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## **Conflicts in Everyday Life: The Influence of Competing Goals on Domestic Energy Conservation**

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**Abstract:** A common approach for understanding people’s domestic energy behavior is to study the influence of deterministic factors, such as attitudes, norms and knowledge, on behavior. However, few studies have succeeded in fully explaining people’s behavior based on these factors alone. To further the understanding of people’s everyday energy use, a goal-oriented approach based on activity theory has been applied to discuss energy conservation from a multiple goal perspective based on the findings from an interview study with 42 informants. The findings show that the informants used energy to fulfill goals linked to basic needs or desires related to their well-being. Even though the majority of informants had an explicit goal to reduce their energy consumption, many experienced conflicts with other competing goals, which often made energy conservation undesirable or challenging. The findings suggest that actions to reduce energy use will most often not be prioritized if they cannot be integrated into people’s daily life without jeopardizing their possibilities to achieve their primary goals and satisfy their everyday needs. It is thus vital to consider people’s everyday life and the many conflicts they experience when aiming to understand why people do, or do not, prioritize energy conservation during everyday activities.

**Keywords:** energy; conservation; goals; behavior change; pro-environmental behavior

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## 1. Introduction

Due to a general increase in domestic energy consumption [1], many countries have set energy conservation targets and explored different ways of reducing consumption. Research has indicated that introducing new technologies that improve the efficiency of appliances and consumer electronics is not always as effective as expected because direct rebound effects, such as increased use, have been found to decrease the potential for savings [2]. Instead, many researchers argue that it is essential to also address people's actions and support people to use energy more mindfully. However, in order to support energy conservation it is important to first understand people's everyday actions [3]. Numerous frameworks and studies have explored the underlying mechanisms that influence people's pro-environmental behavior and a common approach has been to view a specific behavior as the rational and causal consequence of different determinants, for instance, attitudes, beliefs, norms, knowledge, and habits (see reviews by e.g., [3–6]). Even though the studies have been successful in identifying many influencing factors, a discrepancy between expected behavior and people's actual behavior can still be observed in many everyday situations [4]. There is thus a need to move beyond considering solely deterministic factors and explore other perspectives for understanding why people use energy the way they do. One such perspective that has gained many supporters in recent years is social practice theory, which aims to understand social change by understanding how people's practices are situated and transformed dynamically over time (see e.g., [7,8]). This paper avails itself of another approach—a goal-oriented perspective that emphasizes the relevance of understanding people's everyday activities and multiple goals—to present findings from an interview study. The paper initially describes benefits and difficulties of viewing people's actions from a deterministic perspective and introduces a goal-oriented perspective as an alternative. The following section describes the undertaken approach for the interview study and the subsequent analysis. The findings of the study are presented from a goal-oriented perspective and finally discussed to highlight the implications and opportunities they may entail for understanding people's energy use and for supporting energy conservation.

## 2. Theoretical Frameworks

Many theoretical frameworks and approaches for understanding people's actions challenge the common deterministic assumptions and suggest alternative ways of understanding behavior. This section will highlight one such perspective, a goal-oriented perspective, and discuss what advantages it provides for understanding people's actions compared to a deterministic perspective.

### 2.1. People's Actions from a Deterministic Perspective

Many of the most influential models and frameworks describing human action assume a causal relationship between influencing factors and people's behavior. The frameworks commonly address factors such as attitudes, demographic characteristics (e.g., household size, income, age, and education), norms, knowledge, and situational conditions as determinants of behavior (see Table 1 for an overview of commonly addressed factors for a selection of frameworks and studies). The degree to which the factors can predict and explain a specific behavior has been repeatedly assessed in studies on different pro-environmental behaviors including the context of domestic energy behaviors, *i.e.*, behaviors

resulting in end-use of energy consumption (see reviews by e.g., [3,9,10]). Some of the studies have also explored how people's motivations for engaging in specific behaviors can be increased by influencing the different factors.

**Table 1.** Factors commonly addressed in models and frameworks describing behavior and in energy conservation studies (see [10–21]).

Factors	Models and Frameworks	Energy Conservation Studies
Attitudes	[11–14]	[10,15–17]
Behavioral intention	[11–14]	[18]
Beliefs	[12,14,19]	[15–17]
Demographics	[14]	[10,16–18,20]
Outcome expectations	[12–14]	[18]
Perceived behavioral control	[11–13]	[10]
Personal norms	[13,21]	[10,15,20]
Situational conditions	[12,14]	[16,18]
Self-efficacy	[12,13]	[18]
Social norms	[11–14,19,21]	[15,20]
Values	[19]	[17]

Even though there is consensus that specific actions depend on several different factors [5,6,14,22] and it has been argued that people may have multiple behavioral motivations [23–25], superordinate reasons to why a person performs a particular action, out of all available alternatives, have often been disregarded in the deterministic models that aim to explain people's behavior. Recent research suggests that a person's behavior is not only dependent on the psychological and situational factors that influence the particular behavior in question, but also dependent on the person's motivation to engage in other behaviors [26]. A person's lack of engagement in energy conservation behavior could for instance be due to either a lack of motivation to engage in the particular behavior, or a motivation to *not* engage because other behaviors are prioritized.

Studying particular behaviors separately to understand why people engage or do not engage in them is therefore problematic as such studies generally give little insight into how these behaviors relate to other behaviors and activities in daily life. Instead of exploring energy behaviors and their determinants in isolation from each other, it could be beneficial to study people's actions in relation to other actions and everyday priorities with which they coexist, interact, and compete. By considering how everyday goals influence the prioritization of different behavioral options, insights may be gained into why people choose to reduce resource consumption (or not) during different activities.

## 2.2. People's Actions from a Goal-Oriented Perspective

Hitherto, few models and studies address goals and, to the authors' knowledge, none have explicitly discussed people's energy related actions in relation to what goals people want to achieve when engaging in energy demanding everyday activities. Some models and studies that address behavior in general encompass the notion of goals as a mediator between psychological factors and certain behaviors but only refer to goals as assigned or self-selected explicit commitments that generate a form of self-motivation [13,27,28]. Others take a different approach and suggest that people have multiple

motivations or goal frames that differ across everyday situations and interact to affect the degree to which people engage in pro-environmental actions in a given situation [24,25,29,30]. For instance, [25] elaborate on three distinct types—a gain goal frame that involves guarding or improving one's resources; a normative goal frame that entails acting appropriately; and a hedonic goal frame that is all about feeling better right now—which constantly compete for attention and steer people's decisions regarding a specific action. A slightly different perspective is offered by [30] that argue that people, consciously or unconsciously, engage in certain activities to pursue specific goals and outcomes. Moreover, [30] propose that there exist superordinate and subordinate goals that steer people's goal striving process and that people assess a particular goal in comparison to other goals that may not be directly related to the goal, but may make it more or less feasible or desirable.

Even though research on pro-environmental behavior and energy conservation generally acknowledges that contextual factors may influence people's actions, most studies do not, to any higher extent, address people's everyday life and the contextual influences they may experience in different situations. The context in which people's actions are carried out as well as the artifacts used during different activities are however highly important aspects to consider in order to understand why people perform certain actions, instead of others, to achieve their goals [22,31]. One framework that considers people's actions in relation to motives, goals, and contextual factors is based on activity theory (see e.g., [32]). According to the theoretical framework of activity theory, the basic unit for analysis is activity. Human activities are oriented toward motives, corresponding to certain needs, and is usually mediated by one or more tools, which include for instance symbols and language but also technical artifacts. Each activity is conducted through goal-directed actions and one or several actions may contribute to the same activity. Even though the separate actions have their own goals, the activity is what gives meaning to the different actions through an overall goal fulfillment. The actions are implemented through a series of operations and are triggered by the specific physical and social conditions present at the time. The theoretical framework of activity theory has primarily been applied in studies of e.g., learning [33], the use of information systems [34], and human-computer interaction [35,36] but it has also been applied to the analysis of the relation between people and artifacts [37] including the relation between people and energy using artifacts [38]. If considering people's energy use from this perspective it is evident that energy consumption is not a goal *per se*, instead energy consumption and the use of energy consuming artifacts can be considered to be tools that enable people to fulfill their objectives and achieve the goals associated to the activity they engage in. A goal such as energy conservation may therefore compete with goals associated with everyday activities that require energy consumption and may therefore be hard to adopt.

In comparison to the deterministic perspective on behavior discussed previously, a goal-oriented perspective takes into account people's multiple motivations, contextual preconditions, and behavioral alternatives related to their everyday activities. It thus provides a new lens through which energy conservation can be explored and discussed. As such a perspective has the potential to increase the understanding of people's everyday energy use as well as the possibilities for supporting energy conservation, the remainder of this paper will discuss domestic energy conservation from a goal and activity point of view. Goals will be referred to as the underlying objectives that a person wants to meet during everyday activities and actions to ensure that the activities will fulfill the person's needs and desires.

### 3. Approach

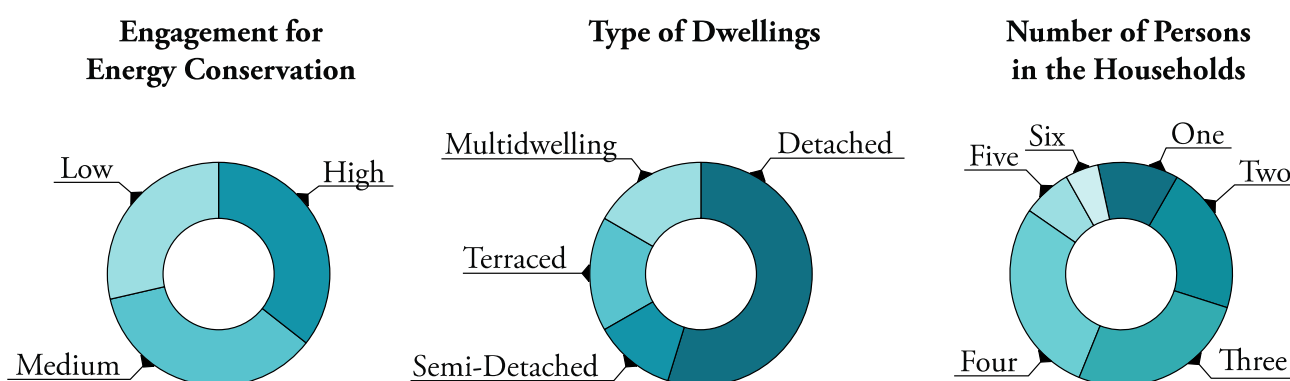
An interview study was undertaken to gain insight into aspects that influence people's everyday domestic energy use and approaches to energy conservation. The overall result of the study, which provides an overview of identified aspects and energy conservation strategies, is discussed by [39] whereas this paper focuses especially on describing the influence of goals on people's energy related actions. For this paper, an approach based on activity theory has been applied to analyze the findings of the study in order to explore how people perceive their possibilities to engage in energy conservation from a goal-oriented perspective.

#### 3.1. Participant Recruitment

The interview study was carried out in Gothenburg, in the southwest region of Sweden. In this region, many households live in apartments for which the energy cost is commonly included as a standard fee in the monthly rent. This may reduce the economic incentives for conserving energy and make people perceive their energy consumption as less tangible compared to those that pay for their consumption separately. Therefore, as a primary screening criterion, only individuals who paid for their energy use separately were chosen for the study to ensure a sample of participants with comparable preconditions in this respect. Further care was taken to ensure that the group of informants included individuals with varied levels of engagement for energy conservation and energy saving actions.

The recruitment of informants was carried out in three ways: through an advertisement in the local newspaper, through a radio announcement, and through approaching people in public shopping malls. In total, 42 individuals volunteered to take part in the study. The informants' ages ranged from 29–69 years (mean of 46 years) and 52% of the informants were male and 48% female.

The sample included individuals with different levels of engagement for energy conservation (see Figure 1). Moreover, the individuals lived in different types of dwellings, and the number of persons in each household varied from one-person households to six-person households. While the majority of informants had a university degree, the level of education spanned from upper secondary school to doctoral studies. The monthly total income for the informants' households varied from under 20' SEK to over 50' SEK.



**Figure 1.** Sample characteristics regarding (i) the informants' engagement for energy conservation; (ii) the type of dwellings they lived in; and (iii) the number of persons in the informants' households.

### 3.2. Interviewing Procedure and Analysis

A semi-structured interview guide was designed and used during the interviews in order to address particular themes but also to provide opportunities for the informants to elaborate on aspects they considered relevant. Demographic characteristics were first collected for each informant, including age and gender, and his/her household, including number of persons in the household, type of dwelling, and type of heating system. Second, the informants' energy related actions and current motivation for energy conservation were discussed to explore the informants' personal and contextual preconditions. Both open-ended questions—such as *Do you do anything to reduce your energy use? Is there anything else you wish you would do to reduce your energy use but do not do? Why do you not perform further actions to reduce your energy use? Do you think your actions are effective in reducing your energy use? and What are the motives behind your actions?*—and specific questions related to particular behaviors—such as *Do you turn appliances off completely or use standby? Do you turn off appliances when you leave your home? and Have you invested in a energy efficient heating system?* — were posed during this part of the interview. In order to enable a responsive and fruitful dialogue, the questions were slightly adjusted during each interview depending on the informants' answers. Third, the informants' attitudes towards technology and their use of appliances and consumer electronics were addressed through questions such as *Are you interested in technology? What types of products or services do you find exciting? What drives you to try out new technologies? What may make you not buy or use a specific product? and Do you consider appliances' energy consumption prior to purchase?*. The interviews were concluded with open-ended questions that gave the participants a chance to talk freely about aspects they considered important in regards to energy use and conservation and that might not have been touched upon earlier during the interview. All interviews were conducted in a university setting; each interview lasted approximately 90 minutes and careful notes were taken during all interviews. A symbolic reward was given to the participants at the end of the interview.

The interview notes were digitized using a data analysis software (NVivo 9.2) and the data was processed using an iterative thematic coding procedure as described by [40]. A set of descriptive codes and relevant key themes was used to condense the collected data, to explore different themes and patterns, and as a basis for interpreting the data. For this paper, the analysis and interpretation of the data entailed identifying which goals the informants referred to during the interviews, identifying different types of conflicts between competing goals, as well as examining how these goals and conflicts influenced the informants' actions, activities, and energy consumption. The informants' prioritizations between goals and strategies for managing conflicting goals were also examined in order to increase the understanding of what relevance competing goals have for people's choice of activities and their possibilities for acting in an energy efficient way.

## 4. The Influence of Goals on Energy Conservation

The findings indicate that the informants—Is—recognized many different factors that influence their actions, for instance, different factors related to them as individuals such as attitudes and knowledge, but also factors related to their everyday activities and goals. In order to fulfill their primary goals in everyday life, *i.e.*, satisfying needs and ensuring well-being, the informants engaged in many different

activities that often involved the use of energy-consuming appliances and devices. Using energy and appliances was thus a mean for carrying out activities that enabled them to satisfy their everyday basic needs or fulfill desires related to their well-being and respective lifestyles.

Apart from their primary goals, all informants, either explicitly or implicitly, also referred to sub-goals related to aspects such as comfort, effort, time, safety, and cost that contributed to the primary goals, if fulfilled. Many informants explicitly described a primary goal of limiting their environmental impact, and a specific goal of reducing their energy consumption. One informant considered it as a matter of course: “It’s natural for us to do it. It’s not about saving, it’s about acting in a sound way.” (I-10). Energy conservation was a desirable and prioritized goal for some informants but many experienced conflicts with other competing sub-goals as energy conservation measures were commonly perceived to be hard work, difficult to carry out, time consuming, or by other means negatively affecting the informant’s lifestyle or home environment. When these conflicts arose the informants were forced to choose between reducing consumption and attaining other goals. Competing goals thus often had a negative impact on the informants’ energy conservation efforts as few informants prioritized actions to reduce consumption over other actions that better helped them to fulfill their needs and desires during everyday activities.

#### *4.1. Competing Goals and Everyday Conflicts*

The findings highlight several goals that the informants perceived competed with the goal of reduced energy consumption and often sparked conflicts in everyday situations that are relevant to consider from an energy conservation perspective. The informants’ conflicting goals often influenced which activities the informants engaged themselves in, which artifacts the informants choose to use during different activities, and which actions they performed when interacting with particular energy-demanding artifacts (see Table 2). The type and strength of these conflicts varied between informants and across situations depending on what they considered to be meaningful and desirable for particular circumstances during everyday life. This section will discuss the three types of conflicts in relation to the most commonly mentioned competing goals, as they are important for understanding the conflicts people experience in daily life and how they influence people’s prioritization and subsequent actions.

##### *4.1.1. Increasing Well-Being, Comfort and Pleasure*

All informants wanted to increase their own well-being by living a comfortable and pleasurable life. For many informants, this aspiration very often conflicted with their goal of energy conservation and most were not willing to forgo their own comfort or pleasure to reduce their energy use. One informant shared her view on why she prioritized everyday comfort instead of engaging in energy conservation: “Electricity is not the worst villain when it comes to environmental issues, we can do other things to reduce our environmental footprint. We have other priorities. I have the right to electricity indulgence, it’s so cold and dark in Sweden.” (I-36). Similarly, many others expressed that they prioritized everyday luxury activities like taking a long shower or keeping the TV on for company over measures to reduce their energy consumption.

**Table 2.** Everyday conflicts that may arise due to competing goals.

Types of Everyday Conflicts	Examples of Competing Goals and Alternative Viewpoints
Conflicts influencing choice of activities	<p><b>Ensuring well-being versus Reducing energy consumption</b> Engaging in pleasurable activities regardless of the amount of energy required <i>versus</i> avoiding pleasurable activities that are too energy demanding</p>
	<p><b>Reducing effort versus Reducing energy consumption</b> Engaging in everyday activities that are easy going with a low workload <i>versus</i> engaging in activities to improve the energy efficiency of the dwelling even though they are effortful and require a high workload</p>
Conflicts influencing choice of artifacts	<p><b>Limiting time misspent versus Reducing energy consumption</b> Using artifacts that are fast but more energy intensive <i>versus</i> using artifacts that are more energy-efficient but slow</p>
	<p><b>Increasing comfort versus Reducing energy consumption</b> Prioritizing other aspects than energy efficiency when investing in new appliances <i>versus</i> prioritizing energy efficiency performance when investing in new appliances regardless of potential drawbacks that influence their daily comfort and user experience negatively</p>
Conflicts influencing interactions with artifacts	<p><b>Reducing effort versus Reducing energy consumption</b> Using artifacts in a convenient but potentially more energy demanding way <i>versus</i> taking action to limit unnecessary energy use by turning off and unplugging devices</p>
	<p><b>Reducing safety risks versus Reducing energy consumption</b> Using artifacts in a way that increases safety on the expense of higher energy consumption <i>versus</i> using artifacts in a way that reduces energy consumption on the expense of higher vulnerability</p>

Aspects related to comfort and pleasure were also mentioned to spark conflicts when the informants considered buying new equipment or new appliances. During investment decisions, the informants often had to balance the energy efficiency performance of a product against possible drawbacks related to, for instance, its functionality and aesthetics. Many informants found products that were less energy efficient but more attractive in other ways more appealing. Several informants explained, for example that they did not buy low-energy bulbs partly because of the poor light quality and one informant explained that she was hesitant of buying a heat pump as she considered it distasteful, too loud, problematic to handle due to water leakage issues: “Heat pumps are ugly and disgusting but they cut the consumption in half. However, they make a lot of noise and are leaky, so it is not such a good solution.” (I-9).

#### 4.1.2. Reducing Effort

Many informants explained that it would require a lot of engagement and effort from them to reduce their energy consumption. For instance, one informant (I-7) especially mentioned that, in addition to investment costs, a high level of effort was a reason for not improving the energy efficiency of her house.



She preferred a more easy-going daily life and lower workload at the expense of higher energy consumption. The conflict between the goal of energy reduction on the one hand and increased effort on the other hand were especially evident when the informants discussed particular actions carried out during different activities. They often prioritized more energy demanding activities and actions if it reduced their effort and increased convenience. For example, several informants talked about their goal of reducing effort in relation to standby consumption and especially related to their television set. They expressed that it was both physically annoying to have to walk up to the TV to turn it off and cognitively burdening to deal with the appliances: “When it comes to standby power, the TV channel box discourage me to turn it off completely. The start-up process is not worth it (...) it’s often problematic, I don’t have the time and it requires a lot of effort.” (I-12). Another informant clarified that when it comes to managing chargers for consumer electronics she is more concerned with living a convenient life than reducing consumption, cost, or safety risks: “I do not unplug them, but I know that they still use electricity, and that it is a fire risk to leave them in, but I still do not unplug them.” (I-21).

The effort of carrying out extensive measures was only rarely discussed, instead most informants talked about the everyday effort of carrying out minor daily actions that in reality might not require a lot of effort. However, the findings suggest that the perceived effort of managing artifacts during daily activities increases with the number of appliances and the frequency of use. One informant explained: “It is convenient to not do anything, there are many appliances to manage if you are to shut them all off.” (I-37). Another informant pointed out how the frequent use of his mobile phone influenced his use of the charger: “It consumes a lot which makes me have to recharge it every night. So the charger is always plugged-in next to my bedside table.” (I-22).

#### 4.1.3. Reducing Time Misspent

When asked about energy saving measures, several informants mentioned time as an aspect that sparked conflicts and made them priorities other activities that better satisfied their overall needs in everyday life: “I have stopped doing it (energy saving measures), I can’t be bothered. I have little time and there are a lot of other demanding things.” (I-27). Conflicts also arose during particular activities in which the informants had to invest extra time if they wanted to use a less energy demanding appliance or handle appliances in a more energy efficient way. One informant elaborated on her behavior when doing the laundry: “My top priority is to make it convenient and easy, so I use a tumbler-drier. I don’t have the time to do it differently.” (I-23). The informants did not want to waste their time managing appliances or waiting for slow appliances to perform when they could spend their time doing other things. The informants especially highlighted conflicts in relation to appliances that were frequently used and required time to manage in an energy efficient way: “I try, but it’s easy to forget, it depends on what appliance it is, but I don’t want to restart the computer every time, it takes forever.” (I-1).

#### 4.1.4. Reducing Safety Risks

Apart from living a comfortable, convenient, and time-efficient life, many informants also wanted to live a safe life. As many energy efficient actions for managing artifacts in daily life reduce for example fire risks—such as turning off kitchen appliances, turning off standby, or unplugging chargers—the individual informant’s goal of reducing energy consumption and the goal of reducing safety risks were

often expressed to reinforce one another. However, some informants considered other risks that made the goals incompatible. One informant brought up child safety as a factor when using appliances: “When it comes to standby it’s a safety issue for the children. It’s better to use standby as they do not need to go up to the TV to push the button, risking that it tips over.” (I-11), while another informant talked about security: “But we keep the lights on with a timer, so that it looks like we’re at home.” (I-24).

#### 4.2. Energy Conservation in Everyday Life

The findings highlight several aspects that influenced whether or not the informants prioritized energy conservation activities and energy efficient actions during particular activities. First, the prioritization depended on both the characteristics of the actions required to achieve the goal of reducing consumption, such as the time frame and associated effort, and the individual’s preconditions to reduce consumption, such as the individual’s ability and opportunity to perform the actions. The informants therefore looked upon actions, such as one-time investments or repeated actions aimed at reducing daily energy consumption, differently. For instance, the informants who had the knowledge, personal interest, and the economic conditions to be able to make long-term investments to reduce energy consumption, such as buying efficient appliances or heating systems, found investments to be easier and more convenient than curtailing energy use during everyday activities. In contrast, informants who lacked the opportunity to invest in new appliances often tried to reduce consumption by behaving in a less energy-demanding manner in their everyday life, as it would be more burdensome or impossible for them to make long-term investments.

Second, for some informants the prioritization also depended on the effort–benefit ratio of reducing energy consumption compared to the benefit of other and competing goals. Several informants considered it useless to every day try to limit their wasteful energy consumption as it required effort, constant attention and often forced them to forgo their own comfort, without resulting in any significant reductions in energy use. If the energy saving potential was low and other activities were more attractive, energy conservation measures were generally not prioritized: “It’s difficult to save energy, it feels pointless. It’s easier and more convenient not to. The standby consumption is quite low nowadays anyway.” (I-24).

Third, different priorities within a household made energy conservation difficult to manage for some informants. The discrepancy between how different persons within the household sought to behave caused frustration, lead to disputes, and made reductions difficult to achieve. Not only did spouses sometimes prioritize different goals, but parents also frequently experienced that their children did not share their goal of reducing consumption: “I chase the kids, they always leave the TV on, and we have a continuous fight over the lighting at home, do we keep it on or off? It’s usually on.” (I-22).

The fourth and possibly most critical aspect is related to the informants’ everyday life. Most informants had a hard time prioritizing energy conservation in everyday life because the activities they engaged themselves in to fulfill their primary goals most often required the use of energy demanding artifacts. The informants’ level of dependence on different energy demanding artifacts in everyday life made it more or less desirable for them to prioritize energy conservation over other activities or when interacting with particular artifacts. For instance, one informant (I-27) explained that he had installed a new efficient heat pump and halogen bulbs, he did not use standby, and he unplugged all chargers, but

he wanted to run a lot of washes because they had small children and a lot of dirty laundry. Although being concerned with reducing energy use in order to reduce costs, consumption, and safety risks when buying and using some artifacts, he prioritized increased energy use when came to managing laundry as he considered that to be essential for his family's hygiene and well-being in their current life situation.

#### *4.3. Managing Energy Conservation Despite Competing Goals*

The informants had various strategies of managing energy conservation by limiting or overcoming the conflicts that arose between energy conservation on the one hand, and competing goals on the other hand. The type of strategies and related actions described by the informants varied depending on their preconditions and the conflicts they experienced in everyday life.

Some the informants tried to increase their own or their family members' attention and awareness in order to emphasize the goal of energy conservation and thereby stimulate energy savings. They mainly tried to remind themselves and other members of the family to reduce consumption and to reduce the use of energy intensive appliances. Several informants also tried to strengthen the motivation to prioritize the goal of reducing energy consumption by increasing the family members' overall awareness of their energy use and its consequences. Discussing the household's energy use within the family was common a common tactic to increase the family members' awareness and reduce conflicts between them. Some also discussed energy issues with their children already at an early age to prevent future conflicts of interest: "It's a reoccurring topic. We want to pass it down to our children. Our daughter understands the link between over-consumption and environmental impact. If you talk about it, the children will know that products that require too much electricity are no good, they will become aware." (I-38).

Investing in new energy efficient technologies was brought up by many informants as a strategy to reduce the need to act energy efficient during most situations in everyday life and thereby avoid conflicts while still managing to reduce energy consumption. To facilitate the process of investing in new energy efficient technologies, such as consumer photovoltaics, efficient heating systems, and efficient comfortable lighting alternatives, many informants asked for assistance from, for instance, sales personnel and house suppliers to compare alternatives. However, this tactic was not so effective, as many informants experienced resistance from the responsible personnel and few received any help when asking for more energy efficient alternatives: "We wanted to build an energy efficient house but it was too difficult. No suppliers were willing to use the system we wanted. The same goes for renovations, it is too difficult to make that choice happen, it's impossible." (I-18). Instead, discussing energy efficiency investments with friends or neighbors was considered to be a better strategy to conveniently get trustworthy information to base investment decisions on without having to spend time and effort evaluating alternatives: "I have gotten recommendations regarding heat pumps, I trust my friends' advice." (I-5).

Further, the majority of informants described many strategies to facilitate energy reductions by using additional products to help them reduce their energy use when interacting with energy demanding artifacts during daily activities. Some used different devices such as feedback monitors and alarms to remind themselves of possible energy saving actions. Others made use of artifacts that made energy saving measures more convenient, less effortful, and less time consuming. Many informants had bought products such as timers and outlet adapters with an on/off switch, which made it more convenient and

less time consuming to curtail use and change the way in which different appliances were used during everyday life. Several informants had also bought wattmeters or energy monitors to investigate how much electricity their appliances used in different modes in order to facilitate prioritization of goals in relation to benefits and required effort. Energy monitors in particular were considered by several informants to be a suitable tool to increase awareness, provide clear incentives to replace energy intensive appliances, and to act in a more energy efficient way during specific activities.

## 5. Discussion

Most studies on energy behavior address how people's actions are influenced by specific determinants, such as values, norm, attitudes, and knowledge, and discuss how people can be encouraged to save energy (see e.g., [10,15,20]). These studies do generally not address people's actions in relation to other actions and activities people engage in during their daily life and neither do they explicitly consider how people's competing everyday goals influence their choice of activities and actions. In contrast, we stress the need to discuss consumption and energy conservation from a broader system perspective in conformity with a growing number of scholars from different fields and theoretical viewpoints (see e.g., [8,31,41–43]). People's energy use rarely has a purpose of its own; it is embedded in the actions and activities that form everyday life. People's energy demanding activities thus co-evolve over time with, for instance, people's preconditions, available technologies, the socio-cultural setting, and the goals people find relevant to pursue (*cf.* [7]). As people's actions are part of this ever-changing web of activities, we argue that it is more relevant for energy conservation research to address people's activities, practices, and their interrelations, rather than focusing on specific behaviors and their determinants. This paper provides yet another piece in the puzzle for understanding energy conservation as it emphasizes in particular the benefits of addressing and understanding the complexity of people's activities in daily life from a goal-oriented perspective. The findings suggest that people, regardless of aspects such as attitudes or knowledge, often have a hard time prioritizing energy conservation measures during everyday activities due to the many conflicts they experience between competing goals. We thus argue that in order to understand how people can be supported to live in a less energy intensive way we need to understand these conflicts as they often bring about practical problems or in other ways make it undesirable for people to reduce consumption.

Even though other studies addressing domestic energy consumption have not generally considered people's energy use from a multiple goal perspective, implicit references to goals in relation to people's prioritizations in everyday life can still be found. For instance, [44] found, when studying households' appropriation of electricity monitors, that people sometimes prioritized activities that provided immediate pleasure over measures to reduce energy consumption. Moreover, some of the households' did not want to behave differently because they considered certain wasteful energy behaviors as appropriate actions because they contributed to fulfilling other goals associated to different roles and functions in the household. Similarly, when evaluating the uptake of domestic energy-efficiency solutions, [45] concluded that many people are not willing to adopt solutions that endanger their current lifestyle, comfort, or pleasure. In conformity with [44] and [45], many informants in this study prioritized convenient, time efficient, and comfortable actions over energy conservation measures. These findings thus support the claim by [25] that hedonic goals, such as avoiding effort and seeking direct pleasure,

are likely to be prioritized to a higher degree than other goals. Tiger [46] provides a rationale that can help explain why pleasurable activities are often given priority over less pleasurable alternatives. He argues that pleasure is biologically desirable as it has been evolutionary developed based on our needs as human beings. Based on our heritage, our brain constantly monitors the comfort of the body and seeks pleasure by prioritizing activities we may enjoy doing in the present. Goals competing with energy conservation, such as increased well-being or pleasure, may thus make it undesirable or difficult to reduce consumption during many activities if a reduction of energy also entails reduced well-being. However, it is worth noting that not all energy conservation measures *per se* conflict with hedonic goals. Actions that reduce consumption can also contribute to a person's well-being by, for instance, being physically pleasurable or meaningful [47]. Furthermore, it may not be the pro-environmental action itself that conflict with a goal such as increased pleasure, but rather the by-products of the action [47]. For example, while turning down the heat and turning off lights might not be very effortful, it may be very unpleasant to live in a cold and dark apartment.

Even though the informants in this study often prioritized hedonic goals, our findings nonetheless indicate that people are able to prioritize less energy intensive undertakings in some situations and that they sometimes even incorporate it as a routinized or natural part of the activity itself. However, as there are many different activities to handle and prioritize between in everyday life, it is very difficult and sometimes undesirable for people to prioritize energy conservation in all situations. Actions to reduce energy use will most often not be prioritized or desirable if they cannot be integrated into daily life without jeopardizing people's possibilities to achieve their primary goals and satisfy their everyday needs. Depending on people's preconditions, the different types of everyday conflicts described in Section 4.1. will thus be more or less challenging to manage, which will affect in which situations people choose to prioritize energy conservation over other goals. Moreover, with an increasing number of energy-demanding household appliances and complex devices used in everyday activities, it may over time become even more difficult and effortful for people to go about their daily life in a less energy intensive way. An increased number of complex appliances will not only risk increasing the direct energy use during specific activities but it might also put people in more demanding situations in which they risk overloading their cognitive resources that might make them focus on their main objectives and neglect other goals including energy conservation (*cf.* [48]).

## 6. Implications and Conclusions

The findings presented in this paper imply that it is vital to consider people's everyday conflicts between competing goals when aiming to understand why people do, or do not, prioritize energy conservation during everyday activities. By understanding how people experience different conflicts throughout everyday life and on what basis they prioritize between different goals, we can gain knowledge of how people may be supported to live in a less energy intensive way while still pursuing their goals and desires. Addressing people's everyday conflicts between competing goals provides many opportunities to explore in future studies when aiming to support energy conservation.

Activating and strengthening people's goal of energy conservation is one approach to explore that may reduce the risk of conflicts with competing goals and make people prioritize energy conservation over other goals. However, people are sometimes locked-in to energy intensive patterns due to situational

conditions or the energy consuming artifacts they use during everyday activities, which might make it difficult to use less energy regardless of their level of motivation. Moreover, not everyone has an explicit goal to reduce energy consumption and additional approaches are therefore needed to support energy conservation for the individuals who want to engage in various types of conservation actions as well as the individuals who are not at all interested in reducing consumption.

Another approach to support energy conservation that is relevant to explore it thus how the artifacts people use in everyday life may be designed to support them to use less energy while still enabling them to engage in desirable activities that let them fulfill their needs and attain their primary goals. As people experience different types of conflicts throughout daily life, energy conservation may be supported in several ways. For instance, conflicts related to people's interactions with particular tools, *i.e.*, energy-demanding artifacts, could be addressed by improving the functionality and usability of products that may facilitate convenient and energy efficient interaction that enable people to use less energy when using products during everyday activities. People's choice of artifacts to use during everyday life and their choice of artifacts for future investments may be facilitated by, for instance, providing people with feedback on consumption or relevant product information prior to purchase.

Improving the design and user experience of energy efficient technologies may also make more people prioritize energy efficient appliances when making investment decisions regardless of whether or not they are interested in reducing consumption. Introducing new types of artifacts that enable people to consume differently or engage in new types of activities that are more desirable but less energy intensive is yet another approach that can be explored when aiming to support energy conservation. Taking on these types of approaches, *i.e.*, designing for sustainable behavior (see e.g., [49–51]) or practice-oriented design (see e.g., [52,53]), may result in new product solutions that, instead of negative rebound effects on consumption, can have positive effects on consumption as they may enable people to reduce consumption by living their lives differently [2].

This paper adds two important aspects to the existing literature on energy conservation that may be advantageous to consider for future research. First, the paper highlights the importance of addressing energy conservation in relation to people's everyday life, their activities and the many conflicts people experience between competing goals. Instead of studying people's actions and their determinants separately, we argue that it is vital to understand the interrelations between different actions, related everyday conflicts, and the complex web of activities that shapes people's everyday life, as these aspects strongly influence people's energy use and their approach to energy conservation. Second, this paper also highlights different types of conflicts related to energy conservation that people might experience in everyday life. As these conflicts influence people's energy use in different ways, it may be beneficial for future research to differentiate between them when exploring how energy conservation can be supported and facilitated. Addressing competing goals and everyday conflicts in future research has potential to provide insight on domestic energy consumption from a new perspective, which can contribute to a more holistic understanding of people's energy consumption in general and opportunities to support energy conservation in particular.

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## Author Contributions

Anneli Selvefors and Ulrike Rahe conceived and designed the study; Anneli Selvefors performed the data collection and analyzed the data; Anneli Selvefors and I. C. MariAnne Karlsson wrote the paper.

## Conflicts of Interest

The authors declare no conflict of interest. The founding sponsors had no role in the design of the study; in the collection, analyses, or interpretation of data; in the writing of the manuscript, and in the decision to publish the results.

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