties about the energy consumption being too high and looming consequences in the form of disconnections and energy debts are constantly present in many households. This does not apply to well-off households. In general, the people interviewed do not want to spend too much thought on heating. It simply has to function and should ideally be programmed to start in advance, so that the flat is already comfortably warm when they come home from work. The dwellings of households with a higher income represent an oasis of tranquility, relaxation, and a place for leaving behind stressful everyday realities. Being comfortable in this place is crucial, and heating practices are adjusted to facilitate this feeling of well-being. Investing in efficiency measures or forms of renewable energy is the exception to the rule among the group of people interviewed in this survey, although most of the heating systems are older and technically not up to date. It therefore follows that greater financial possibilities do not necessarily entail investments in the area of efficiency, even in the face of rising energy prices.

LIGHTING PRACTICES

There are a number of studies that predict a continuing rise of power consumption from residential lighting in the future. On the one hand, this is attributed to the rising number of different types of smaller households which means that energy consumption for lighting is increasing per person due to the disappearance of co-use; on the other hand, changing needs regarding lighting and forms of usage are to be held responsible. Up to the present day, however, hardly any studies have investigated the consumption of light from the consumers' point of view²⁶, which is why the reasons for the rise still largely remain unknown.

As with heating practices, the example of illumination makes abundantly clear that energy consumption is characterised by an interplay of economic, social, cultural and technological factors. Lighting practices do not only depend on the location of the flat but also, for some part, on the seasons and times of the day and the resulting amount of daylight. According to the combination of these factors, the requirements for illumination can vary considerably. In the most extreme cases, a dense stock of trees in front of the window makes it indispensable to keep at least one source of lighting on when someone is present in order to allow for certain activities. The sample of interviews features a large number of dark dwellings, which entails an increased need for lighting.

Apart from the question of the availability of daylight, a large part of the requirements for lighting results from the necessities (factors for well-being) and activities of the inhabitants. If dimmed, indirect lighting is preferred for reasons of well-being and comfort; domestic tasks (reading, cooking, changing diapers, etc.) require different qualities and intensities of lighting. In this context, a large preference for brighter (and partly also more intense) light was noted; therefore, the ceiling lamp or frequently also additional sources of light are switched on.

Almost without exceptions, the results from this study prove the existence of a 'European' lighting culture, manifesting itself in the duality of the modes of illumination. 'European lighting culture' refers to the difference between 'brightness' and 'cosiness' with reference to lighting which has become apparent in intercultural studies. For example, the

26 | Mats Bladh/Helena Krantz: "Towards a Bright Future? Household Use of Electric Light: A Microlevel Study", in: *Energy Policy* 36 (2008), 3521-30.

differences between Japan and Norway that have been identified include a preference for one central source of light, suspended from the ceiling, which illuminates the room brightly in Japan, as opposed to a Norwegian preference for various smaller lamps spreading a feeling of cosiness. These cultural differences in lighting practices also have repercussions on the energy consumption: The consumption in Japanese households averages at 2.5 light bulbs per room; Norwegian households have an average of 9.6.²⁷

To cite one interviewee of our study, these dual modes could be termed “illumination for a purpose” and “atmospheric illumination”, respectively. The first refers to central sources of light, mostly suspended from the ceiling, which illuminate the room and are mostly connected with brightness, immediacy, glaring or artificial and cold light; sometimes, they are compared to the ambience of offices and associated with the corresponding tasks and activities (work) which mostly require bright lights. “Atmospheric illumination”, in contrast, provokes associations of decentralised sources of light, dimmed and indirect lighting, comfort, warmth, tranquillity, and romance. The latter form of lighting is in most cases perceived as being more pleasant and associated with ideas of a comfortable home. The results of the present study also corroborate that mood is a central factor for determining lighting practices.

The problem of the infrastructure available in the household, which is dated in many cases, also extends to lighting practices. Many of the people interviewed refer to light fittings that came with the flat or to lights they have become used to because they have been part of the household for a considerable stretch of time, and which are often seen as difficult to modify or regarded unsuitable for energy saving lights. Frequently, these fittings are chandeliers that are considered as having an extremely high consumption of power. However, even a source of light that has high-energy consumption, provokes aesthetic objections and is therefore perceived as problematic, can be integrated into the lighting practices within a prolonged process of domestication.²⁸ It could even be integrated

27 | Harold Wilhite/Hidetoshi Nakagami/Takashi Masuda/Yukiko Yamaga: “A Cross-Cultural Analysis of Household Energy Use Behaviour in Japan and Norway”, in: *Energy Policy* 24 (1996), 799.

28 | Thomas Berker/Maren Hartmann/Yves Punie/Katie J. Ward, eds. *Domestication of Media and Technology*. Maidenhead, UK: Open University Press, 2006.

into the fittings of the dwelling, inhibiting changes. Preferences for sources of light integrated into the furniture are frequent, be it kitchen lights, the lighting of small bathroom cabinets, or the lights of a kitchen hood. They are either used as additional sources of light (in the evening) or as the only source of light (e.g. when using the toilet). Forming part of the inventory of the dwelling, they thus immediately suggest themselves for this use, even if they are extremely inefficient in their energy consumption.

Efficiency and sufficiency strategies could also be identified regarding lighting practices. Starting with sufficiency strategies, modesty regarding lighting becomes evident in many interviews, manifesting itself in accordingly adapted lighting. One strategy, for instance, consists of using the potentially available sources of light only selectively or not at all. Thus, chandeliers are sometimes only equipped with a part of the light bulbs (if some of these have broken over time they are not replaced) to dim the light. This could be attributed to economic reasons, but could also be related to the intensity of the light (too strong) in single cases. Some of the sources of light considered as having excessive energy consumption are only used scarcely or not at all (e.g. neon tubes). Moreover, using small lights instead of larger ones or generally reducing illumination (using light bulbs with less luminosity or only using one instead of many sources of lights) also belongs to these practices. In many households, the light emission from a TV set serves as the only source of illumination in the evening, justified with the argument of being sufficient for the activities that accompany watching TV. Another frequent practice is combining the light emitted by the TV set with a second, smaller source of light.

Some low-income households use candles as an additional or the main source of light – sometimes for reasons of reducing illumination, sometimes because of the warmth of the light they radiate, especially in winter.

Another strategy that is tightly linked to the respective heating practices consists in only lighting one room – in most cases, the main living room –, thus benefiting from the light for the adjacent rooms (e.g. the bathroom).

A further strategy, corresponding to the widespread norm of not wasting energy, is the practice of switching off the lights when leaving a room. This is a central practice especially in those cases where children are being trained to save energy. The parents in these cases in turn refer back to their own upbringing when explaining the roots of this attitude. Often, this practice is being taken for granted and considered to be an evidence

of energy saving behaviour. However, some cases show the development of this attitude over time (e.g. in the case of a recent radical social descent) following a period of wasteful lighting.

Even if many of the people interviewed refer to more or less developed practices of reducing the lighting in their everyday illumination habits, there are many examples where a reduction is considered inadequate and a full illumination of the house is opted for. This seems to be the norm particularly in the presence of visiting friends or relatives: For visitors, the flat has to be bright and well-lit. Illumination, therefore, appears to be a way of showing respect, and brightness as opposed to saving money could be considered an indication of hospitality.²⁹

Despite a considerably developed consciousness regarding energy, Christmas lights could be quoted as another example of abandoning the norm of reducing consumption. Installing these lights signifies being able to participate in cultural celebrations without restrictions, and therefore permits feeling like an integrated member of society. However, a minority of the interviewees appear not to reflect on their lighting practices in spite of their restricted conditions, nor do they show intentions of saving or identifying potentials for economising in their households.

With regard to efficiency strategies, it might be of interest to ask whether affordable 'minor investments' (e.g. energy saving bulbs) which contribute to raising energy efficiency are carried out despite limited financial resources. As the results of the study show, a fifth of the people interviewed already shifted to using mostly compact fluorescent lamps; three fifth changed at least partly to energy saving lights, and the remaining fifth does not use them at all. Consequently, more than three quarters of the households are already equipped with compact fluorescent lamps, which reveals a strikingly high tendency in low-income households towards saving energy through affordable investments.

The differences between low and high-income households that became apparent from the questionnaires about household appliances reveal that low-income households are generally already trying to operate on a low energy level and to implement many potential measures for saving energy. While households with lower incomes have 12 lamps on average (ranging between 2 and 34), better-off households own an averaged 32

29 | Harold Wilhite/Loren Lutzenhiser: "Social Loading and Sustainable Consumption", in: *Advances in Consumer Research* 26:1 (1999), 281-87.

lamps (ranging between 22 and 46). In low-income households, the share of energy-saving lights comprises 24 percent of the lamps used, whereas households on higher incomes only show 18 percent on average. Eight of the poorer households even use 100 percent compact fluorescent lamps, but this was not found to be the case in any of the better-off households in the current sample. Whereas other studies have explained the use of energy saving lights with motivations rooted in cost and environmental aspects³⁰, the factors that clearly predominate in the impoverished households under investigation in the present study are mainly related to expenses.

CONCLUSION

The example of energy consumption in households with a low income and the problem of fuel poverty has served to illustrate the ways in which people from lower social classes deal with energy in the household and which difficulties rising energy prices, energy-inefficient dwellings and appliances as well as low incomes entail. Energy practices of better-off households were rudimentarily included for the purpose of comparison.

What is, then, the relevance of analyses such as these? From a social theory perspective the analysis serves to show how social inequalities become manifest in energy practices, contributing to the analysis of the connection between social differentiation and environmentally relevant consumption.

Politically, investigations of this kind are relevant in two ways: Firstly, policies and possible political measures for fighting fuel poverty could be deduced from the insights gained. The results of the NELA project clearly show that low-income and fuel-poor households are characterised by a number of energy burdens and related coping strategies. Regarding the structural framework, the factors that make households more vulnerable and are, at the same time, beyond the reach of their influence, were found to lie in inefficient construction features of buildings, heating technology and larger household appliances. Thus, if the structural framework mentioned here exerts a decisive negative influence on energy consumption and

30 | Rob Wall/Tracie Crosbie: "Potential for Reducing Electricity Demand for Lighting in Households: An Exploratory Socio-Technical Study", in: *Energy Policy* 37 (2009), 1021-31.

well-being, any measures to be taken would have to start from there. The study at hand reveals that these households have great difficulties in tapping their full efficiency potentials due to the cladding of the building, the heating technology and the household equipment. Smaller and cost-neutral efficiency potentials are often already being exploited to a large part (for example, by using energy saving lights). For further measures, however, financial resources are often insufficient, even if there is a recognised need for greater efficiency in the building. It is exactly from this point that measures for raising the efficiency of buildings and tools could start, offering solutions that are ideally as cost-neutral as possible for the people concerned. On the long run, refurbishing the entire building would be the most efficient way of lowering energy costs and preventing fuel poverty. Besides long-term strategies like these, however, additional short-term measures to effectively combat fuel poverty are necessary. To name just a few: energy efficiency funds for the replacement of old devices, energy counselling tailored to the needs of fuel-poor households, a power-disconnection prevention system, and monthly energy bills.³¹ The proposed measures should, however, not be implemented separately and in an uncoordinated manner but integrated into a (national) strategy for the reduction of fuel poverty.

As mentioned in the beginning, these analyses are also politically relevant in relation to the question of managing the transition to a sustainable energy system and ecological as well as social equality. In the discussion on climate change, 'climate justice' is increasingly becoming a relevant topic. A further focus of attention is the differences between various population groups and regions in their contribution to climate change together with the fact that they are affected by the consequences in different ways.³² A study from Israel on energy consumption and use of cars by private households, for example, calculated that the Israeli

31 | For further details see Karl-Michael Brunner/Markus Spitzer/Anja Christanell: "Fuel Poverty. A Case Study of Vulnerable Households in Vienna/Austria", in: ECEEE, ed. *Proceedings of the 2011 ECEEE Summer Study*. Stockholm: ECEEE, 2011, 2057-68.

32 | Robin Leichenko/Adelle Thomas/Mark Barnes: "Vulnerability and Adaptations to Climate Change", in: Constance Lever-Tracy, ed. *Routledge Handbook of Climate Change and Society*. London: Routledge, 2010, 133-51.

population with the highest income produces emissions that are 25 times higher than those of the population with the lowest incomes.³³

Sustainable politics should take these differences and related questions regarding the equality of distribution into consideration. It is necessary to test the effects of political tools (e.g. environmental taxes or trading systems) on socially and economically vulnerable groups in order to prevent pressure in the form of excessive costs on those which contribute less to the exploitation of resources anyway. In order for this to happen, however, it is necessary to obtain more data on energy consumption of different social groups.

To date, research on the socio-structural dimensions of energy consumption is still only fragmentary. In the face of the social challenges that climate change and the transition to a 'low-carbon society' entail, a more differentiated insight into energy practices of various social milieus and lifestyles is required. The project NELA has attempted to take a step in this direction.

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33 | Dan Rabinowitz/Carmit Lubanov: *Climate Justice in Israel*. Tel Aviv: The Association of Environmental Justice in Israel, 2011.

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