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Adapting Household Energy Consumption: How Consumers in Germany and Sweden Managed the European Energy Crisis

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By

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Abstract

Residential energy consumption in Europe is unsustainable, relying heavily on fossil fuels and contributing to climate change. The European energy crisis, as a naturally occurring experiment, disrupted energy consumption in households due to drastically increased prices and raised public awareness while creating a unique opportunity to study the dynamics of change in household energy consumption. Employing a qualitative research approach and drawing on social practice theory, this thesis examines changes in household energy consumption through 16 semi-structured interviews with participants from a variety of households in Germany and Sweden. The findings show that consumers actively reflect on and question household practices related to energy use due to the disruption. How and when practices changed were found to vary between households largely dependent on different meanings ascribed to the practices connected to social norms and conventions that strongly impact if practices change. Households responded to increased energy prices by employing either a shifting or reducing approach to modify energy-related practices, which was further influenced by structural factors. Notably, the use of technology facilitated practice changes by enabling the reconfiguration and temporal rearrangement of activities. The thesis concludes that, although awareness of household energy consumption significantly increased due to the energy crisis, to some extent, it remains invisible in everyday life. Nevertheless, when finding other ways of fulfilling expectations of comfort and well-being, consuming less energy in households is feasible. Supported by socio-material and socio-technological arrangements, results additionally show consumers' ability to adapt to renewable energy sources' variability. This indicates that transitioning to more sustainable household energy consumption beyond the energy crisis is possible.

Keywords: Sustainable consumption, energy consumption, energy crisis, social practice theory, disruptions to practices

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1. Introduction

1.1 (Un) Sustainable energy consumption

Everyday consumption is inextricably linked to environmental impacts, as industrialised societies are still dependent on fossil fuel energy sources. The connection between lowering energy consumption and climate change mitigation has been widely recognised for some time (Ivanova & Wood, 2020; IPCC, 2022). At the same time, the flexibility and freedom fossil fuels provide allow for resource-intensive lifestyles and mask energy use in daily activities due to the perpetual supply "regardless of the time, space and quantity of demand" (Järvensivu, 2017, p. 146). More than 75% of the EU's greenhouse gas (GHG) emissions are attributed to the production and consumption of energy (*Energy and the Green Deal*, 2022) while globally energy use in residential buildings accounts for about 11% of GHG emissions (Ritchie et al., 2020).

Decarbonising the residential energy sector is seen to be achievable by transitioning to a post-fossil fuels era of zero GHG emissions by adapting renewable energy carriers in the housing sector complemented by insulation and efficiency improvements (Mata et al., 2021). Mainstream policy approaches apply a technological perspective targeting individuals in terms of influencing consumption behaviour towards improving the efficiency of dwellings and appliances (Chappells & Trentmann, 2015). In this view, energy consumption is regarded as a residential consumer phenomenon taking place on the micro-level (Cheah & Low, 2021). Efforts to influence consumption from top-down include financial incentives, e.g., subsidies, energy tax deductions or credits, and non-financial incentives like information provision, product labelling, or other educational instruments (Slupik et al. 2021). However, scholars argue that policies focusing on energy efficiency serve to reproduce the status quo while failing to question the ways of life and forms of energy demand and supply it reproduces, thus working for energy efficiency "unwittingly binds us to an unsustainable future" (Shove, 2018, p. 781).

Unsurprisingly, efficiency improvements are often characterised as a form of 'weak sustainability', which describes incremental changes to individual behaviour falling short of initiating meaningful change in consumption patterns (Anantharaman, 2018). This calls for a

deeper understanding of energy consumption, the factors that influence it and what it takes to make it sustainable. Especially considering that most of our energy consumption is inconspicuous, invisible to us in our everyday life as it is deeply embedded in everyday practices including the routinized use of infrastructure and appliances (Shove, 2003; Watson & Shove, 2022). The IPCC (2022) WG III concluded in their latest report that mitigating climate change would require major transitions in the energy sector. Apart from switching to alternative energy carriers and efforts of energy efficiency this also includes energy conservation and working with demand-side management (IPCC,2022). Decarbonisation thus necessarily entails the reconfiguration of infrastructures and practices to ones that are considerably less resource intensive than what we are currently used to (Watson & Shove, 2022). Facing the sustainability issues of today requires bringing the inconspicuous consumption of energy out into the light (Shove, 2003).

1.2 Europe's energy crisis as a point of disruption

The European Union (EU) is highly dependent on natural gas imports from outside the EU, as production within the EU is declining (Chadwick, 2021). According to the EU's statistical office, the EU imported almost 90% of its natural gas in 2019, predominantly from Russia (Eurostat, 2021). As a result of Russia's invasion of Ukraine, in February 2022, and the changes in the energy market due to gas embargos and export stops, European electricity prices increased by 35% in 2022 compared to 2021 (Eurostat, 2022). A recent analysis by the IEA reports that the EU gas demand substantially dropped in 2022 viewing reasons for the building sector in weather effects, behaviour and fuel switches, and efficiency improvements partly influenced by governmental energy-saving campaigns (IEA, 2023). Governmental campaigns, e.g., the EU campaign under the slogan of "*Playing my part: How to save money, reduce reliance on Russian energy, support Ukraine and help the planet*" included recommendations about changing mobility behaviour, turning down heating and using less air conditioning at home, adjusting boiler settings in dwellings, and working from home (EU, 2022). With drastically rising energy prices, officially published emergency plans in the case of energy shortages and the possible

need for planned shutdowns to curb demand at peak hours, energy consumption has taken a step into the light and into the awareness of private households (BMWK, 2019).

The increased energy prices in the EU are also fuelling inflation and affecting other areas of life, such as mobility and food, illustrating the magnitude of the challenges residents are facing. The crisis can be viewed as a disruption of everyday practices, predominantly connected to costs for energy use in households due to the above-mentioned circumstances. According to Trentmann (2009) "most disruptions in social life are not as deliberate, nor do they turn the world upside down, but they disturb habitual ways of doing things." (p. 81). As the EU and its member governments took measures to ensure energy supply (e.g., by making new deals with other supplying countries and pushing renewable energy sources in the case of Germany), energy shortages and blackouts have so far been avoided. Due to the contemporary interdependence of technology and lifestyles, disruptions are deemed to be a part of daily life affecting quotidian rhythms while varying in severity of consequences, dynamics, and scale (Trentmann, 2009). Thus, everyday life seems to be temporarily fragile and elastic while people experience disruptions subjectively (Trentmann, 2009). Considering the energy crisis' effects, it is particularly interesting to investigate people's reflections towards, how they change their energy consumption in the light of this disruption, and whether it leads to more sustainable energy consumption activities, which has informed the aim of this study.

1.3 Perspectives on changing energy consumption

Recent studies in the field show that a variety of socio-demographic, economic, cultural, social, and psychological factors, such as income, age, gender and living conditions are regarded to influence people's energy consumption behaviour (Chen et al., 2017; Gardan et al., 2023). Findings show for example that people with higher income are more willing to spend more for pollution reduction (Chen et al., 2017; Gardan et al., 2023), that women consume electricity more responsibly than men (Gardan et al., 2023), and that older people and people living in rural areas lack knowledge about possibilities to consume more sustainably (Gardan et al., 2023; Chen et al., 2017). Placing individuals at the centre of attention originates from an understanding of consumption arriving from traditional economic theories that assume human agency and

decision-making to be rational and goal-oriented (Frederiks et al., 2015). However, they fail to take social dynamics into account while neglecting people to have several conflicting motivations and values to act upon (Corsini et, al., 2019).

Evidence from behavioural economics and psychology investigating daily life shows that people routinely deviate from rational choices, for example, in failing to recycle or avoiding using fossil fuel energy sources despite their environmental consciousness and concern (Frederiks et al., 2015). The discrepancy between pro-environmental values and the actual reductions in energy use is referred to as the value-action or intention-action gap (Frederiks et al., 2015). Although values, attitudes, and beliefs stimulate people "to save energy or adopt efficiency measures, people fall short in translating these into actions to reduce energy consumption in households (Frederiks et al., 2015). However, as Shove (2010) insightfully points out, the value-action gap "is only mystifying if we suppose that values do (or should) translate into action." (p. 1276, parentheses in original). She argues that this is a remnant of the ABC, - Attitudes, Behaviour and Choice, paradigm that assumes individual choice to be the driver of social change without considering the wider structures and systems in which consumer behaviour takes place. According to Evans et al. (2017), these systems and structures include the "role of infrastructures, institutions, routines and conventions in shaping (environmentally damaging) processes of consumption" (p. 1399).

In this respect theories of practice offer a valuable approach to studying (un)sustainable energy consumption as it aims to overcome methodological individualism in suggesting moving beyond the ABC, when understanding consumption (Shove, 2010). Shove (2010) argues that social practice theory (SPT) can guide critical lines of inquiry regarding systems of practices and the development of related institutions and infrastructures to analyse how more or less sustainable ways of life emerge and disappear. Furthermore, unlike models focusing on individual attitudes, behaviour and choice, a practice approach offers a good entry point to study ordinary and inconspicuous consumption, such as that of energy, as it is often invisible to us, hidden in everyday routines (Shove, 2003). Moreover, Halkier et al. (2011) argue that practice theories are useful for understanding consumer culture as "it helps us focus on the performative processes

of social life" (p. 10). Consumption as such, is deeply social and our practices are guided by social conventions restricting our choices (Butler et al., 2016).

Previous research on social practices has shown that household energy consumption is deeply connected to embodied understandings, norms and social conventions of comfort and convenience guiding our everyday practices (Shove, 2003; Gram-Hanssen, 2011; Hansen, 2016; Butler et al., 2016; Madsen & Gram-Hanssen, 2017; Madsen, 2018a & 2018b; Sahakian et al., 2020). Exploring how social norms and conventions, as well as material and technology, influence the performance of practices related to laundry (Shove, 2003; Jack, 2013; Sahakian et al., 2021), bathing (Shove, 2003) and heating homes (Shove, 2003; Hampton, 2017; Madsen, 2018a & 2018b; Sahakian et al., 2020; Wang et al., 2021), researchers have demonstrated the value of a practice theoretical approach for understanding energy consumption. Situating the performance of human activities at the centre of analysis while taking the context of the activity into account, practice theory aims to bridge the gap between structure and agency in social theory (Schatzki, 2001).

Thus, a social practice perspective critically addresses individual agency in consumption and takes into account the social and material configuration on which practices depend and are performed to uphold, making it a useful perspective to analyse energy consumption patterns. However, although several practice theoretical researchers have recognised the potential of changing energy consumption practices (Shove, 2003; Aune et al., 2016; Gram-Hanssen, 2011; Sahakian et al., 2020), how changes occur and how to potentially initiate changes remain an underdeveloped area of research (Jensen et al., 2018; Sahakian et al., 2021). Previous studies have investigated how change in practices has developed historically through socio-material configurations and conventions of comfort, convenience and cleanliness (Shove, 2003), gradually through increased awareness of climate change risk (Aune et al., 2016) and using experiments to analyse how residents can change domestic energy consumption (Sahakian et al., 2020 & 2021). Nevertheless, how practices change due to sudden large-scale natural disruptions directly affecting households and how this change spreads between interconnected practices is a novel area of research. Thus, the European energy crisis provides a unique and

compelling opportunity to study how household energy consumption changes which has informed the aim of this study.

1.4 Research aim and questions

As noted, current levels of energy use and demand in industrialised parts of the world, such as the EU are unsustainable, still being dependent to a large extent on fossil fuels. Thus, they require both rapid and significant changes to mitigate climate change (IPCC, 2022) and reach EU emissions targets for 2030 and 2050 (*Energy and the Green Deal*, 2022). Previous policies aimed at mitigating climate change through efforts of energy efficiency and models of rational consumer choice were unsuccessful in reducing energy use (Shove, 2018; Jensen et al., 2018) as they failed to take larger systems and social structures into account. Here SPT offers a valuable framework to study energy consumption as previous research has found that household energy consumption is intrinsically linked to social norms and conventions of what it means to live well (Shove, 2003; Sahakian et al., 2020; Watson & Shove, 2022). However, recent studies have also found reason to question the notion of energy cultures as resilient to change (Aune et al., 2016) and living lab experiments have found households capable of changing routinized practices related to energy use (Sahakian et al., 2021). The process by which changes in energy consumption can be initiated and spread between different practices, specifically due to sudden large-scale disruptions, is an area that requires further research.

The current European energy crisis and the consequently higher and more volatile energy prices and raised awareness of energy use this has entailed provides a unique opportunity to study household energy consumption and how change can be initiated, negotiated and sustained. Viewing household energy consumption through the lens of SPT in this thesis we consider the energy crisis and the drastic rise in energy prices that has taken place in Europe in the recent past, as a disruption of everyday practices that involve energy use. By looking at everyday household practices, *the aim of our study is to understand how and why household energy use changes in the face of large-scale disruptions and how these changes are approached and framed*. Further aiming to explore what this means for future possibilities for more sustainable energy consumption. We explore this aim through the following research questions.

RQ 1: How do consumers change their household practices in response to increasing energy prices and increased visibility of energy use?

RQ 2: What different approaches to the increasing energy prices do they develop?

RQ 3: What frames these changes and approaches?

We have chosen to explore these questions in two countries, Germany and Sweden, and among a variety of households to understand different approaches. Despite their commonalities as industrialised countries, these two states have distinct energy system structures, further explained in chapter two, which makes them a compelling subject for analysis and exploring differences in how household energy consumption changes. This work contributes to research on sustainable consumption in creating a deeper understanding of consumers' perspectives of domestic energy consumption. Further contributing to the field of SPT research in understanding how disruptions to practices can create changes in practices and possibly make them more sustainable. It is also valuable to policymakers to understand how and why energy use changes when creating policies aimed at reducing energy consumption.

1.5 Structure of the thesis

The upcoming chapters are organised in the subsequent manner. In chapter two, which is our *Theoretical Framework*, we explore how to define sustainable energy consumption and introduce the framework of SPT along with the concepts that we will use to analyse our empirical data. Chapter three contains a presentation of our *Methodology*, explaining our research approach, how we used semi-structured interviews to understand household energy consumption and elaborates on our choice of cases (Germany and Sweden). Chapter four presents our *Analysis* of the results of our study using the theoretical framework and concepts presented in chapter two, exploring how the energy crisis affected household practices, when and how they changed. Finally, in chapter five, we *discuss* how our analysis answers the research aim and questions, summarise our outcomes, draw significant *conclusions*, and reflect on the potential consequences of our research.

2. Theoretical framework: Social practice theory in household energy consumption

In this chapter we will present our theoretical framework that forms the foundation for our research and how we interpret our empirical findings. First, we will discuss how sustainable energy consumption can be understood and defined after which SPT as a theoretical approach will be explored followed by how it can be applied to the study of sustainable energy consumption. Finally, relevant findings and concepts from previous research on energy consumption using a practice theoretical framework will be expanded on.

2.1 Defining sustainable energy consumption

According to the UNEP, producing and consuming sustainably means "doing more and better with less" while "decoupling economic growth from environmental degradation, increasing resource efficiency and promoting sustainable lifestyles." (UNEP, n.d.). However, sustainable production and consumption is cumbersome as it is regarded as an umbrella concept (Geels et al., 2015). Although both terms are used jointly when discussing sustainable development goals, environmental policies regard sustainable production in terms of products and services including life-cycle assessments, and sustainable consumption interchangeably with consumer behaviour (Evans et al., 2017).

Sustainable energy consumption in terms of emitting less GHG on a household level includes using less energy in activities like heating and cooling rooms, cooking, showering, bathing and doing laundry (Evans, 2019). Perez-Sanchez et al. (2022) propose practical examples for residents to increase sustainable energy consumption, which, besides efficiency improvements of appliance use, include options questioning current ways of living (Perez-Sanchez et al., 2022). They suggest decreasing expectations of indoor temperatures, illumination according to the season, less frequent washing clothes, cooking simpler food, or chopping manually instead of using a blender while increasing the repairing, refurbishment, remanufacturing, and maintenance of old and existing appliances (Perez-Sanchez et al., 2022).

As the above-mentioned practical examples show, apart from adopting renewable energies, achieving sustainable energy consumption may also require changes in how we perform energy-related activities at home. The revived concept of sufficiency recently emerged in housing-related sustainable consumption research due to its potential to remove rebound effects arriving from efficiency improvements (Lorek & Spangenberg, 2019). Sufficiency describes equal access and a fair share for all personally needed energy services without compromising environmental impacts (Gaspard et al., 2023). It contrasts the efficiency concept by excluding demand and focusing on sufficiency measures decreasing thermal needs, limiting the size and use of appliances, and providing infrastructure to allow sufficiency to be possible (Gaspard et al., 2023). The concept thus calls for social innovation, as scholars argue that available technology results in rising expectations on everyday activities, like higher standards of cleanliness connected to more frequent use of washing machines (Perez-Sanchez et al., 2022). SPT can be used to explore these issues as will be discussed in the following sections.

2.2 Social Practice Theory

A 'practice turn' in research emerged as a response to behavioural and economic theories insufficiently accounting to explain the "rise, maintenance and disappearance of varieties of practice related to resource use in the home" (Browne et al., p. 182). In addition to opposing social theories such as individualism, as previously discussed, a social practice approach also confronts theories of structuralism and systems theory by not defining the social world through only individuals, structures, language or institutions (Schatzki, 2001). This builds to a large extent on the work of Pierre Bourdieu who criticised previous social theories for failing to adequately explain human action (Roth, 2000). Bourdieu and Giddens theoretically situate social action as a product of intricate interplay between agency and structure encompassing both social and material structures (Butler et al., 2016). Their conceptualization contrasts with the idea of individual motivation, rational decision-making, and linear processes of action arising solely from values and proposes the key to understanding human actions is to study practices (Butler et al., 2016; Roth, 2000).

Foundationally building on the theoretical work of, among others, Bourdieu, Giddens, Schatzki and Reckwitz, various approaches to social practices exist, sharing the aim to overcome the dichotomy between structure and agency in social theories (Sahakian et al., 2021). While humans are seen as active and reflexive, individual agency is not the central object of social theory as the social is continuously changing, built of interconnected activities and what they embody (Corsini et al., 2019). Instead, practice theories offer a way to understand social phenomena by studying human activities within social and material structures and how they are shaped by and in turn shape them. Viewing the social as "a field of embodied, materially interwoven practices centrally organised around shared practical understandings" (Schatzki, 2001, p. 12). Rather than focusing solely on the individual or superimposed structures (Corsini et al., 2019), practice theories view the field of practices in which human activities are performed as the focus of empirical study and the subject of analysis (Schatzki, 2001).

It is important to note that practice theory is no unified approach but encompasses several different views of what constitutes a practice and different understandings of the role of the body and materials in practices (Schatzki, 2001; Reckwitz 2002; Shove et al., 2012). Most theorists, however, agree that practices are assemblages of materially mediated and embodied human activities that are dependent on shared skills and understandings (Schatzki, 2001). A practice as a way of doing something, e.g., cooking or working, consists of several interconnected elements that form a routinized type of behaviour (Reckwitz, 2002). Reckwitz (2002, p. 249) defines these elements as "*forms of bodily activities, forms of mental activities, 'things' and their use, a background knowledge in the form of understanding, know-how, states of emotion and motivational knowledge*." The individual can here be understood as a carrier of practices, as an agent performing these routinized behaviours of knowing, understanding and bodily action (Reckwitz, 2002). Furthermore, as these are shared understandings, skills and know-how, the performance of practices is understood not only by the agent performing the practice but likely also by others within the same culture who share the same understanding, thus practices are inherently social but don't necessitate social interaction (Reckwitz, 2002).

Building on the different approaches of SPT introduced above, Shove et al. (2012) propose a simplified scheme to understand practices based on three elements: *Materials, Competence, and*

Meanings. As practices are intrinsically intertwined with the tangible environment, *Materials* refer to "objects, infrastructures, tools, hardware and the body itself" (Shove et al., 2012, p.23). The second element *Competence* combines various forms of understanding and practical knowledge based on what Giddens frames as practical consciousness or cultivated skill (Shove et al., 2012). Schatzki emphasises doings' future orientation by describing teleo-affective formations referring to arrangements that link various practices towards shared goals and organise participants' emotional involvement by providing overarching frameworks helping them to comprehend the endeavours they undertake (Welch, 2017). For simplifying reasons, Shove et al. (2012) treat the third element *Meanings* inseparable from practices. In this work, we lean on these three elements as a foundation to understand the constitution of practices while putting them into the context of various energy consumption practices in households illustrated in Figure 1.
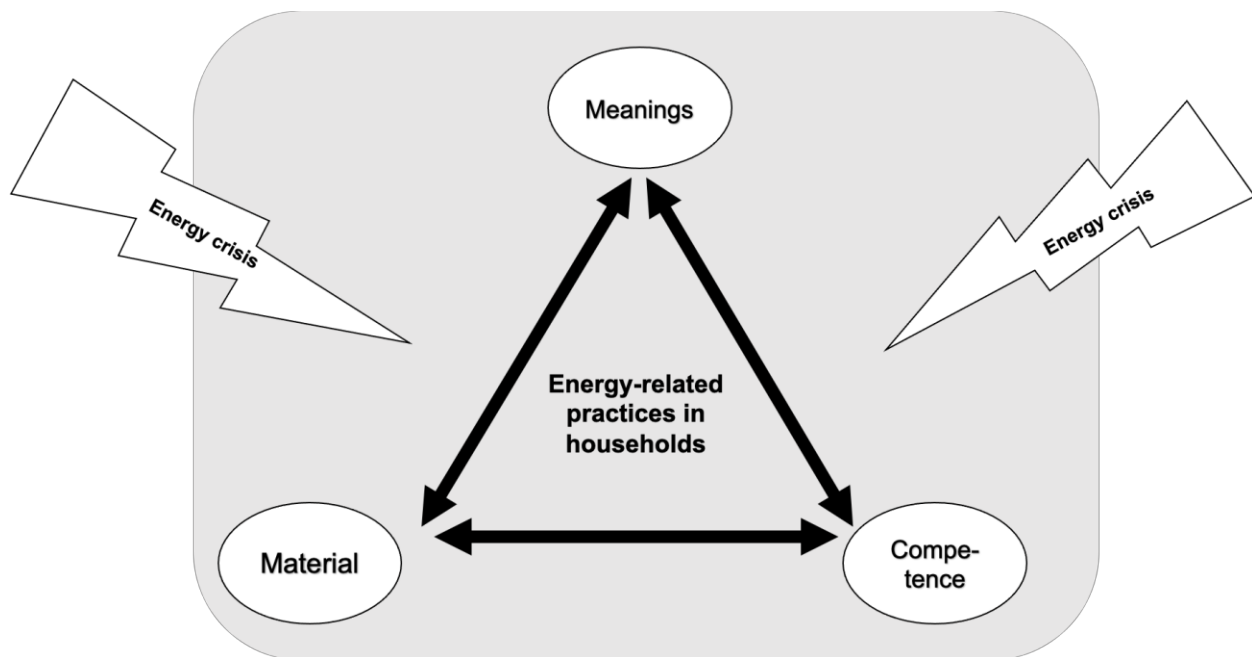

Figure 1: Elements of practice and disruption. Adapted from Shove et al., 2012.

2.3 Applying social practice theory to the study of (un)sustainable energy consumption

Studying consumption from a practice theoretical perspective Warde (2005) offers valuable insights into understanding consumption not as a practice or a goal in itself but as "a moment in almost every practice" (p.137) enabling practices. Similarly, Halkier et al. (2011) note that these processes necessarily entail some form of consumption, and that practice theory recognises the importance of these processes while simultaneously taking into account both the consumption and the cultural conditioning affecting consumption. Analysing consumption, we must consider both the practical activity and what it represents as "practices consist of both doing and sayings" (Warde, 2005, p.134). To understand consumption, we must therefore view it in the context of the everyday social life it is tied up in (Sahakian & Wilhite, 2014). In this respect practice theory offers a good entry point to study consumption.

Considering energy consumption from a practice theoretical perspective can still be challenging as it is related to many different practices where energy use is just one, often invisible, part performed through socio-technical configurations connected to the use of technology, infrastructure and information (Shove, 2003; Gram-Hanssen, 2011; Hansen, 2018; Watson & Shove, 2022). As noted by Gram-Hanssen (2014) "Energy consumption is not a practice in itself, but all the different things that people do at home which consume energy, such as cooking or washing" (p. 94). These practices must further be understood in relation to the common rules and collective structures they are a part of (Gram-Hanssen, 2014). To understand energy use we thus need to understand the material and social arrangements of practices in which energy is a part, and how these practices are carried out and reproduced in a society (Shove & Walker, 2014).

While SPT broadens the view on sustainable energy consumption focusing on practices rather than individuals as the level of analysis, the theoretical approach comes with some limitations. Whitmarsh et al., (2010) admonish individuals' exclusion when approaching sustainable consumption from a practice theoretical standpoint as it rejects individual responsibility. They stress that claiming SPT as the only legitimate view on sustainable transition should be alarming

"particularly when this view is one in which society must change but sees no role for citizens in directing or enacting this change." (Whitmarsh et al., 2010, p. 260). However, as previously noted, proponents of SPT acknowledge the role of human agency though it is not the focal point of the research (Corsini et al., 2019). According to Gram-Hanssen (2011) even if practice theory does not have an individualised approach "it is open for understanding how changes in practices may start in the everyday life of individuals" (p. 76). Thus, it takes individual agency into account and as argued by Schatzki (2011) the field of practices is a place where you can examine phenomena such as agency. In this thesis, we side with the views of Gram-Hanssen and Schatzki and aim to study the potential for changes in practices originating in individuals' everyday life.

Keller et al. (2016) mention another concern regarding SPT's practical applicability related to the difficulty of defining practices' boundaries and the point where practices interlock. Uncertainty about practices' interlocking hampers informing policymakers and practitioners where to intervene when aiming to increase sustainable energy consumption (Keller et al., 2016). This shows the importance of studying these connections. Nicolini (2016) argues that the only way to fully understand practices is to understand their interconnection through both time and space to study the conditions that enable and constrain practices. In energy consumption research studying these connections and understanding the contexts and larger socio-technical systems in which practices emerge is especially important. In this way, practice theory can be used to understand why changes that authorities and organisations try to implement may be unsuccessful and what components could create change (Gram-Hanssen, 2011; Shove, 2003).

Just as there are several versions of SPT there are multiple different streams of how SPT is used in energy consumption research. Our research builds primarily on the work of Elisabeth Shove and colleagues, Kirsten Gram-Hanssen and Marlyne Sahakian, who are prominent researchers in the field. In this thesis, we view the field of practices (Schatzki, 2001) where household energy consumption takes place as the subject of analysis. Looking at the interconnection of energy consumption practices (Nicolini et al., 2016), the material and social arrangements of these practices (Shove & Walker, 2014) and the embodied understandings, socio-technical and socio-temporal structures shaping and enabling them (Shove, 2003; Gram-Hanssen, 2011; Sahakian et al., 2021; Van Tienoven et al., 2017). Understanding energy consumption as a part of a diverse

array of practices and not a practice itself (Warde, 2005; Gram-Hanssen, 2011) to understand how and why energy consumption changes. The following sections outline learnings from previous research on household energy consumption employing a practice theoretical framework and important concepts that we will use to analyse our empirical material.

2.3.1 The role of comfort, cleanliness, and convenience

Understanding perceptions, expectations, and interpretations of comfort is crucial in comprehending energy consumption practices, as these factors significantly influence energy use (Shove, 2003; Madsen & Gram-Hanssen, 2017; Madsen, 2018a; Wang et al., 2021; Hansen 2016). Madsen's (2018a) Danish study of energy use in detached houses emphasises the importance of considering daily homemaking practices and social meanings of comfort associated with the concept of home. Wang et al.'s (2021) UK study further highlight how different meanings of home, changing over a lifetime, can significantly influence energy consumption. Meanings of hospitality and being a good host to guests and the meaning of a safe and comfortable home were connected to higher energy use (Wang et al., 2021). These results were also found in Sahakian et al.'s (2020) study which, by viewing the indoor microclimate as an artefact, further argues that indoor temperature becomes a symbol of social conventions and norms regarding comfort and convenience and in this way, household heating practices create a connection to the wider society.

Focusing on heating practices, several empirical studies confirm that, apart from varying between individuals, what is perceived as a comfortable indoor temperature differs between rooms in the house and how they are used. Most people prefer a higher temperature in the living room while accepting or preferring a lower temperature in the bedroom (Madsen & Gram-Hanssen, 2017; Madsen 2018a & 2018b; Sahakian et al., 2020; Moeller & Bauer, 2022). In a UK study of energy demand and working from home, Hampton (2017) found that interviewees used adaptive comfort practices such as wearing warm socks, drinking hot beverages, and moving their bodies to stay warm instead of increasing heating.

Although conventions often are regarded as the context in which practices take place and thus are understood as separate entities, they are rather perpetuated and transformed through the

continuous replication of social practices (Shove, 2010). Centring meanings and normality, most everyday actions are carried out because they conform to established conventions (Jack, 2020). While indoor temperatures connected to comfort and convenience are shaped by socio-technical systems, social conventions of cleanliness focus on multifaceted practices like showering, bathing and washing that go beyond mere functionality and encompass various dimensions of social life (Shove, 2003). Jack (2020) mentions that conventions of cleanliness are "intertwined with a host of co-conventions such as freshness, health, femininity, masculinity" (p. 331). Judging from its comparably low share of total household energy consumption, seemingly trivial laundry practices hold a significant value in comprehending transformations in relation to established and habitual practices (Sahakian et al., 2021).

2.3.2 The role of materiality and technology

Although material objects are hardly present in Bourdieu's and Giddens' work, they are featured prominently in the theoretical developments of Reckwitz and Schatzki and, as present above, a fundamental part of practices in Shove et al.'s (2012) three elements model. Social, technological and material factors are seen to influence how practices evolve as they create "the possibilities for and propensities towards particular ways of living" (Butler et al., 2016, p. 898). Thus, they enable and support certain ways of doing and relating to the social world (Butler et al., 2016; Shove, 2003; Keller et al., 2016). Material objects are central parts of many practices and the relationship between them and the agent performing the practice becomes a way of reproducing the social (Reckwitz, 2002). Shove et al. (2012) place the material element within practices as a part of the practice. The patterns of connection between the social and material are crucial to understanding "the dynamics of energy use" and "for thinking through processes of past and future transition" as high-energy lifestyles are reconstructed and perpetuated through socio-technical and material structures (Butler et al., 2016, p. 898).

Furthermore, the relationship between practices and technology requires specific consideration when employing a practice theoretical framework, especially when researching energy consumption. Gram-Hanssen (2011) argues that technology is one of the elements binding practices together and that practices and technology co-develop over time. She notes that "The

design of a technology makes some actions easier or more obvious than others" (p. 76). Even beyond the technological elements of the practice itself, practices are further connected to and influenced by larger socio-technical systems such as infrastructure (Gram-Hanssen, 2011). Similarly, Watson and Shove (2022) note how larger systems of infrastructural provision shape how practices develop over time, while practices also contribute to the development of infrastructure, thus they shape each other.

The socio-technical configurations shaping practices can create structural lock-ins and demand for technical know-how that if missing can lead to higher energy consumption. As discussed above, most people were found to prefer different temperatures in different parts of their homes. However, with modern building structures and heating technology, this is not always easily achieved, also affecting the residents' perception of comfort (Madsen, 2018a & 2018b; Moeller & Bauer, 2022). Moeller and Bauer's (2022) study on multi-apartment buildings in Germany discovered that highly insulated buildings produce thermal monotony resulting in undesirable adaptive behaviours such as tilting windows for long periods to achieve the desired level of comfort. Similar practices were found in Madsen's (2018a & 2018b) study of detached low-energy houses in Denmark. These adaptive practices can lead to higher energy consumption than planned. Unlike deliberate rebound effects, this added energy consumption results from technological and structural lock-ins based on estimates of thermal comfort embedded in building structures affecting residents' practices.

To summarise, we have here shown the important role that material objects play in social practices and how they influence the ways in which people interact with the social world (Reckwitz, 2002; Shove, 2003; Shove et al., 2012; Butler et al., 2016). The relationship between practices and technology is further demonstrated, showing how practices and technology co-develop over time (Gram-Hanssen, 2011). As demonstrated, the socio-technical configurations shaping practices create structural lock-ins and demand for technical know-how possibly leading to higher energy consumption and undesirable adaptive behaviours (Madsen, 2018a & 2018b; Moeller & Bauer, 2022). This highlights the importance of considering the different materials, technologies, and infrastructures related to practices under study and how they affect the relationship between practices and the possibility of change. In relation to these socio-

material and socio-technical aspects of practices, the influence and configurations of temporal aspects will now be further explored.

2.3.4 The role of time and technology

The social organisation of everyday life is reflected in the temporal patterns of daily practices. Van Tienoven et al. (2017) argue that routines are consciously adopted and structured around a series of regular activities, all of which rely on a shared understanding of normative temporal frameworks. Furthermore, social challenges of coordination, reducing time spent on activities and greater control over personal schedules create perpetual demand for convenience and convenience technologies (Shove, 2003). Consequently, rather than being independent of time, everyday life is fundamentally intertwined with it, as time is created through the habitual daily actions that characterise social order, rendering it a socio-temporal phenomenon (Van Tienoven et al., 2017). Temporal rhythms are ordered and re-ordered, which creates several simultaneously existing and overlapping routines of working-, shopping-, eating-, and laundering times that are made and remade daily (Southerton, 2009).

Consumer theories describe a shift from a production and work low-energy society to a consumption and leisure society in which, e.g., convenient technologies and work-life balance approaches attempt to compensate for the acceleration of contemporary life (Southerton, 2009). Carrying out practices must be consistent in their allocation of time, alignment with cultural norms, and the utilisation of existing infrastructure (Pérez-Sánchez et al., 2022). In addition to how people address the intertwining of time and the social organisation of daily life, materials play an integral part in shaping practice temporalities (Spurling, 2021). Spurling et al. (2021) highlight the significance of materials' combination with temporality in the analysis of daily energy consumption practices such as laundry, keeping warm, and staying clean.

2.3.5 Changing practices

The embedded notions of comfort and convenience in energy consumption and energy cultures as illustrated above, makes practices related to energy consumption resilient to change (Aune et al., 2016; Butler et al., 2016). This underlines the importance of understanding the practices involved in creating a safe and comfortable home and the socio-material structures supporting

them to understand the energy consumption these entail and how this may be changed to become more sustainable (Madsen, 2018: Butler et al., 2016; Aune et al., 2016).

As noted by Sahakian et al. (2020), perceptions of what it means to live well and practices of how we dress indoors and how we stay warm have changed over time. Indoor microclimates may appear natural but are really an anthropogenic creation built on social constructs, culturally accepted practices and political standardizations (Sahakian et al., 2020). Average UK Indoor temperature levels, for example, increased dramatically from 11 to 17 degrees C between 1970 and 2010 during wintertime in the UK due to changing perceptions and use of the home, structural provisions and policies (Chappells & Trentmann, 2015). Shove (2003) also argues that the reproduction of standardised indoor temperatures creates norms and expectations of what is to be considered a comfortable indoor temperature, which further shapes how people dress and act in this environment. However, it is possible to challenge this normalisation as Sahakian et al. (2020) found that people appropriating[1] a lower indoor temperature at home become more sensitive to other indoor microclimates and experience previous 'normal' temperatures as uncomfortably warm. Thus, indicating the feasibility of reconsidering standards of comfort and heating.

Moreover, Aune et al. (2016) showed that the growing public awareness of climate change and associated risks in Norway problematized the previously unquestioned view of the country's energy supply as clean and abundant. This led to a sense of ambiguity and guilt around energy consumption for comfort and convenience, resulting in small but noticeable changes in energy consumption. Thus, challenging the inherent resilience and resistance to change in energy cultures (Aune et al., 2016). Sahakian et al. (2020) further argue that by materialising the indoor microclimate as an artefact of consumption, it can reveal power relations, potential lock-ins and make the indoor microclimate into something political that can be challenged. This opens discussions of heating bodies instead of rooms and for more sustainable forms of energy use. These examples show how current energy consumption practices and the norms and

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[1] see Warde 2005 for a discussion of appropriating consumption

expectations they are founded upon can be challenged, consequently creating the possibility for change (Shove, 2003; Aune et al., 2016; Gram-Hanssen, 2011; Sahakian et al., 2020).

Understanding change in practices in general and related to energy consumption specifically, also necessarily entails considering the interconnection of practices (Gram-Hanssen, 2011; Jensen et al., 2018). No single practice exists on its own delineated from other practices but in a web or mesh of practices that can share elements and affect each other, thus change in one practice can lead to changes in another connected practice (Shove, 2003; Gram-Hanssen, 2011; Sahakian & Wilhite, 2014; Shove & Walker, 2014; Keller et al., 2016; Corsini et al., 2019). Gram-Hanssen (2011) argues that this is especially true for practices that share technology or engagement and that practices can change either by conscious reflection and engagement or by the process of naturalising new habits into routines. Therefore, studying the connections between practices is crucial to understand how everyday life consumer practices change (Gram-Hanssen, 2011).

Building on the three elements model (presented in 2.2), Shove et al. (2012) suggest that change and stability in practices can be studied by considering how links are made and broken between the different elements. In the expanded Figure 2, they illustrate how elements can exist without being connected (proto-practices) as elements of practices can be durable over time and thus capable of circulating between places (Shove et al., 2012). The second scenario illustrates how the severing of links between elements can cause the disintegration of practices (ex-practices). Furthermore, elements of practices are not just interconnected, they are mutually shaping each other, thus change in one element may cause change in another. Due to their situated and structured nature "practices are always in the process of formation, re-formation and de-formation." (Shove et al., 2012, p. 44).
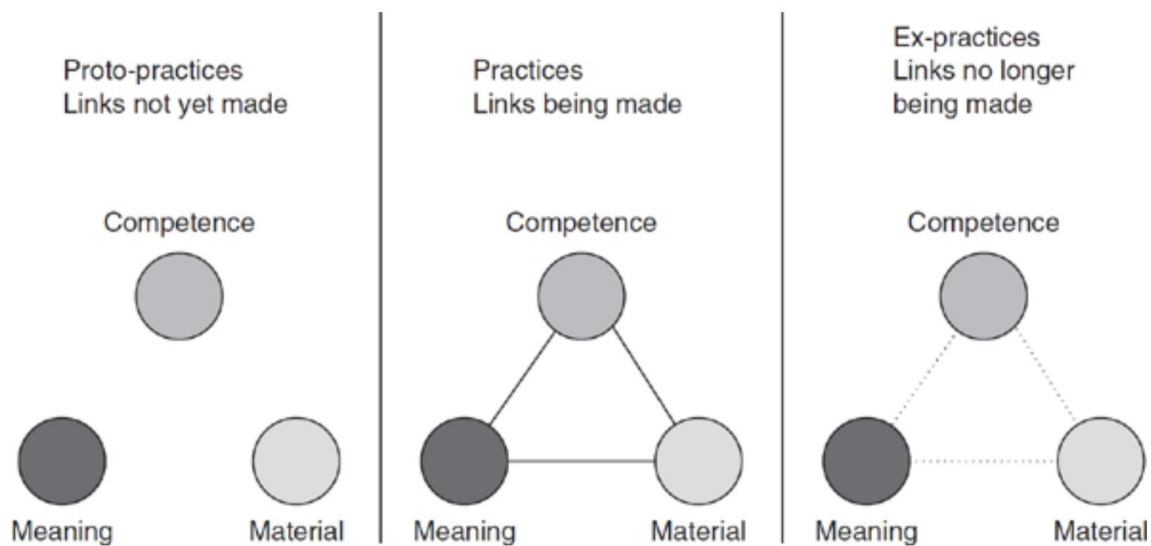
Figure 2: Proto-practices, practices, and ex-practices by Shove et al., 2012.

2.4 Summary

In this chapter, we have illustrated how SPT can be used as a framework to study (un)sustainable consumption. By examining how practices are formed, sustained, and changed over time while accounting for social, material, technological, and temporal factors, SPT can offer valuable insights into household energy consumption. We have introduced the three constitutive elements of practices - materials, meanings, and competencies - as conceptualised by Shove et al. (2012). Moreover, we have highlighted the importance of socio-technical, socio-material, and socio-temporal configurations in shaping practices, including infrastructure, social norms, and conventions. Further illustrating the significance of comfort, convenience, and meanings of home in understanding practices that are tied to specific physical and social spaces. Lastly, the interconnection of practices has been presented as an important factor creating opportunities and constraints for the adoption and diffusion of new practices, emphasising the complex and dynamic nature of social practices. Overall, using these concepts in our analysis, SPT provides a comprehensive and nuanced framework helping us understand how energy consumption practices are sustained, changed, and interconnected over time.

3. Methodology

The different practice theoretical approaches draw on commonalities from cultural theories constituting an interdisciplinary field of sciences which in turn requires epistemological and methodological reflections. Aiming to study how household energy consumption changes and how these changes are approached and framed in different households we employed a qualitative research approach that will now be further explained. Besides including a presentation of how the study was conducted, the following chapter discusses the epistemological and methodological considerations of the study including choice of cases, data analysis and ethical- and quality considerations.

3.1 Research strategy

Viewing sustainable consumption through the lens of practice theory, we are interested in the practical day-to-day activities in which people are engaged and continuously construct and maintain their social worlds (Silverman, 2022). As such we adhere to a constructionist ontological standpoint, departing from the belief that reality is socially constructed and continuously reconstructed through the practices and social actions of everyday life (Silverman, 2022). To understand consumers' developed approaches to changing their household practices in response to increasing energy prices we depart from a belief that practices differ among individuals who in turn can only be understood by being placed into a social context (Fay, 1996). We thus view household practices to entail varying existing realities that guide the individuals performing them in their everyday life (Gram-Hanssen, 2014). This view is situated in the epistemology of perspectivism which postulates that every epistemic endeavour is characterised as perspectival (Fay, 1996). Accordingly, we addressed our research aim openly and sensitively to allow an understanding of different views and analysed the data using a practice theoretical perspective (Fay, 1996).

We aim to identify and understand social processes and use a qualitative approach which is appropriate when trying to answer questions of why and how and when, and aiming to understand how people respond to situations and perceive things (Silverman, 2022). To gain a

comprehensive understanding of the participants' worldviews and to ground this in the relevant theoretical context, an abductive research approach was used. This approach involves a continuous process of reflection and iteration between theory and empirical data, allowing for a deep exploration of the diverse perspectives, languages, and meanings that contribute to the participants' worldviews (Alvehus, 2019; Bryman, 2016).

3.2 Research design

3.2.1 Choice of cases

The research was carried out in two countries: Germany and Sweden. The choice to include two countries was based on the interest to see if there were any differences in how households changed and framed changes in their energy consumption in different parts of the EU as the energy crisis affected all member states. A cross-national research design allowed us to study differences and similarities in approaches, thus, providing a perspective of both the local and the general processes (May 2011). Germany and Sweden were specifically chosen partly due to the accessibility of participants for data collection in the limited time frame of the thesis and partly due to their different characteristics of the country-specific energy markets and energy policies.

Germany strongly focuses on energy efficiency and renewable energy expansion in the housing sector while aiming to support households in reducing their energy bills by adapting energy-saving measures and the use of self-generated renewable energy (BMWK, 2023). The energy market is dominated by a few large utilities and their subsidiaries making it more challenging for households to find affordable energy prices (Deloitte, 2015). In contrast, Sweden's energy market is relatively decentralised with many small and medium-sized companies involved in electricity generation and retail (EI, 2023). This leads to greater competition and more price transparency, allowing households to compare prices and choose the most cost-effective energy provider. Germany and Sweden further differ in their smart metre rollout connected to real-time pricing. As electricity prices vary depending on the time of day, real-time pricing allows households to shift their energy consumption to off-peak hours and reduce their energy bills (Ambec & Crampes, 2021). While Sweden has a fully rolled-out system of real-time pricing,

Germany significantly lacks behind in the smart metre implementation in dwellings (Merino & Esser, 2021). Existing market structures and technologies compromise a country's energy infrastructure which in turn influences practices (see Gram-Hanssen, 2011). The mentioned infrastructural distinctions make both countries a compelling case when studying energy consumption from a practice theoretical approach.

3.2.2 Sampling strategy

A purposive sampling technique was employed to study the social phenomenon of changing energy-related consumption practices as this allowed us to find cases where the practices we were interested in studying were most likely to occur (Silverman, 2022). Participants who self-reportedly had changed their energy consumption were recruited to the study through personal networks and referrals. As we aimed to understand how this is addressed and framed differently among different households in Germany and Sweden respectively, we aimed to have a wide variety of household compositions and housing types in our sample. We considered people living in rented and owned; apartments, semi-detached, detached, and townhouses, as well as different household compositions, as we assumed these configurations to possibly affect how people address changes in energy consumption. Departing from our research aim and questions we used a sequential sampling approach starting with an initial sample and progressively adding to the sample (Bryman, 2016). This allowed us to critically reflect on our sample throughout the process and, compared to using a fixed sampling strategy or snowball sampling, allowed us flexibility to take into account new factors that emerged in our data collection to find a sample suited to answer our research questions (Silverman, 2022; Bryman, 2016). New factors included the use of technology, in particular tracking apps and smart metres to monitor and adjust electricity use, and life stages affecting how and why household activities related to energy use were performed.

3.2.3 Designing semi-structured interviews

When evaluating different methods to research our topic we considered the aim of our study, which is to understand how households change energy consumption due to the ongoing energy crisis and raised energy prices, and how they approach and frame these changes. We, therefore,

needed to gain access to people's views and the narratives they construct around energy-related consumption practices. To this end, open-ended semi-structured interviews were deemed appropriate (Silverman, 2022), as they encourage dialogue between the interviewer and interviewee, allowing for elaboration and clarification through follow-up questions, and a deeper understanding of how meaning is created in social life (May, 2011). This format also provides some structure for comparison between respondents while allowing respondents greater freedom to answer on their own terms compared to structured interviews (May, 2011).

We designed an interview guide in English (Appendix A), which was then translated into German (Appendix B) and Swedish (Appendix C). The guide was structured around themes from SPT and informed by previous research with questions focused on everyday practices relating to energy use. In the interview guide, we primarily included open-ended questions to give the interviewees freedom to express themselves, thus allowing for richer data collection (Silverman, 2022). Initially, two pilot interviews, one in each country, were conducted to test the interview guide and our interview technique as recommended by Bryman (2016) and Silverman (2022). With the insights we gained from these pilot interviews the protocol was further revised with some alterations and additional questions. However, as noted by Silverman (2022) in a constructionist model the research protocol is not as important as the interviewer and the interviewee "co-construct a version of reality" (p. 324). In our interviews the research protocol served as a helpful guide to keep the focus on our topic and research questions while allowing us freedom to follow the flow of the interview, occasionally asking questions in a different order suiting the context of the interview and focusing more on areas of particular interest to the specific interviewee.

3.2.4 Conducting semi-structured interviews

At the beginning of each interview, we took care to establish rapport with the interviewee, by initial small talk, explaining the purpose of the interview and that their participation was appreciated, also allowing them to ask questions (Leech, 2002; May, 2011). This served to establish trust and ensured that they felt comfortable with us as researchers, in expressing themselves and to allow the "interview to flow more freely" (May, 2011, p. 143). To this end we also considered the order of the questions (Leech, 2002), beginning with more general

background questions about the interviewee and what their thoughts are regarding the current energy crisis. During the interview, prompts, both formal (see Appendix A) and informal non-verbal prompts such as "uh-huh", were used to encourage interviewees to continue and expand further on certain questions (Leech, 2002). Similarly, questions asked in different ways were used to clarify answers and to provoke further thought and reflection on certain subjects (May, 2011). This allowed the interviewees to reflect and elaborate which was found very helpful. Additional follow-up questions regarding what family members and acquaintances did were sometimes also used to prompt the interviewees to further reflect on their practices (Hitchings, 2012). Towards the end of the interview, the interviewees were asked to consider future possible scenarios concerning their current and past experiences. This gave us further insights into how they reflected on their practices related to energy use, how they frame this and insights into what they considered important (May, 2011).

In qualitative interviewing, the number of participants cannot be predetermined as the aim is to gather individual accounts of social and shared practices, which depends on the findings (Cobern & Adams, 2020). We therefore employed an open approach to the interviews and continued data collection until we found the same findings repeated by interviewees after which a few additional interviews were carried out to assure that data saturation had been reached (Cobern & Adams, 2020; Silverman, 2022). This resulted in 16 interviews, 8 in each country, which is coherent with previous findings that for topics of limited scope, the number of interviews is usually between 15 - 20 (Cobern & Adams, 2020). The length of interviews ranged from 45 min to 1h 25 min with an average length of 61 minutes. The interviews were carried out separately in Germany and Sweden and were conducted in person, on Zoom or over the phone depending on what was most convenient for the interviewee. We did not experience any major differences in the different interview forms however in longer interviews (over 1 hour), regardless of form, it became apparent that the interviewees were becoming tired.

Considering the inherently interpretive process of translation (Al-Amer et al., 2016), we decided to conduct the interviews in the participants' native languages of German and Swedish despite some interviewees' ability to speak English. In addition to ensuring accurate expression and avoiding language barriers, it can also increase the comfort level for both interviewees and

researchers and allow for capturing of nuanced meanings conveyed through language-specific formulations such as metaphors, sayings, and proverbs (Al-Amer et al., 2016). To ensure full access to data in the analysis process all interviews were recorded and transcribed (Silverman, 2022). The interviews were transcribed verbatim using Trint software and manually verified at least twice for accuracy (Silverman, 2022). Then, they were translated into English using Trint and DeepL software and verified once again by listening to the recording while reading and correcting the transcript. Both the native language and translated transcripts were stored for transparency (Younas, 2022). Tables 1 and 2 provide an overview of the interviewees with the pseudonyms used in the analysis.

Germany			
Pseudonym	Gender, age group	Household	Housing type
Monica	Woman, 50's	Single household	Detached house, owned
Julia	Woman, 20's	Family with baby	Detached house, owned
Paul	Man, 20's	Couple household	Apartment, rental
Felix	Man, 30's	Shared Accommodation	Apartment, rental
Marie	Women, 40's	Family with young Children	Semi-detached house, owned
Florian	Man, 30's	Family with young child	Semi-detached house, owned
Tim	Man, 30's	Family with young children	Townhouse, owned
Jonas	Man, 20's	Couple household	Apartment, rental

Table 1: Overview of participants, Germany.

Sweden			
Pseudonym	Gender, age group	Household	Housing type
Elsa	Woman, 60's	Single household	Detached house, owned

Anna	Woman, 30's	Family with young children	Semi-detached house, owned
Maja	Woman, 30's	Family with young children	Townhouse, rental
Lars	Man, 50's	Family with older children	Detached house, owned
Alma	Woman, 30's	Family with young children	Detached house, owned
Per	Man, 60's	Single household	Apartment, owned
Anders	Man, 50's	Single household	Apartment, owned
Ebba	Woman, 20's	Family with young children	Townhouse, owned

Table 2: Overview of participants, Sweden.

3.3 Analysing the data

We view qualitative data analysis as a non-linear, iterative process that involves continuous reflection on the research, particularly when collecting and interpreting the empirical material in the light of theory (Flick, 2018; Bryman, 2016). As the transcription process involved listening, reading, verifying and additionally translating the content, we spent a great deal of time with the material while preparing the data for analysis (Rennstam & Wästerfors, 2018). SPT views human activities within social and material structures and how they are shaped by and in turn shape them as the fundamental unit of analysis for any practice (Reckwitz, 2002). Accordingly, our thematic analysis focused on the aspects shaping energy consumption activities in everyday life to examine how household energy consumption changes, the approaches that consumers develop, and the underlying framing shaping these changes. During the initial coding, we read the data with openness to certify not missing any valuable information before applying focused and selective coding (Rennstam & Wästerfors, 2018). Drawing on concepts from SPT, we identified more frequently used codes and sorted the data through analytical induction resulting in 35 codes (Rennstam & Wästerfors, 2018). These codes were further delineated into 3 overarching themes that provide the base of our analysis; *Reflecting on energy consumption*; *When practices change*; and *How practices change* with the subthemes *Shifting* and *Reducing*. For structuring the codes and themes we used the software ATLAS.ti.

3.4 Ethical considerations

Throughout the research process ethical considerations were continuously taken into account following the ethical guidelines as set out by the Swedish Research Council (2017). This primarily consisted of concern for the interviewees in terms of respecting their privacy, ensuring voluntary participation, obtaining informed consent and avoiding harm to participants (Swedish Research Council, 2017; Silverman, 2022; Bryman, 2016). All interviewees participated voluntarily and before each interview, they were informed of the possibility to withdraw or refrain from answering questions at any time during the interview (Silverman, 2022). This was especially important to make the interviewees feel comfortable because talking about daily routines can "entail the embarrassment of admitting you tacitly subscribe to ideas of 'appropriate' behaviour in ways that may feel uncomfortably revealing" (Hitchings, 2012, p. 62). Before the interviews, we also explained the purpose of the research and how the interview would be used to not deceive the participants (Bryman, 2016). The confidentiality of their personal information was further explained and at this point, we also received verbal informed consent for participation (Silverman, 2022). Considering potential harm to participants we judged that the nature of the research and the presentation of collected data in the analysis would not cause any damage to the participants' interests or well-being (Silverman, 2022). Throughout the analysis, pseudonyms were used to anonymize and ensure participants' confidentiality (Tables 1 & 2). In addition, we notified the participants that the interview transcripts and recordings would be deleted once the study was finished and reviewed.

3.5 Quality considerations

Using Interviews as a method to investigate social practices brings challenges which we as researchers need to be aware of to ensure data validity and reproducible results. Firstly, examining changed activities requires caution as people might feel offended by being asked questions about the alterations implying that they would misbehave (Hitchings, 2012). Further, people can feel uncomfortable when describing their routines, as it involves disclosing to what ideals of behaviour they tacitly subscribe (Hitchings, 2012) As the feeling of being offended presumably results from "the embarrassment of not being able to position yourself as entirely

the master of your actions" (Hitchings, 2012, p. 63), we attempted to overcome this by sensitively informing the participants about the interview questions to possibly sound trivial stressing that they know their activities best. At the same time, this encouraged participants to detach from their activities to reduce ambivalence as suggested by Hitchings (2012). Additionally, interviewing people about their routines bears the challenge of uncovering the difference between explicit formulations of the activity and what is actually being done based on the assumption that informants might construct themselves as moral agents when being interviewed (Martens, 2012). However, similar to Hitchings (2012), we found that people can indeed talk about their daily routines when being encouraged to detach from their actions, especially when these routines are brought to light. The increased awareness of energy activities in households, due to the high energy prices and public debate, provided a valuable opportunity to investigate alterations through interviews.

Qualitative research is often criticised for non-representative sampling and limited generalisability (Silverman, 2022). However, the goal of our study is not to make universal claims but to identify social processes (Silverman, 2022). Analytical generalisations based on theoretical concepts can provide a broader perspective on particular qualitative patterns but must be specific and context-bound (Halkier, 2011). Considering the unique dynamics and complexities of overlapping contexts, the findings can then be extrapolated to other instances (Silverman, 2022). Cobern and Adams (2020) similarly suggest that generalisability should not be discussed in qualitative research, but rather view results as being indicative or transferable. Accordingly, as this research is based on a case study of two European countries the findings cannot be generalised globally but could be transferable to similar contexts considering how household energy consumption changes. Furthermore, the socio-demographic characteristics of the sample need to be taken into account when considering the transferability of results to other circumstances. Transferability requires a focus on validity by supplying adequate information about the context in which the research is conducted (Cobern and Adams, 2020; Bryman, 2016). Accordingly, we have aimed to be transparent and provide detailed information about the data collection process, methodological choices, and research context throughout this thesis.

4. Understanding changes in everyday household practices during the European energy crisis: An analysis

In this chapter, we will present and analyse our findings using the theoretical framework of SPT and concepts presented in chapter two. In particular, considering the different elements of the practices, how they interconnect and the different socio-material, -technological and -temporal configurations that shape the practice. Viewing the energy crisis as a disruption to everyday practices, this analysis demonstrates how this disruption caused practices to be recrafted and reconfigured in relation to changing elements of the practices. As mentioned in the methodology chapter we have identified different themes in our empirical data that will be the foundation of our analysis. The themes consider how participants reflected on their everyday practices in the energy crisis, when practices changed - particularly concerning different meanings ascribed to the practice, how practices changed - based on different approaches.

As this analysis will go on to show, practices were viewed in a different light, changed in different ways and to a varying extent by the participants of this study. The first section discusses how participants reflected on their energy use and different motivations to change it in light of the energy crisis. The next section considers when participants were willing to change their practices with two major considerations identified in our analysis of the data, as participants considered the meaningfulness of the practice and its potential impact on energy consumption. In section 4.3 we further explore how consumers approach and enact change in the different practices, identifying two main approaches to energy consumption that we refer to as the Shifting approach and the Reducing approach. These different approaches led to different ways of changing practices with the material element of the practice playing a central role in both approaches. A summary of the results of the analysis will be presented in 4.4.

4.1 Reflecting on energy consumption

As previously noted, energy use is connected to a diverse array of practices in everyday life (Warde, 2005; Gram-Hanssen, 2014) which was also reflected in the answers from our interview participants. Increased awareness, due to the energy crisis, led participants to reflect more on

their energy consumption and where they could save energy. Thus, challenging the routinized everyday practices involving energy use, questioning different aspects such as knowledge, know-how and meanings of practices.

4.1.1 Increased awareness of energy use in the home

The European energy crisis has drastically pushed everyday energy consumption forward in the realm of public awareness. Raising awareness through public calls to save energy, governmental recommendations and regulations, tv-shows about energy saving measures, news reports of gas shortages and highly increased and volatile energy prices. Thus, to some extent, bringing the inconspicuous consumption of energy into the light. This increased visibility was reflected by our interview participants who described that they were now much more aware of energy consumption than before the energy crisis. One interviewee, Jonas, expressed it as a constant thing that he is now always thinking about how he can save more and what he could do differently in his home to save electricity, heat or hot water. He has thus started to actively reflect on his practices and question how he performs them. Something that is also illustrated in the below quote from Anders.

> Definitely, you are aware of the energy consumption in a completely different way and I have turned off a lot of things that were previously on 24 hours a day, perhaps without any use. - Anders

Similarly, Per talks about how he directly experiences the impact of the increased news coverage on the topic.

> The more it's written in the newspapers, the more it's talked about on the radio and everywhere, it's obviously influencing me to do more to reduce my own consumption as much as possible. - Per

Through these quotes we can see how the increased visibility of energy consumption and increased awareness has led to a process of conscious reflection regarding energy-consuming practices. This process was also mirrored by several of our other participants who expressed new ways of thinking about the different practices that involved energy use in their homes. In this way, the routinized performance of their everyday practices, (see Reckwitz, 2002), was challenged by the disruption of higher energy prices and increased awareness of energy consumption. Leading them to question previous understandings and ways of doing the

practice, relating to different elements of the practices. As noted by Gram-Hanssen (2011) the process of active reflection is something that may initiate change in practices which was also visible among our participants. As an example, Paul describes how thinking about energy use led him to reconsider how he does certain activities at home such as laundry and washing the dishes.

> You definitely waste one or two more thoughts on it, but that's also very good. It also sharpens the view of where unnecessary energy is being consumed. That is not a disadvantage. For example, if the washing machine is running, it should also be full. The dishwasher too. - Paul

The practice of washing dishes was also discussed by several other participants, Julia mentions that she washes more by hand now rather than filling up the machine with large pots as she might have done previously, as she considers this more energy efficient. Similarly, Elsa talks about cooking, saying that she now always "thinks twice" before using the oven because of its high energy consumption and instead tries to find other ways of cooking. This is also repeated by Anna who avoids using the oven as much as possible while Alma mentions avoiding using the deep fryer "Because it has felt unnecessary to use electricity in that way.". The increased awareness of energy use here changed the understanding of the practices which further led to a change or shift in the material elements. As described by Shove et al. (2012) we can see how change in one element leads to change in other elements of the practice, causing the practices of washing dishes and cooking to be reconfigured.

Furthermore, discussing the energy crisis and different household practices with family and friends was expressed as something new that helped several of the participants further reflect on how to recraft their practices. Ebba mentions comparing consumption with work colleagues to see if you can do something differently and Anders similarly notes that "You talk to each other and give tips and suggestions.". In this way, we can see how the shared skills and understandings encompassing the practice (see Schatzki, 2001) were also affected by the energy crisis, further reflecting the social nature of everyday practices (Reckwitz, 2002).

4.1.2 Motivation to change

The motivational knowledge which constitutes the element of practices enabling individuals to understand why specific practices matter and thus motivate them to participate (Reckwitz, 2002), was found to vary across the interviewees. Saving money, however, was found to be the initial driver for changing practices for many participants as the energy crisis affected daily life substantially. The quote below from Felix illustrates how the increased energy prices affected his household.

> I'll say, this has had a very significant impact on our everyday lives too [...] Simply because the additional costs are so high. And that's when I realised, okay, that definitely does something so fundamentally with the reality of life. - Felix

Having recently moved to a larger apartment the increased costs had a big impact on Felix's everyday life. Lars, Tim, Paul and Marie all similarly state the costs as their reasons for changing consumption and Lars expresses that "Maybe because you can't pay twice as much". Elsa also mentions increased costs as her primary incentive to reduce energy use and refers to "these insane bills you get", at the same time she notes that she has never been wasteful with energy.

> But also I have never been wasteful with it, because energy is something that comes from somewhere. It affects the climate and it affects everything. So it's nothing you're supposed to waste. I don't think so and I've never thought that. So it's well both for economic reasons and environmental impacts or climate impact. - Elsa

This reflects the dual motivations that were evident in several of our interviews when participants reflected on both personal and larger societal or environmental concern. For example, Jonas expresses concerns over resource scarcity and states that he doesn't want to "take anything away from anyone" and that his consumption shouldn't "destroy our planet". Maja takes it further by employing a long-term perspective pointing to the challenges of climate change illustrated in the following quote.

> You can't take as much as you want from our common resources. We have one planet and trying to live with as small a footprint as possible should be a starting point for everyone. It's no secret that we're facing some pretty big challenges and I think we should do our bit, actually. - Maja

Additionally, many participants expressed a feeling of solidarity and moral responsibility based on the understanding that by saving energy they would contribute to a larger cause. Jonas stresses that he regards changing his practices and saving energy as a way to oppose the "crime" and "injustices" resulting from Russia's attack on Ukraine. Further, Monica states that she wants to contribute in terms of ensuring "that the energy stores are always filled and everyone has enough" and stresses that one shouldn't "use up resources senselessly just because we can." Alma also says that her motivation to not use electricity "unnecessarily" is based partly on financial reasons and partly that they in societal terms want to "contribute where we can." Per, on the other hand, notes that the increased costs don't affect him but that he is, similar to Monica, driven by moral reasons to contribute.

> But just common sense tells you that you shouldn't waste things just because you can or because you can afford it. And that's kind of the motto I live by as well when it comes to energy consumption and also other things, maybe. Trying to make as small an imprint as possible [...] And I think it goes without saying that the less finite resources we use, the smaller the problem will be for everyone. Globally and locally. - Per

These participants can be seen to reflect on aspects related to the concept of sufficiency (Gaspard et al., 2023). Further, these statements show that the motivational knowledge people attach to participating or changing practices differed but was mainly driven by personal financial concerns and/or broader societal and environmental concerns. Nevertheless, as energy consumption is not a practice itself (Gram-Hanssen, 2014), the motivations above cannot be connected to a specific practice but were mentioned more generally by participants. Still, we can see that the various practices related to energy use at home share these various motivations as an element demonstrating how people view the problem of increased energy prices and their motivation to change practices.

4.2 When practices change: exploring the role of meaning in household energy use

Apart from recognising the variety of practices of which energy use is a part, these practices must also be understood in relation to the common rules and larger social structures where they

are carried out and reproduced (Gram-Hanssen, 2014; Shove & Walker, 2014). In our interviews we found that household practices involving energy use were strongly linked to the element of meanings in practices, which encompasses "the social and symbolic significance of participation at any one moment" (Shove et al., 2012, p. 23). Heating, showering and bathing, and cooking were the most significant household practices related to energy use considered by our participants. Social norms, structures and conventions were found to play a significant role here. The increased awareness of household energy consumption as described in the previous section led to new practical knowledge and understanding relating to the element of competence (see Shove et al., 2012) that was also used to decide if and how to change a practice. However, as we will show, if strong meanings were ascribed to the practice this was often found to outweigh other factors such as energy and cost savings. Sometimes this led to a form of negotiation between the meaning of the practice and the impact it had on energy use and thus its consequential potential for cost savings. This negotiation process was influenced by social norms and conventions regarding aspects such as comfort and related to feelings of well-being and expectations of a home.

4.2.1 Negotiating comfort and heating practices

In line with previous research (Shove, 2003; Hansen 2016; Madsen & Gram-Hanssen, 2017; Madsen, 2018a; Wang et al., 2021), we also found that varying perceptions, expectations and interpretations of comfort influence households' energy use, particularly affecting how participants changed their heating practices. Throughout our interviews, heating practices recurred as an energy-related activity that was changed by many participants in different ways. Several participants like Ebba and Anders lowered their indoor temperature, from previously above 20 degrees to a couple of degrees less.

> Because you don't have to have 20-21 degrees, maybe you just want it because it's a little more cosy, or a little more comfortable. But if we hadn't had this electricity crisis, we might have always had 21 degrees, but now we've had maybe 18, 19. - Ebba

Illustrated in the quote above, higher indoor temperatures are perceived as more comfortable which aligns with previous research (Madsen & Gram-Hanssen, 2017; Madsen 2018a & 2018b;

Moeller & Bauer, 2022; Sahakian et al., 2020). Some participants expressed a clear discomfort in having lower indoor temperatures. Felix had completely turned off the heating in his apartment, as a response to the increased energy prices. Despite being unable to describe the reasons why, for him to feel at home means to have a warm space that somehow differs from the outside.

> You have to get an apartment warm and it has to be warm everywhere you are. So when you go into an ice-cold bathroom, it just doesn't feel pleasant. It just makes sense that everything around you is just warm. I can't even describe that right now, but it has something about feeling at home and feeling cosy and arriving. And not just from the freezing cold outside to the freezing cold inside. - Felix

Several participants reported that to maintain a perceived level of comfort, after turning down or off heating, they used other adaptive measures, similar to what Sahakian et al. (2020) found in their study. Paul, for example, stated that instead of turning on heating he put on a sweater and long pants to save energy. Similarly, Ebba also dressed differently as a response to keep up a comfortable level of warmth during the night and used warmer pyjamas for her children.

Aside from putting on more clothes other tangible items were used to compensate for low indoor temperatures adding more artefacts to the material element of heating practices. Tim made himself a cup of tea "to stimulate [his] inner warmth" while Monica used a heated-up grape seed pillow to "feel good even when it's only 14 degrees in the room". Sheep sock slippers, in Lars' case, became a family Christmas gift:

> My wife actually bought as a Christmas present this year such sheep slippers or sheep sock slippers, something made somewhere [locally] that she found and thought was a great present for everyone. Really warm and nice, everyone shuffles around here in the house with those. - Lars

The meaning of the home being a comfortable place is further illustrated in how Florian strives to continue having a certain level of indoor temperature despite changing the material element of his heating practice from using gas radiators to a wood stove. His statement also shows the socio-temporal organisation of daily life as the temporal rhythm of his morning routine was re-ordered and overlapped with his previous working routine (see Southerton, 2009), as he got up earlier to turn on the wood stove.

> And then I got up in the morning and turned on the wood stove first thing at 5:45 a.m., so that when my wife and child get up, they have it nice and warm in the living room or in the dining room for breakfast. It costs me 20 minutes each morning until the oven burns. So I need 20 minutes longer before I can go to work. - Florian

Several other participants also reconfigured the material element of the heating practice, similarly, turning to more affordable heating sources. Like Florian above, Tim, Julia, Elsa, and Marie all began to rely more on their wood stoves to warm their homes. Marie explained that before the energy crisis, she had viewed the wood stove as a 'nice-to-have' item, appreciated primarily for its aesthetic value. However, in the current context, the wood stove became an essential element of their heating practice, as it provided warmth at a more affordable price.

> So we actually bought the oven just for the feeling. Simply because it is a nice thing to have an open fire. That's why we didn't use it as often. So maybe two or three times a month before the crisis. It was such a nice-to-have. To be honest, we don't even need it. [...] But now this winter, I'd say we've been using it 2 to 3 times a week. - Marie

Feeling cosy at home connected to expected levels of comfort thus remained necessary for participants to maintain. For Julia, turning off the heating was no solution as she is "not going to lower standards so much that it becomes unpleasant". In contrast to wood stoves allowing to keep up the expected level of comfort, added material to compensate was perceived as uncomfortable due to varying forms of bodily sensations as expressed by Marie.

> It wasn't the same, of course. Because you feel it differently on your skin. You feel pleasantly warm with clothes and blankets, but you can still feel the cold on the skin on your face, for example, or on your hands. It's a different kind of warmth, isn't it? - Marie

Similarly, Lars, who periodically turned off the heating entirely, states that despite using added material to keep warm, he still doesn't feel cosy. He even describes that in this case, the home as a place of safety and comfort (cf. Wang et al., 2021) lost its value:

> Then you don't want to be at home. So you don't feel like it. No, you don't want to be there. No, and you notice that, it's not that you: "yes, but now we're watching TV!", it's not cosy to sit there. Let's go to bed, yes, but it's freezing in bed. [...] There have been days when you don't want to be at home. You just feel, no, it's not fun there and you shouldn't feel that way. - Lars

However, other participants regard the change in indoor temperature as less problematic saying that they had gotten used to the temperature and planned to maintain it in the future even if energy prices would go down again. The following quote from Anders illustrates how he views it.

> Yes, I have lowered the temperature in the apartment by a couple of degrees so instead of having 20 plus, it's below 20 and you have to put on a sweater and a pair of pants instead. But the comfort is basically not affected because yeah, I get dressed instead of heating. [...] I think I would have continued to have a lower temperature in the apartment than before the energy crisis. Simply because you get used to it. I am used to wearing a sweater, I am used to having a slightly lower temperature in the bedroom so why should I increase the temperature. - Anders

We can see here how Anders found new ways to achieve his desired level of comfort and has appropriated a lower indoor temperature, therefore seeing no reason to return to previous levels of heating (cf. Sahakian et al., 2020) in contrast to other participants. As this chapter shows expectations of the home as a place of comfort supplemented by differing bodily sensations, affected if and how heating practices changed.

4.2.1.1 Being a good host - Social conventions of heating

Other practices related to heating that were also affected by perceptions and expectations of comfort were the social settings of hosting guests and of being a guest in other people's homes. This was mentioned by several interviewees in relation to everyday practices that involve energy use. Despite increased prices, Felix, Jonas, Paul and Elsa all mention that they turn up the heating at home when they have visitors. Felix and Jonas both say that they do this because the guests "should feel good" and Felix further states that "it should be a bit more comfortable here when there are visitors. So let's turn on the heating!" indicating that their tacit understanding, relating to the element of competence in practices (Shove et al., 2012), of what it means to be a good host requires them to heat their homes differently. Social norms here influence the performance of the practice of heating homes resulting in higher energy consumption, similar to what Wang et al. (2021) found in their study.

These differences in heating practices further illustrate that what the interviewees perceive as an acceptable level of heating and comfort for themselves, is not what they believe others find

comfortable. On the contrary, Julia describes that being a guest she doesn't have specific expectations of heating or temperature seeing it rather as the host's decision.

> When I visit someone, I will definitely not say that it is too cold for me or that the heating should be turned on. That is the decision of the host. I'm really happy when I just get another sweater or thick socks. [...] So when I'm a guest somewhere, I find I don't have the right to demand now how they should keep the room temperature. Just so that I feel good. Because I'll only be there for a few hours and then I'll leave again. [...] when you're a guest, you adapt to the circumstances there and comply with them. - Julia

This quote illustrates that the social conventions surrounding the different roles of being a host and of being a guest encompass very different expectations of comfort. Similar to what Sahakian et al. (2020) found in their study, we can see how the indoor microclimate here becomes a symbol of social conventions regarding comfort creating connections to wider society with implications for energy consumption.

4.2.3 Different meanings of showering and bathing

Showering and bathing were other everyday practices that most participants recognised as important in terms of energy consumption. However, whether they changed it depended on the different meanings they ascribed to the practice. Monica, Anna and Ebba previously bathed regularly but have since the energy crisis significantly reduced this and in Ebba's case completely given it up in favour of showering. Monica and Ebba also describe how they miss bathing and the feeling of relaxation it provided. Maja on the other hand has slightly reduced bathing and also describes bathing as "a source of relaxation that is so necessary" but says that even though she has considered its significance for energy consumption, she is not willing to give it up as the bathing is too important to her.

> No, I can't give in to that, I am a big consumer of water. [...] I think it's very important for me to feel good. That I have to bathe. And I have had problems with my back. But just to feel that you are in phase with the day and get that little moment for yourself. That is probably the most important thing, to come and get a little break from the family where you are, think your own thoughts, plan the day and land. Because without the baths, I'd go under. So on the whole, it can be a good investment. - Maja

It is clear here that the practice of bathing has transcended far beyond the mere functionality of the practice in terms of getting clean to encompass other dimensions of social life (cf. Shove, 2003; Jack, 2020) in this case connected to wellbeing, health and recuperation. Jonas also describes taking warm showers as something he doesn't do out of necessity but something that he looks forward to and celebrates, describing it as a moment of self-care and treating yourself. Julia similarly answers that hot showers are connected to her well-being, something she is not willing to compromise on. At the same time, she describes bathing as a luxury as it uses so much water which makes it wasteful and therefore something she usually doesn't do. We can here see how the practices of showering and bathing strongly link the elements of material and competence in the practice and how it should be performed, to the meaning and symbolic significance that is ascribed to it making it difficult to change for these interviewees (see Shove et al., 2012). Simultaneously, there is a clear negotiation between the meaning of the practice and its impact in terms of water and energy use illustrated by Maja referring to her baths as a good investment and Julia refraining from the luxury of bathing but not willing to compromise her hot showers.

Some interviewees further reflected on and questioned these meanings due to the energy crisis. The following extract from the interview with Felix illustrates the meaning of showering for him and how he reconsidered this and at the same time found other benefits in terms of timesaving.

> **Felix -** ""I'll definitely shower faster. I've already noticed that. I used to really like to take a long shower and now I notice that I'm already abbreviating that. In principle, that I am not now reflecting on my life in the shower while leaning my head against the wall and hot water patters over me, but that I say that this is not a feel-good moment, but that is now a necessity in order to be well-groomed afterwards. That has already changed. So standing in the shower thoughtlessly, I don't do that anymore."
>
> **Interviewer** - How does this change feel to you?
>
> **Felix** - That is feasible and it is also okay. In any case, I am wasting a lot less time as a result. But sometimes I also miss that moment in which I can say, okay, now I'm standing in the shower for a quarter of an hour or 20 minutes and collecting myself or reflecting on the day or simply following my thoughts. There is also something very meditative about that. I already miss that then. But overall, I

don't think it's restrictive. I notice that I'm done faster and I'm simply less lazy. It is a bit at the expense of this feel-good factor but in favour of the time factor."

Negotiating between the meaning he has ascribed to the practice of showering and the impact it has on energy use, Felix has reconsidered the meaning and views it no longer as a feel-good moment but as a necessity which changed the way he performed the practice. To compensate for this, he mentions finding other ways of achieving the moment of reflection and stillness he previously found in the shower, such as meditation. This quote further illustrates the practice of showering and bathing as related to the social organisation of everyday life and its temporal rhythms (see Van Tienoven et al., 2017). Similarly for Maja, as illustrated in her previous quote, the morning bath is a routine where she finds energy, a place for herself in family life and also plans the rest of her day.

Several other interviewees mention showering as important when meeting friends, going to work or for other social occasions, further illustrating how social conventions of cleanliness play an important role in the performance of the practice (see Shove 2003; Jack 2013 & 2020) and how it interconnects with other practices (see Nicolini, 2016). Florian, Anders and Ebba all note that they have reduced showering from once a day to every other day after the start of the energy crisis. While Anders and Ebba both describe this as a positive change, requiring only a short period of adjustment and something they plan to continue with, Florian says that he would like to shower warmer and longer again. Anders and Ebba can be seen to have changed the practice by naturalising a new habit as described by Gram-Hanssen (2011) while for Florian it appears to be more of a temporary change due to the energy crisis.

Overall, we can see from our interviews that considering the practices of bathing and showering regarding energy consumption and how it could be made more sustainable is a multifaceted issue. Apart from considering the social conventions and collective structures it is a part of (see Gram-Hanssen, 2014; Shove 2003), it requires considering what the practice is for. The practice of showering or bathing to get clean requires radically different considerations than the practice of showering and bathing for purposes of relaxation and recovery in everyday life and has very different implications for energy use.

4.2.4 The social significance of cooking in the energy crisis

Another practice that varied a lot among participants depending on meanings was the everyday practice of cooking. Interestingly we saw in our interviews that there was a noticeable difference in the narrative of cooking practices between German and Swedish participants. Most Swedish participants mentioned changing cooking to different degrees e.g., by using the oven less as mentioned above (4.2.1) or by cooking larger meals more rarely, which was mentioned by Maja, Ebba and Anders. In other cases, cooking was not seen as an energy-intensive activity and thus not considered in relation to the energy crisis, reflected by Lars' and Per's responses. Though they hadn't given much consideration to energy used in cooking activities, Alma and Per already had the same practice as Maja, Ebba and Anders now had adopted of cooking many meals at once and preparing for days ahead. Overall, the discourse of cooking activities in these interviews related more to the temporal coordination of everyday life than to the social significance of the practice. On the contrary, many of the German interviewees expressed a strong social significance of cooking and reflected on the importance of this practice in everyday life.

The following extract from Paul's interview illustrates the social values he ascribes to cooking as well as how he considered the activity connected to the energy crisis.

> **Paul** - But it was nice and also important to get together to spend time comfortably. I always associate that with cooking. Spend time together. It is something cosy and a treat. For me, this is one of the most important feelings in life. Enjoyment. If I don't have that, then I'm missing something. I notice this even if I haven't cooked for a long time or haven't taken the time for a long time. It's important for me to feel life, recharge my batteries, relax after a working day and also have conversations. I believe that cooking or eating together creates the best conversations. This is important for social life.

> **Interviewer** - Has anything changed in cooking since the energy crisis?

> **Paul** - No Absolutely not. I wouldn't change that either. Not cooking. I may have bought other products, cheaper products. But when it comes to eating and cooking itself, there were no changes. That was still important to me. But I didn't link that to the energy crisis either. Well, I didn't think that cooking less would save energy. This was saved by me under basic conditions. As a basic need. That was different when it came to heating.

In the same manner, Jonas states that he loves and values cooking and doesn't see it as an alternative to change it, also comparing it to heating he says, "Cooking is simply more important to me than heating". He ascribes enjoyment, fun, and taking care of himself as meanings of cooking and sees it as a socially important activity making him reluctant to change it.

While Paul hadn't considered the effects of cooking for energy use, Jonas had reflected on it and concluded that improvements only made marginal differences while the social values it held for him were much more important. Felix similarly describes cooking as something calming and relaxing, stressing the importance of cooking and eating together for the sense of community; he also goes on to say that "funnily enough, when it comes to saving energy, I hardly thought about saving energy when cooking". Despite considering the energy intensity of many other household activities and making changes in their everyday lives, the social value and symbolic significance of cooking overshadowed the possible energy and cost savings from this activity for these interviewees. The collective structures and social arrangements of the practice of cooking strongly influenced the performance and meaning of the practice (see Gram-Hanssen, 2011; Shove & Walker, 2014). Interestingly both Paul and Jonas compare cooking to heating, expressing that it is more important to them. Here the meanings of different practices are compared to each other illustrating the importance of studying the context of the everyday social life that energy consumption is tied up in (Sahakian & Wilhite, 2014).

The difference between the responses from the participants in the different countries could be connected to cultural conditioning (see Halkier et al., 2011) of cooking that affects the performance of the practice and subsequent energy consumption. Changes in how cooking practices were recrafted were also found to depend on how the participants approached energy savings with some participants time-shifting their cooking practices to save money and energy with the help of technological and material reconfigurations. This will be further elaborated on in the next section.

4.3 The dynamics of change in household energy practices

During our thematic analysis of the empirical material two main approaches to changing everyday practices related to energy use appeared. The first approach involved tracking and monitoring energy consumption, which then formed the base for planning and time-shifting practices to reduce energy costs. This approach relies heavily on technological and material arrangements of the practice, for many participants introducing new technological solutions that spanned across several practices and reshaped interconnections of different practices. The second approach focused more on a general reduction of household energy use to reduce cost, aiming to reduce use where possible through different measures such as turning off appliances, externalising consumption and finding new ways to perform the practices. The different aspects of the approaches will now be presented starting with the shifting approach and followed by the reducing approach.

4.3.1 The Shifting approach

This approach is largely influenced by and reliant on different technological solutions. Participants introduced new materials and technologies in the practices to monitor their energy consumption to identify areas of high energy consumption, reflect on practices and identify possible areas of improvement or change. This resulted in increased planning and organising of everyday practices to be more energy efficient, often by shifting the temporal aspect of the practice to times with lower energy prices. In Sweden, this depended on consumers having the possibility to adopt real-time energy pricing agreements and shifting practices to periods of low demand on the energy grid. This was not an option for participants in Germany, as the country has not yet fully implemented the application of smart metres (Merino & Esser, 2021). Instead, in Germany this was seen through installing photovoltaic (PV) systems and shifting energy use according to when they were able to produce their own electricity. The different infrastructural provisions in the countries thus created different conditions for the possibility of change, affecting participants' agency to act. In this way, we can see how infrastructure shapes practices and practices shape infrastructure through e.g., private energy production (cf. Watson & Shove, 2022).

In our interviews tracking electricity consumption was identified by several of our interviewees as an important technique to address the rising energy prices. Tracking consumption was primarily done by using different apps that were connected to smart metres and smart plugs throughout the home showing electricity consumption more or less in real-time. Ebba describes how the app they use sends them notifications when prices are especially high or especially low and explains how using the app made her reflect on how they use energy in their home.

> ...by getting these notifications and text messages from the app, you often think about; oh, it costs a lot right now, what do we do? How do we do it? What should we do better? So, there's a little more pressure to learn faster, to be a little better. Or a lot better. - Ebba

To manage costs during the energy crisis, Ebba switched to time-based pricing and monitored her household electricity usage with the app for greater control. Maja describes a similar scenario.

> Because before we had the average price. But then it became an hourly rate. And then when we also had the app for this, that's what you need to be able to predict and plan. I think it feels very good too because I think the price picture indicates when a lot of electricity is used. So, I think it feels very nice to be able to contribute to an equalisation in the system. That I don't contribute to consuming a lot when there is a shortage of electricity. - Maja

In addition to controlling the household's costs for electricity, Maja describes how using the app also allows her to contribute to a system equalisation and the feeling of solidarity this gives her. In this way, energy use, through the app, creates a connection to wider society (cf. Sahakian et al., 2020) and affects the social and symbolic meanings (see Shove et al. 2012) of how the practices involving energy use are performed.

Switching to real-time pricing agreements and tracking their consumption via apps was a common approach among the Swedish interviewees to cope with increasing energy prices. Additionally, Anders describes how he installed metered plugs on most of his electrical devices in his home, from the hot water boiler to kitchen appliances and the TV, to measure their individual consumption and be able to switch them on and off via his phone. Florian and Tim

from Germany also use apps and metres to track their household electricity consumption. However, in their case, it is connected to PVs they have installed on the roofs of their homes to produce their own electricity. Tim reports using his mobile phone very often to track what has been saved, how efficiently the system works and what changes when he turns on the stove. Florian describes his usage of the system in a similar manner.

> So, I can see our electricity consumption via the app. I can see what I'm feeding in, what I've used up and how much money I've saved per day - that is calculated automatically. [...] So when it comes to power consumption, I can almost see live what I'm using. It's very interesting because when you see the consumption live, you can search for which devices you can switch off. So, when consumption spikes up - e.g. The refrigerator, the freezer and so on and you have 800 watts of consumption - then you have to see why. - Florian

Likewise, tracking consumption is used by other participants to become more aware of energy consumption and what practices or equipment are particularly energy intensive to identify areas of improvement. Lars explains:

> I have my app and things like that and if I see, for example, that some days the consumption goes up, I'm a bit curious. What are we consuming here all of a sudden? If we have such an even consumption, maybe three kilowatts per hour, let's say. Then all of a sudden at 17-18 it rises to 5-6 kilowatts. What happened there? What is it that we consumed? - Lars

Anders further explains how the plugs he has installed made him question previous conceptions of where energy was used and identify what to focus his efforts on.

> And also, I have measured my refrigerator that I have which I thought used a lot of energy but which doesn't, versus my TV which I instead thought did not use energy but which does. Completely unnecessary. - Anders

Following this information Anders describes how he now makes sure the TV is never in standby mode anymore. Similar to Lars and Anders, Alma describes how she has used the app and a smart metre in her kitchen to keep track of their household energy consumption and how much electricity different things use.

> So yeah, because I have been a little bit worried that we have things that use electricity more than they need to. So that's why, during the fall and winter and so on, I've been in and checked quite a bit

just to see, in case there are things that stand out that you can't explain in any way, and then you could see when we turned off this old freezer [...] It made a very big difference. And then we have also previously had a small electricity metre that has been sitting in the kitchen where you can see directly how much electricity is consumed. Which has been quite fun. Just because now, you see that when you turn on the oven, yes, but then it uses this much. When you turn on the microwave, it uses this much. So, it's mostly just been because I find it a bit interesting to follow. I've looked quite a lot at day-to-day consumption. - Alma

Overall, we can see that the introduction of these new technological elements in everyday practices caused the participants to engage in more active reflection of their practices, initiating processes of change (see Gram-Hanssen, 2011). New knowledge and understanding of energy use further changed the element of competence (see Shove et al., 2012) in these practices. Furthermore, as indicated by the quote from Alma above, the addition of this technology was often perceived as interesting and fun adding motivation to further change energy consumption practices which contrasts with findings from previous studies showing declining interest in energy consumption data (Hagejärd et al., 2023).

4.3.1.2 Time-shifting practices

Participants who used real-time pricing or PV systems to a large extent changed practices by temporal rearrangement, shifting when the practice was performed. In some cases, this meant not reducing energy consumption but only costs. Tim reflects on his energy consumption and states "So my consumption hasn't changed, it's just shifted." explaining that by shifting his electricity consumption to times when his PVs produced electricity, he didn't actually reduce consumption but only adjusted when he used it. Others adopted a broader approach aiming to both shift and reduce consumption. We will see here how the new material and technological elements of the practices play a significant role in shaping the temporalities of the practice (cf. Spurling et al., 2021).

Maja, Anna, and Ebba all talk about using their apps daily to check prices during the day and for the next day to plan everyday practices. They mention the continuous use of timer functions on dishwashers and washing machines, so the machines only run when prices are the lowest. Anna says "Every time in the evening when the dishwasher is full, we check when it's the cheapest and

so we put the timer on, so it gets started then.". Similarly, they all plan their laundry routines according to when prices are low. Maja and Ebba have started to mainly time laundry during the night as they find prices usually are lowest then. All three also state that if prices are high, they would now wait with laundry until prices are low again. Maja describes the new laundry routines as follows: "It will be in batches depending on the electricity prices then, so it may be that it can stand still for a week or so.". Anna and Ebba who have adopted similar routines reflect on how this affects everyday life.

> We are very careful now to only wash when the prices are low. So therefore, it will be that sometimes you get to adjust your life after that, yes but now we can't wash this weekend because prices are very expensive this weekend so we will have to wait. - Anna

> Then some days it was very cheap all day and it was also very common that we did that. So, a whole day, just washing machine all day. - Ebba

On the contrary, Lars decided not to change laundry practices even though considering the possibility of time-shifting the practice he concluded that it doesn't have a large impact on electricity use and household cost. Furthermore, describing it as something you have to do indicates that he ascribes different meanings and understandings to the practice and how it can be performed.

> No, that is, admittedly the question comes up. Should we wash tonight, or can we wash? Is it cheap now? I don't know. I've read up on it, I don't know if I'm wrong, but that in particular, wash doesn't affect that much. [...] But nothing has happened. No, you have to do it. You have to do those things - Lars

Tim, however, notes planning washing in a similar manner as Ebba, Maja and Anna but based on when his PVs produce electricity.

> So yesterday we came home from the family weekend. The washing machine is then filled, but you then wait until the next noon to turn it on and don't wash in the evening, but really, when the energy source is at its best, that's when you wash. - Tim

In the same way cooking practices have changed for some participants, shifting the activity to times of day when prices were low. Anna, being at home, says she sometimes prepares dinner during the day when prices are lower and Maja describes a more extreme case:

> My partner has also been up cooking at four o'clock in the morning because there has been a cheap electricity price, so he has to get up and cook then. Making some meat sauce while he's still up, so very active. - Maja

One important aspect of time-shifting the practices is being able to control them, apart from using timer functions as described above, this was primarily done through apps and smart functions connected to different appliances. Tim describes how he turns on the dishwasher from work using his phone. Illustrating a re-ordering of the temporal rhythms of everyday life that causes practices such as working and doing laundry to overlap and interconnect in new ways (Southerton, 2009). Similarly, Ebba and Anders remotely start the heating before returning home from work or after a long trip, allowing it to operate only when necessary, instead of continuously like before the energy crisis. In this way, the convenience of the technology enhances their control over the practices and allows them to manage multiple activities simultaneously (Shove, 2003).

Apart from the time of day, the influence of weather also played a significant role in the temporal organisation of daily practices for several of our participants. They mentioned considering the weather in ways they hadn't done previously. This was seen in both countries and in different ways among the participants.

As mentioned above Tim plans laundry and dishwashing at times of day when they can get electricity from their PVs. Florian, who also has a PV system, further mentions how they have shifted the times they cook and bake to when the sun is shining.

> We bake our own bread. With the PV system, we are now doing this, of course, also during the day and preferably when the sun is shining, of course. So that we don't start cooking at eight in the evening when the sun is no longer shining, but that we actually do it at noon or in the afternoon. [...] That has definitely changed. - Florian

Comparably Maja describes how they monitor the weather to predict when prices may be low so they can bake pizza, a practice they identified as very energy intensive.

> For example, if we're going to cook, we don't cook pizza if the electricity is expensive, but then we keep an eye on the weather, if it's going to be windy then we know that it's pizza weather *laughs* so we can prepare for that. - Maja

Ebba on the other hand keeps an eye on the weather to adjust heating settings.

> It's more about looking at the weather and then setting the temperature limits so that they agree with how the weather will be. If it looks like it will be cold, you should set the limits so that the heat pump starts a little faster or a little earlier than when it is sunny and warm or not as windy outside. So, it sort of sets a slightly higher limit. - Ebba

This is a practice also employed by other participants. Tim mentions "So depending on the weather, there is sometimes less and sometimes more heating." Likewise, Anders mentions not turning on the heating if it is warm and sunny outside. In this way we can see that participants started adapting practices using energy to the weather in a new way, creating new links to understandings of how to perform the practice.

4.3.2 The Reducing approach

Participants who didn't monitor and shift their energy consumption were found to employ a more general strategy aimed at overall reduction in household energy consumption connected to not knowing what made an actual impact on consumption. This was done by different means throughout the home e.g., by unplugging and switching off devices, replacing appliances and in some cases externalising energy consumption outside the household.

4.3.2.1 Not knowing what made a difference

When not tracking consumption, people from both countries struggled to identify impactful measures to reduce energy consumption at home. Elsa says she has read about saving tips from official sources like her supplier and the Swedish Energy Agency but was confused by contradictory information about the actual impact the measures have on saving energy.

But at the same time I find it a little confusing there to read too, because one says something and the other says something else and I think about for example all the chargers you have, yes but they must not stay in the socket because they use some power and then someone else says no but it doesn't matter, it's so little, so yeah I don't know, how is it? - Elsa

Trying to handle the uncertainty due to contradictory information, participants used best guesses to reduce their consumption. For example, Jonas assumed that using the oven five minutes more wouldn't make a big difference while admitting he doesn't know for sure.

But the difference is also marginal. How much it ultimately amounts to. That is a guess. I don't know that. But I assume that's not that much. Whether I have the oven on for five more minutes or not. - Jonas

Julia also struggled to know what measures to take to reduce energy consumption. Her quote below further illustrates the problem many German consumers faced of getting an annual electricity bill thus not continuously knowing what impact their changes made on actual consumption.

Now the mode is that you try to save money and try to change something in one direction or the other and remember to turn off lights and so on. But when you look at the annual statement, okay, that all the factors have now only brought about a minimal improvement, then of course you have to sit down and think about what you can change more. - Julia

Felix, also from Germany, expressed similar concerns.

In the end, we talked about everything where it is possible in principle, from a hot shower to turning off the lights, and then we also said okay, we will now live a bit more economically and also make sure that we keep the costs as low as possible until we know for the first time what the real costs in the utility bill are. - Felix

Once again, we can see how the larger socio-technical systems play a significant role in shaping household practices. Despite information deficits, however, participants didn't shy away from taking various measures to reduce overall energy consumption.

4.3.2.2 Unplugging and switching off

Because of the inherent uncertainty of the reduction approach a wide variety of different measures were taken by participants to reduce their energy consumption. Unplugging devices like microwaves, mobile phone chargers, and televisions and switching off lamps and other devices not in use were common measures. Monica's quote below hints at the reduction approach's scope.

> I turn off everything I don't need. For example, the triple plugs on the sockets. Now I have a switch that I always turn off. The microwave too, I unplug it completely because there is such a digital clock on it that consumes electricity. When my cell phone is fully charged, I unplug the cable. The heating too, I only heat the rooms I stay in. When I leave the room, I turn the heating off again. In the bathroom, for example. Even in the bedroom. Just to warm up for a minute. And then I turn it off when it's warm enough. It's very handy. [...] I completely unplugged the television in the bedroom. Because it was also on standby. - Monica

Per also describes that he turns off his computer and lights to a greater extent than before, while Paul has gotten into the habit of unplugging the power strip and speakers on his desk since the energy crisis. Further, Jonas notes how he always unplugs and switches off electrical devices that are not used.

> Conscious decisions too, of course. I deliberately omit devices and I intentionally unplug the sockets and turn off the switch. Yes, that is the main thing. I always turn off the light. Yes, of course. - Jonas

Besides unplugging devices, participants increasingly turned off lights as a measure to reduce their consumption, like mentioned by Jonas above. Felix says that he now turns off the light in the corridor when he is inside other rooms and when leaving the room he is in. When noticing a burning light which is not needed, he runs after it to quickly turn it off. Similarly, Paul, Jonas and Elsa say that they now turn the lights on only in the room they are staying in while Elsa adds that she also doesn't turn on all lights in the room but only some. Further, Julia describes that while it was an active effort at first, turning off lights has now become habitual.

> I'm walking around the apartment and I'm just turning on and off the lights. It is now a habit to turn off the light when I leave the room. It was just more of a process in the beginning, until you always remember it and then remind each other a bit of it. It is now completely automated. - Julia

By switching off and unplugging the participants thus re-ordered how they performed everyday practices of charging devices and illuminating their homes to reduce their energy consumption.

4.3.2.3 Buying material and externalising consumption

Other ways of reducing energy consumption employed in the reducing approach involves changing how the practice is performed by e.g., externalising consumption outside the household and changing the material element of the practice by buying new materials that help to consume less energy. Felix explains that he bought a new TV, as he assumed his old one consumed much more energy. Julia also replaced her freezer as a result of reflecting on what to do to reduce energy consumption while Paul bought candles to compensate for heating less. Per bought low-flow shower heads while Jonas bought water savers after reflecting on hot water as a source of high energy consumption. Additionally, Jonas bought a portable solar panel which he placed in front of the window to charge a power bank which in turn provides energy for his mobile phone although he says it doesn't save much.

> I bought another portable solar panel that I would like to use. But so far, the sun hasn't been strong enough. This is a solar panel that can be attached to a hook on the window. [...] So if it works, it would be cool, then you could hang it there and charge the power bank to charge your cell phones. So it's not enough for more. But at least a cell phone charge would be possible. It doesn't save much, but it might be a good try in some way. - Jonas

Finally, as daily life usually includes being at different places related to work or hobbies, reducing energy consumption at home also took the form of externalising consumption to other places for some participants. Both Felix and Paul talk about taking showers at the gym more frequently after a workout, also using the sauna and taking baths there to save energy at home. Additionally, Paul spends more time at work rather than working from home as he regards this as a measure to save money. The practice of showering, bathing, and working for him thus changed in terms of its location allowing him to reduce energy consumption at home.

> In fact, I spent more time at work instead of working from home. Simply to reduce energy consumption at home and save money because I don't have to pay for the energy at work. - Paul

Illustrated in the examples above, participants employing a reducing approach creatively changed elements of practices based on best estimates and available information to reduce energy consumption while adapting to the higher energy prices. Practices were recrafted with new material elements and by changing the coordination of everyday life.

4.3.3 Shifting and Reducing

It is important to note that the approaches described above do in no way represent a hard divide but were identified in our interviews as the main ways of adapting to the increased costs of the energy crisis and changing household practices. As the level of monitoring and subsequent knowledge of where energy was consumed varied, individuals who primarily approached their energy-consuming practices from a shifting perspective could also employ a modus operandi connected to the reducing approach by aiming to reduce overall energy consumption as well. After considering their household energy consumption and attempting to find the best ways of reducing consumption and costs, all participants engaged in processes of planning and re-organising their daily practices related to energy use, as described in the different sections above. Some practices, such as switching off the lights, were adopted by most participants regardless of the overall approach even though many recognised the impact as trivial in terms of energy consumption. Furthermore, the opportunity to adopt either approach and to change certain practices also depended on larger structural factors creating conditions that could either limit or enable how practices change (Nicolini, 2016) such as adopting real-time pricing and time-shifting.

Furthermore, the structural properties of the buildings in which participants lived were noted as limitations by some participants. Per notes, the housing association to which his apartment belongs has attempted to lower the temperature in the entire building to decrease energy consumption and costs. However, due to the old building's structural properties, heating is distributed unevenly, leading to discomfort for some residents.

...there are things to do and we have also done so when it comes to how you distribute heat to the different parts of the house at the different ends. But there have been problems with that because we've tried to do that, to lower it centrally, as it were. And then, people in some apartments in some vulnerable places start to complain because then they start to get 17 degrees while the others have 20. - Per

The larger material structures here create limits to how changes can be made. Similarly, Florian, who as previously noted installed a PV system to produce electricity, found he was more limited when it came to changing the heating source of his home.

So a new heating system would also be an option for me, but I will have no choice but a gas boiler. For structural reasons. There is no distance from the neighbours in a terraced house to install a heat pump. And I also don't have a low-temperature heating system in the house. That means it will be a huge effort to retrofit it at all.[...] And then we don't even have enough electricity to convert to the heat pump. In other words, this is not possible in the house with the latest technology. - Florian

As indicated by these quotes the structural factors created lock-ins in terms of energy use that are difficult for individual consumers to break, thus creating a reliance on higher energy consumption.

Some participants actively reflected on the larger socio-technical systems affecting energy use and questioned whether their individual consumption mattered and if it had an overall impact on energy consumption and the energy crisis. Per expresses concern over the larger systems he cannot influence in the following quote.

There are a lot of things you can't influence in this. Look at the server halls, which are all there, look at mobile systems and that kind of new systems that we didn't have 20-30 years ago, which are popping up and increasing in scope and which I use like everyone else and which I may not be able to do without. I must have my internet, I must have my cloud storage and so on to be able to function in a society. I find it quite difficult to do anything about Microsoft's server halls devouring energy en masse. Not least because I lack knowledge about what I could do. Should I delete all my pictures from one drive or something? Would that improve things? Would it reduce energy consumption on a global perspective? I have no idea. - Per

A common feeling among our respondents was also to have done what you can and not knowing what else to do, indicated in the quote below from Anna.

Now we have looked over it very much. There's very little we can do to energy optimize at home. As I said, we have only low-energy lamps, we have an energy-efficient dishwasher, we have an energy-efficient washing machine. - Anna

These quotes illustrate how socio-technical and socio-material structures continuously reconstruct high-energy lifestyles (Butler et al., 2016). Further, they show that households' energy consumption is not detached from structural factors which in this case also differ between Germany and Sweden.

4.4 Chapter summary

In this chapter we have illustrated how the European energy crisis has increased the awareness of household energy consumption, making the inconspicuous use of energy in daily life more visible. This caused participants to actively reflect on everyday practices relating to energy use and question previous routinized ways of performing practices, thus initiating processes of change. If practices changed, to a large part depended on the meanings associated with practices in the form of social and symbolic significance and embedded understandings of social conventions of comfort, which were found to partly differ between the countries of the study and between participants. How practices changed varied based on different approaches, i.e., the shifting and reducing approach, which are shaped by larger socio-technical systems and socio-material structures. Practices changed primarily by reconfiguring and recrafting the material and technological elements of the practices and shifting temporalities in the performance of the practice creating new socio-technological, socio-material and socio-temporal organisations of everyday life and changing how practices interconnect.

5. Adapting household energy consumption: Discussion and Conclusions

In this final chapter we will summarise our findings, discuss how this contributes to previous research in the field and draw relevant conclusions as well as reflect on the practical implications of our research findings. Finally, suggestions for future research will be presented. First, we would like to repeat our research questions; How do consumers change their household practices in response to increasing energy prices and increased visibility of energy use? What different approaches to the increasing energy prices do they develop? What frames these changes and approaches?

5.1 Discussion

Our findings highlight that the energy crisis disrupted the routinized performances of everyday household practices, initiating processes of change. Participants described a greater awareness of household energy consumption, leading them to critically reflect on their energy-related practices in new ways. Practices were found to change in various ways among participants. By altering different aspects of the practices, they engaged in recrafting, reconfiguring, or temporally rearranging them. Practices tied to strong meanings, carrying social and symbolic significance, proved more resistant to change, while practices involving shared technology or replaceable material elements were perceived as comparatively easier to modify. Changing practices with strong meanings was not only challenging but also viewed negatively and considered less sustainable in the long term. Modifying the material elements of practices, such as adding layers of clothing instead of increasing heating, opting for showers over baths, or adopting energy-efficient alternatives, emerged as common techniques. Another approach involved adjusting the temporal coordination of daily life, such as reducing the frequency of certain practices, e.g., showering every other day instead of daily, or preparing larger meals once a week rather than daily. Through these adaptations, practices were successfully reconfigured and recrafted by reshaping their meanings, competencies, or material elements, thereby severing links between elements of the practices.

Two main approaches to adapting household practices during the energy crisis emerged: shifting and reducing. The shifting approach involved tracking consumption and time-shifting practices to minimise costs. This involved measuring individual appliance usage or tracking hourly or daily consumption. Consumers with real-time pricing agreements used this knowledge together with information about electricity rates, to decide how and what practices to change. Consumers with PVs similarly used information about when and how much electricity their systems produced. For instance, they would turn off the heating and delay laundry during peak price periods or use the dishwasher and bake bread when the PVs generated electricity. Facilitated by new technological elements of the practices, changing practices through time-shifting further led to new interconnections between practices. Controlling appliances remotely from work via mobile apps and discussing with colleagues how to best save energy created overlaps between practices in private everyday life and work life. Consequently, shared understandings surrounding the performance of these practices were reconfigured, accommodating the evolving dynamics of interconnected work and personal spheres.

In the reducing approach, on the other hand, consumers aimed to reduce their overall household energy consumption to decrease household costs. Based on uncertainty about what practices made an impact on energy consumption a variety of measures were taken to reduce energy consumption, such as unplugging devices and buying new materials to be more energy efficient. Participants could also employ a combined approach by tracking consumption and prices followed by shifting practices to low-cost periods while also aiming to reduce overall energy consumption by e.g., unplugging devices. These approaches were further enabled and restrained by structural factors that were both country-specific and varied among participants, stressing how socio-material and socio-technological structures shape practices.

Facing the increased energy prices and risks of energy shortages consumers reflected on their energy consumption in different ways. We found that what framed both changes and approaches to changing energy consumption were different ways of doing what you can. Some participants stressed moral and social values of doing their part to save energy to contribute to an equalisation on the energy grid or making sure everyone had enough as well as expressing concern for the environment. Others emphasised the financial strain of the energy crisis.

However, these motivations were also shaped within the broader context of striving to make meaningful changes while preserving a balance between sustainable practices and maintaining an acceptable standard of living. This often involved compromising on desired levels of comfort and negotiating the meanings of practices within one's home. Once again, different meanings and social conventions as well as socio-material structures were seen to influence how practices changed as well as how these changes were framed. Furthermore, we found that possibilities of shifting consumption supported by technological solutions were framed as a convenient and easy way to change energy consumption.

Overall, our results support previous research findings that social conventions and notions of comfort and well-being connected to home and household practices lead to higher energy consumption (Shove, 2003; Madsen & Gram-Hanssen, 2017; Sahakian et al., 2020; Wang et al., 2021). It also extends previous research in finding that the expectations of a comfortable home remain resilient even when energy prices drastically increase. We show that participants were often reluctant to change practices related to these perceptions even in the case of large disruptions. However, although they remain resilient and it is challenging, our research further supports previous findings that it is indeed possible to question and change these perceptions (Aune et al., 2016; Sahakian et al., 2020). Our results further contribute by revealing that when households are faced with the necessity to change practices due to large disruptions, the meanings ascribed to practices are negotiated between practices, e.g., bathing is perceived as a good investment while cooking practices can be changed or the social significance of cooking outweighs the comfort of heating due to the social meanings attached.

Our research also confirms that although individuals are active and reflexive, they are simultaneously influenced by social and collective structures and restrained by socio-material and socio-technological structures impacting their energy consumption practices and limiting their agency (Gram-Hanssen, 2014; Shove & Walker, 2014; Watson & Shove, 2022). In contrast to previous research (Hagejärd et al., 2023) our results show that monitoring consumption was found to motivate participants to effectively shift practices as a response to increased energy prices. Our research further confirms previous findings that consumers who have the possibility and financial incentive to do so time-shift their practices to a large extent which should not be

understood as simply a rational consumer choice but is related to understandings of energy as limited and connected to environmental concern (Gram-Hanssen et al., 2020).

5.2 Conclusions

The findings show that consuming less energy in household practices is feasible when other ways of fulfilling expectations of comfort and wellbeing are found or when previous notions of comfort and wellbeing are questioned. As noted, the increased awareness, due to the energy crisis and higher energy prices, initiated processes of change for our participants. It also made them reflect on their energy needs and the larger societal implications of household energy use. We can thus see an approximation to the concept of sufficiency in terms of a fair share of energy needs while minimising environmental harm. Indicating that residential energy consumption could become more sustainable in the long term.

However, although the energy crisis increased awareness and visibility of household energy use, we also found that, to some degree, it is still hidden in the practices of daily life. Regardless of the approach, participants came to different conclusions regarding what practices to change and oftentimes were not aware of how much energy or money they saved on specific measures taken to reduce energy consumption. Some participants regarded certain practices as cooking or showering important while others dismissed these practices as irrelevant for energy consumption. Even if the same practice was regarded as important it could be considered in opposite ways between participants regarding what was the most energy-efficient way of performing the practice. Furthermore, when strong social conventions were connected to how to perform the practice this overshadowed the energy consumption. In these ways, we can see that the everyday consumption of energy to some extent remains invisible to consumers.

As noted, our findings revealed that individuals perceived the option of shifting consumption, facilitated by technological solutions, as a convenient and easy approach to changing energy consumption. This indicates a willingness to adapt consumption patterns when such opportunities are available. Although this meant that, in some cases, energy consumption was not reduced but instead only temporally reorganised, it often also resulted in a reduction of

energy use by, for example, performing certain practices less frequently. Based on our analysis, offering renewable energy sources and allowing for tracking household energy consumption is a measure that might lead people to reduce their consumption. Furthermore, it shows that when supported by socio-material and socio-technological arrangements, consumers can and are willing to adapt to the variability of renewable energy sources. Thus, this opens the possibility of moving away from the continuous supply of fossil fuel-based energy that supports current energy-intensive lifestyles.

5.3 Practical implications of the research

As discussed, our research showed that there was no consensus among participants regarding what practices they changed and in what way as different participants premiered certain changes over others. This indicates the scope of the problem of changing energy consumption and the challenges to address it. Furthermore, it shows that though increased prices may initiate a process of reflection and change for consumers it is not enough when strong meanings and social significance are attached to the practices in which energy use is a part. Therefore, reducing energy consumption requires considering the specific social and collective structures it is a part of which is important for policymakers to be aware of. The naturally occurring experiment of the energy crisis thus confirms that mainstream policy approaches of efficiency and price incentives do not suffice even when prices are extremely high. The remaining invisibility of energy consumption, despite technological aids, further illustrates the problem of addressing household energy consumption.

5.4 Future research outlooks

Although it's clear from our findings that practices changed due to the disruption of the energy crisis, whether the changes will be maintained in the long term remains unclear. Therefore, a follow up study to investigate this would be an interesting area for future research. Particularly, the motivation to use smart meters tracking and shifting consumption, which in previous research was found to decrease but, in our study, increased, provides an interesting topic to investigate. Further, as this research found that shifting consumption affects the temporal

coordination of everyday life, creating new connections between work life and private life, the challenges arriving from this new temporal coordination and how it possibly affects role understandings in everyday life constitutes another compelling topic to be studied.

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Appendix A - Interview guide

Introduction

Hi!

My name is NN and I am a Masters student at Lund University currently writing this thesis together with NN to finish our degree in Sustainable Service Management at the department of Service Studies. The thesis is about household energy consumption and specifically about how the current energy situation in Europe has affected different households' energy consumption in Germany and Sweden. In this interview I am interested in hearing your own thoughts and reflections about how you use energy in your home. The interview will be recorded and transcribed solely for academic purposes, your personal data will be handled with confidentiality and only available to me and my research partner. In the thesis your answers will be anonymized and analysed and presented together with other respondents' answers. If you don't wish to answer a specific question or if you for any reason wish to withdraw from the interview you are free to do so at any time, just let me know. Before we begin, I would like to mention that some of the questions may seem quite trivial to you at first. However, this apparent triviality is particularly valuable for this study. Therefore, please do not be unsettled when answering the questions. We very much appreciate your participation, it is a valuable contribution to our research. Following this information I would like to formally ask you:

If you consent to participate?

And if you consent to recording the interview for the previously stated reasons?

Do you have any questions before we begin?

Thank you so much! I will now start the recording.

Opening questions

1. Could you please tell me a little bit about yourself?

2. Could you describe your current living situation (type of housing, number of people in household, geographic location)?

General Questions

3. What are your thoughts on the current energy crisis/situation in Europe?

4. How has the energy crisis affected you?

5. If you think about your energy consumption before the current energy crisis compared to your energy consumption today, what changes have you noticed?
   a. (Can you give me an example? Can you think of another example?)

6. Have you made any efforts to actively reduce your energy consumption?
   a. If yes, could you please describe what you have done?

Changing practices - (inconspicuous consumption prompts, if not mentioned yet and possible follow up questions)

7. Can you tell me about how you're heating / cooling your home (differences between winter and summer)?

a. How often, when, what occasion? What appliances are used? Changed? When? Compared to neighbours and friends? Do you know how much energy you consume/save on this?

8. Can you tell me about your cooking activities?
   a. How often, when, what occasion? What appliances are used? Changed? When? Compared to neighbours and friends? Do you know how much energy you consume/save on this?

9. Can you tell me about your showering/bathing activities?
   a. How often, when, what occasion? What appliances are used? Changed? When? Compared to neighbours and friends? Do you know how much energy you consume/save on this?

10. Can you tell me about your laundry activities?

    a. How often, when, what occasion? What appliances are used? Changed? When? Compared to neighbours and friends? Do you know how much energy you consume/save on this?

11. Can you tell me about your electricity activities? (e.g., lighting, mobile charging, devices, appliances etc.)

    a. How often, when, what occasion? What appliances are used? Changed? When? Compared to neighbours and friends? Do you know how much energy you consume/save on this?

Skills/Knowledge/Materials

12. Can you tell me about any specific skills you needed to make these changes?

13. Were there any specific things you needed to make the changes, if so could you tell me about them?

14. Have you experienced any difficulties in changing your energy consumption, if so could you describe this?

15. Have you received any information or guidance on energy consumption during the energy crisis?

    a. If yes, could you share your experience?

Meanings

16. Why have you chosen to make these changes to your energy use?

    a. What was your motivation?

17. If you think back over the past year; Are there any changes you have considered but chosen not to make?

    a. If so could you please describe these?

    b. If not making certain changes: Why have you not made these changes?

18. How do you experience the changes to energy use you have made in your everyday life? (following questions are regarded as additions to explore more about the meanings they associate with energy use at home)

    a. How does it affect your day to day life?

b.   How does it affect how you use your home? (in any other way?)

c.   Does it affect how you feel at home? In what way, could you please describe?

19. How has your perception of everyday energy consumption changed during the energy crisis compared to before the crisis?

Final questions

20. How do you think that the current energy crisis will affect your energy consumption in the long term?

a.   Are you planning to maintain these changes, even accelerate, or return? (Can you give an example? Can you think of anything else?)

21. If energy prices in the future would return to similar levels as before the energy crisis what do you think your energy consumption would look like then?

22. What do you think will happen in terms of your energy use in the future?

Closing

23. Is there anything else you would like to add?

24. Can you recommend anyone else that you think would be interested in participating in this research?

Thank you very much for taking the time to share your thoughts with me!

Appendix B - Interview guide - German

Hallo!

Mein Name ist NN und ich bin Masterstudent an der Universität Lund. Ich schreibe derzeit zusammen mit NN unsere Abschlussarbeit in Nachhaltigem Dienstleistungsmanagement an der Fakultät für Dienstleistungsstudien in Schweden. In dieser Arbeit geht es um den Energieverbrauch der Haushalte und insbesondere darum, wie sich die aktuelle Energiesituation in Europa auf den Energieverbrauch der verschiedenen Haushalte in Schweden und Deutschland ausgewirkt hat. In diesem Interview interessieren mich neben deinen eigenen Gedanken und Überlegungen zum Thema, wie du Energie in deinem Haushalt nutzt. Das Interview wird aufgezeichnet und ausschließlich für wissenschaftliche Zwecke transkribiert. Deine persönlichen Daten werden vertraulich behandelt und stehen nur mir und meiner Forschungspartner/in zur Verfügung. In der Thesis werden deine Antworten anonymisiert und zusammen mit den Antworten anderer Befragten analysiert und dargestellt. Wenn du eine bestimmte Frage nicht beantworten möchtest oder dich aus irgendeinem Grund von der Befragung zurückziehen willst, kannst du dies jederzeit tun, lass es es mich einfach wissen. Bevor wir beginnen, möchte ich erwähnen, dass dir einige Fragen zunächst ziemlich banal vorkommen könnten. Diese scheinbare Banalität ist für diese Studie allerdings besonders wertvoll. Lass dich daher bitte nicht verunsichern. Wir wissen deine Teilnahme sehr zu schätzen, sie ist ein wertvoller Beitrag zu unserer Forschung. Nach diesen Informationen möchte ich dich förmlich fragen:

Bist du mit der Teilnahme einverstanden?

Bist du mit der Aufzeichnung des Interviews einverstanden?

Herzlichen Dank für deine Teilnahme! Ich starte nun die Aufnahme.

Einleitende Fragen

1. Kannst du mir bitte ein wenig über dich erzählen (Alter, Beruf)?

2. Kannst du mir deine derzeitige Wohnsituation beschreiben (Art der Wohnung, Anzahl der Personen im Haushalt, geografische Lage)?

Allgemeine Fragen

3. Was denkst du über die aktuelle Energiekrise/Situation in Europa?

4. Wie hat sich dies auf dich ausgewirkt?

5. Hast du Veränderungen in deinem Energieverbrauch im Vergleich zu vor der Krise festgestellt? Wenn ja, wie sehen diese aus?
   a. (Kannst du mir ein Beispiel nennen? Fällt dir noch ein anderes Beispiel ein?)

6. Hast du irgendwelche Anstrengungen unternommen, um deinen Energieverbrauch zu senken?
   a. Wenn ja, kannst du bitte beschreiben, was du getan hast?

Änderung von Praktiken (unauffällig - falls noch nicht erwähnt)

7. Heizen / Kühlen der Wohnung: Kannst du mir erzählen, wie du dein Haus/deine Wohnung heizt/kühlst?
   a. Wie oft/Wann/Zu welchem Anlass/Im Vergleich zu Bekannten?)

8. Kochen: Kannst du mir erzählen, wie du kochst?
   a. Wie oft/Wann/Zu welchem Anlass/Im Vergleich zu Bekannten/Hat sich etwas geändert seit der Energiekrise?

9. Duschen/Baden: Kannst du mir erzählen, wie du duschst und badest?
   a. Wie oft/Wann/Zu welchem Anlass/Im Vergleich zu Bekannten/Hat sich etwas geändert seit der Energiekrise?

10. Wäsche waschen: Kannst du mir erzählen, wie du Wäsche wäschst?
    a. Wie oft/Wann/Zu welchem Anlass/Im Vergleich zu Bekannten/Hat sich etwas geändert seit der Energiekrise?

11. Elektrizität: Kannst du mir erzählen, wie du sonstige Elektrizität nutzt (z.B. Geräte, Technologien, Beleuchtung etc.)?

a. Wie oft/Wann/Zu welchem Anlass/Im Vergleich zu Bekannten/Hat sich etwas geändert seit der Energiekrise?

Fertigkeiten/Kenntnisse/Materialien

12. Welche Dinge oder Fähigkeiten hast du benötigt, um diese Änderungen vorzunehmen?
13. Bist du bei der Umstellung deines Energieverbrauchs auf Schwierigkeiten gestoßen? Wenn ja, kannst du diese beschreiben?
14. Hast du während der Energiekrise Informationen oder Ratschläge zum Energieverbrauch erhalten?
    a. Wenn ja, kannst du deine Erfahrungen mitteilen?

Bedeutungen

15. Warum hast du dich dazu entschieden, Änderungen vorzunehmen?
    a. Was war deine Motivation?
16. Wenn du an das letzte Jahr denkst: Gibt es Änderungen, die du in Erwägung gezogen aber nicht vorgenommen hast? Wenn ja, kannst du dies bitte beschreiben?
    a. Falls die befragte Person angibt, bestimmte Änderungen nicht weiter vorzunehmen: Warum nicht?
17. Wie erlebst du diese Veränderungen in deinem täglichen Leben?
    a. Wie beeinflusst dies dein tägliches Leben?
    b. Wie beeinflusst dies wie du deine Wohnung/dein Haus nutzt?
    c. Wie beeinflusst dies dein Gefühl, dich zuhause zu fühlen? Inwiefern, kannst du das beschreiben?
18. Wie hat sich deine Wahrnehmung des täglichen Energieverbrauchs während der Energiekrise im Vergleich zu vor der Krise verändert?

Abschließende Fragen

19. Wie wird sich deiner Meinung nach die derzeitige Energiekrise langfristig auf deinen Energieverbrauch auswirken?

    a. Planst du, diese Veränderungen beizubehalten, sogar zu beschleunigen oder zurückzukehren? (Kannst du ein Beispiel nennen? Fällt dir noch etwas ein?)

20. Wenn die Energiepreise in Zukunft wieder auf ein ähnliches Niveau wie vor der Energiekrise zurückkehren würden, wie würde dein Energieverbrauch dann aussehen?

21. Was glaubst du, wie sich dein Energieverbrauch in der Zukunft entwickeln wird?

Schlusswort

22. Gibt es noch etwas, das du hinzufügen möchtest?

23. Kannst du andere Personen empfehlen, die an einer Teilnahme an dieser Untersuchung interessiert wären?

Vielen Dank, dass du dir die Zeit genommen hast, deine Gedanken mit mir zu teilen!

Appendix C - Interview guide - Swedish

Introduktion

Hej!

Mitt namn är NN och jag är en masterstudent vid Lunds universitet som skriver detta examensarbete tillsammans med NN för att avsluta vår examen i Sustainable Service Management vid institutionen för tjänsteforskning. Uppsatsen handlar om hushållens energiförbrukning och specifikt om hur den nuvarande energisituationen i Europa har påverkat olika hushålls energiförbrukning i Tyskland och Sverige. I den här intervjun är jag intresserad av att höra dina egna tankar och reflektioner kring hur du använder energi i ditt hem. Intervjun kommer att spelas in och transkriberas enbart för akademiska ändamål, dina personuppgifter kommer att behandlas konfidentiellt och endast vara tillgängliga för mig och min uppsatspartner. I uppsatsen kommer dina svar att anonymiseras och analyseras och presenteras tillsammans med andra respondenters svar. Om du inte vill svara på en specifik fråga eller om du av någon anledning vill avbryta intervjun står det dig fritt att göra det när som helst, bara meddela mig. Innan vi börjar vill jag nämna att en del av frågorna kan verka ganska triviala till en början. Denna skenbara trivialitet är dock särskilt värdefull för den här studien. Var därför inte orolig när du svarar på frågorna. Vi uppskattar verkligen ditt deltagande, det är ett värdefullt bidrag till vår forskning. Efter denna information vill jag formellt fråga dig:

Om du vill delta i intervjun?

Om du godkänner att intervjun spelas in för tidigare nämnda syften?

Om du har några frågor innan vi börjar?

Tack! Då startar jag inspelningen.

Öppningsfrågor

1. Skulle du kunna berätta lite om dig själv?

2. Kan du beskriva din nuvarande boendesituation (typ av bostad, antal personer i hushållet, geografiskt läge)?

Generella frågor

3. Kan du berätta om dina tankar kring den nuvarande energikrisen i Europa?
4. Hur upplever du att detta har påverkat dig?
5. Om du tänker på din energianvändning i hemmet före energikrisen och din energianvändning nu, hur har det förändrats? (Kan du ge ett exempel? Har du något mer exempel?)
6. Har du gjort något för att aktivt minska din energiförbrukning?
    a. Om Ja: Skulle du kunna berätta om du vad du gjort? (Något annat?)

Förändrade rutiner - (uppmaningar gällande diskret konsumtion, om de inte redan har nämnts, och eventuella följdfrågor)

7. Kan du berätta om hur du värmer upp/kyler ner ditt hem (skillnader mellan vinter och sommar)?
    a. Hur ofta, när, vid vilket tillfälle? Förändrats? När? Vilken utrustning används? Jämfört med grannar och vänner? Vet du hur mycket energi du förbrukar/sparar på detta?
8. Kan du berätta om hur du vanligtvis lagar mat?
    a. Hur ofta, när, vid vilket tillfälle? Förändrats? När? Vilken utrustning används? Jämfört med grannar och vänner? Vet du hur mycket energi du förbrukar/sparar på detta?
9. Kan du berätta om hur du vanligtvis duschar/badar?
    a. Hur ofta, när, vid vilket tillfälle? Förändrats? När? Vilken utrustning används? Jämfört med grannar och vänner? Vet du hur mycket energi du förbrukar/sparar på detta?
10. Kan du berätta om hur du tvättar?

a. Hur ofta, när, vid vilket tillfälle? Förändrats? När? Vilken utrustning används? Jämfört med grannar och vänner? Vet du hur mycket energi du förbrukar/sparar på detta?

11. Kan du berätta om hur du använder el i ditt hem? (t.ex. belysning, laddning av mobiler, apparater, vitvaror osv.)

a. Hur ofta, när, vid vilket tillfälle? Förändrats? När? Vilken utrustning används? Jämfört med grannar och vänner? Vet du hur mycket energi du förbrukar/sparar på detta?

Kunskaper och material

12. Kan du berätta om några särskilda färdigheter som du behövde för att göra dessa förändringar?

13. Var det några särskilda saker du behövde för att göra förändringarna, kan du i så fall berätta om dem?

14. Har du upplevt några svårigheter med att ändra din energiförbrukning, kan du i så fall beskriva detta?

15. Har du fått någon information eller vägledning om energiförbrukning under energikrisen?

a. Om ja, kan du dela med dig av dina erfarenheter?

Mening

16. Hur kommer det sig att du har valt att göra dessa förändringar i din energianvändning?

a. Vad motiverade dig?

17. Om du tänker tillbaka på det senaste året, finns det några förändringar som du har funderat på att göra men valt att inte göra?

a. Om ja, skulle du kunna beskriva dessa?

b. Om personen nämner att hen valt att inte göra vissa förändringar: Varför har du inte gjort dessa förändringar?

18. Hur upplever du de förändringar av energianvändningen som du har gjort i din vardag? (Följande frågor betraktas som tillägg för att utforska mer om de betydelser som de förknippar med energianvändning i hemmet).
    a. Hur påverkar det ditt dagliga liv?
    b. Hur påverkar det hur du använder ditt hem (på något annat sätt?)?
    c. Påverkar det hur du känner dig hemma? På vilket sätt, kan du beskriva det?
19. Hur har din inställning till vardaglig energiförbrukning förändrats under energikrisen? (medvetenhet)

Framtid

20. Hur tror du att den nuvarande energikrisen kommer att påverka din energiförbrukning på längre sikt?
    a. Planerar du att fortsätta med dessa förändringar? göra något mer? eller sluta med något? (Kan du ge ett exempel? Kan du komma på något annat?)
21. Om energipriserna i framtiden skulle återgå till samma nivåer som före energikrisen, hur tror du att din energiförbrukning skulle se ut då?
22. Hur tror du att energiförbrukning i allmänhet kommer se ut i framtiden?

Avslut

23. Finns det något mer du vill tillägga?
24. Kan du rekommendera någon mer som skulle vara intresserad av att vara med i denna studien?

Tack så mycket för att du tog dig tid och delade dina tankar med mig!