



Charging Up: Energy usage in households around the world

Charging Up is an international study of people's practices and motivations in relation to everyday usage of energy in households. In the domain of energy many things are changing for consumers. Costs are going up and discussions on environmental aspects are becoming more frequent. Energy usage has increasingly become an issue in people's daily life. At the same time however, it is an area that is fairly abstract, difficult to monitor and for many people not a favourite subject to spend time on. This study investigated the interest and willingness people have to review and potentially alter their daily routines in energy usage, and in this respect explored how energy providers may support their customers with new services and tools. By doing a parallel study in nine countries around the world many similarities and some differences between households across cultures were identified. The results inform the development of Service Design strategies.



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Energy provision:

A common problem

A naive observer might think that energy companies couldn't care less if their customers do not understand or monitor their energy usage. They are in the business of selling energy, aren't they? The more energy people consume, the better for the company. However,

this is not completely the case. Energy companies are facing a problem that has relevance for society as a whole. At peak moments of energy usage during the day, traditionally in the early mornings and evenings, when many people are using a lot of energy at the same time, the regular stocks of energy companies are insufficient. They need to draw energy

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from resources that are more expensive (hydro) and more polluting (nuclear) than their regular stocks (gas and coal). They would actually rather avoid doing so and deliver energy in a more steady, inexpensive and unpolluting way.

Initial conversations with the internationally operating energy company EDF revealed that in their terms this issue is called 'load balancing'. They need to balance the load of energy requested from them. If they under-deliver, there will be social and economic uproar, if they over-deliver the network will 'melt down'. A fascinating illustration of the urgency of this issue can be found online in the video 'Tea Time Britain', a fragment of the BBC program 'Britain from Above' (www.bbc.co.uk/britainfromabove/stories/people/teatimebritain.shtml). This fragment shows how the operators of the National Grid Control Centre in the UK brace themselves each day for the end of the popular tv program Eastenders, as it triggers millions of people to put on their kettle for tea, causing an enormous and dangerous peak in energy usage.

These daily recurring power surges are a real concern to energy providers. Not only because of their need to run an efficient business, but also because of pressure from new government regulations and social demands. In this era of general awareness and concerns about the use of limited natural resources and climate change it should be considered a common goal to avoid this situation. The energy companies cannot simply solve this issue on their own. A change in

behaviour and engagement of consumers is also needed.

In business terms energy, like other utilities, belongs to a low-involvement service category. People don't tend to spend much time thinking about it, let alone figuring out how to monitor and manage their energy usage. It is therefore a fairly difficult area to raise the awareness on and to trigger behavioural change. The study 'Charging Up' aimed to discover whether there might be scope for services that enable consumers to be more involved in this issue in an easy accessible and non-obtrusive way. One of the main challenges was to find the trigger point for consumers to reconsider their daily routines in energy usage.

Energy consumption across cultures

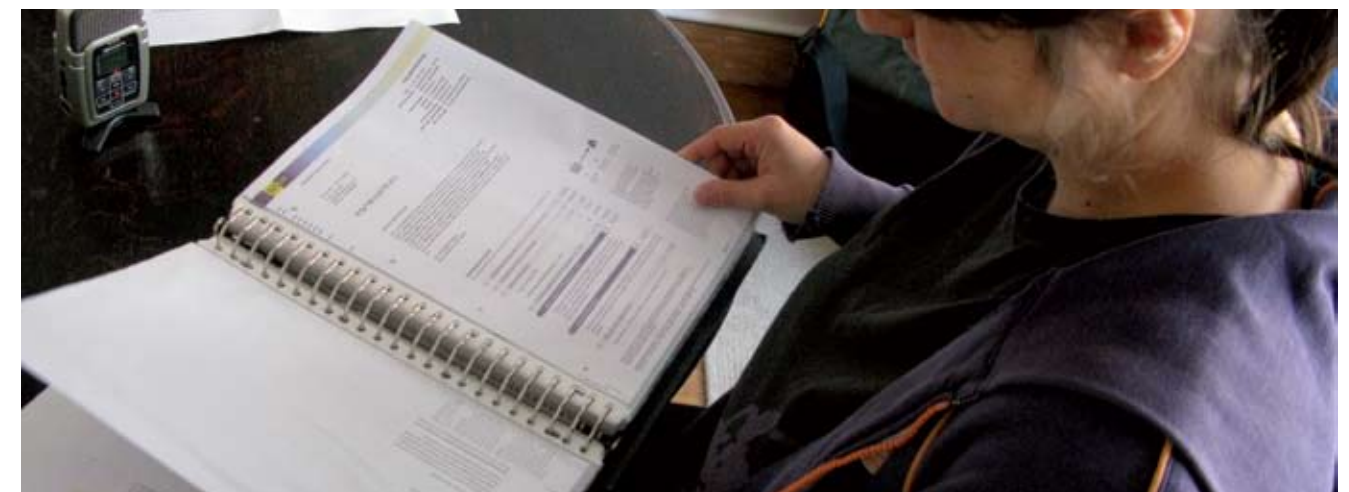
In a parallel study in nine countries the research explored people's everyday energy usage. What are their daily routines around the house? What understanding do they have of their energy usage? What aspects of energy usage do they care most about? What are their needs and concerns? Do they discuss these things in their households? The secondary focus of the study was to investigate people's attitudes towards the wider context of costs and environmental issues related to energy usage. How aware are they of these aspects? How much do they care? Does it drive their practices and discussions? During the preparations for the fieldwork we decided to trigger the conversations with the participants around the charging of mobile devices, as this is one of

the aspects where people might be most actively engaged in everyday routines and considerations around energy usage. The charging of mobile devices was used as the entry point to speak with participants about wider issues related to energy usage in their households.

This research was conducted as a joint study with the nine main partners in the Global Design Research Network REACH. The partners in the network have mixed backgrounds, some primarily in research (social or computer sciences), and others primarily in design (industrial, interaction or product design). The rich experiences and skills that come with these backgrounds inform and inspire our joint area of expertise, Design Research. An additional internal aim of the study for the network was to better align our methods

and research process. For many clients we work with specifically relevant, and often smaller, selections of partners from the network. This project was an opportunity to work with all partners and better align our methodology. Design Research is a crucial aspect of the Service Design approach, as it feeds the framework of thinking about how services can be beneficial for both the people using them and the organisations providing them.

The ethnography-based design research approach used a mix of techniques. Through home visits by local research teams to households in nine countries a rich collection of observations and interview data was elicited. The guidelines for the semi-structured in-depth interviews were developed in close collaboration with all the participat-



»These estimated bills are not a good measure of our actual day-to-day energy use. I usually just scan the numbers and don't read the additional information coming in with the bills.« figure 1, Example from Netherlands.

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»The fast pace of typical US households, particularly those with kids and both parents working, often makes it difficult for people to be environmentally responsible as they feel they should be. "It's a frenetic lifestyle, and it's charge this up and go, go, go"« figure 2. Example from USA

ing partners from the Reach network. On average we spent about two hours in each household, including both an interview and a guided tour around the house. These guided tours were documented with photography and video, capturing not only people's remarks about their daily routines and considerations but also the visual context of their daily environment. After the data collection each local research team clustered their data in a previously agreed format, illustrating their preliminary insights with pictures and quotes from the interviews. This way of sharing insights and evidence allowed for a structured comparison across local samples in the next stage of the analysis. By sharing and co-analysing the clustered data sets we jointly identified a series of shared

insights, based on both similarities and differences across the full sample of participants.

For behavioural change a better understanding and easy accessible support is needed

One of the findings that came out strongly across all local samples was that energy usage is an abstract matter to most people. For instance, the actual volumes consumed are very difficult to grasp. Most people did not know what devices were using the most energy in their household. When asked, they tended to mention the devices they use most (e.g. tv, computer, hair dryer), not the ones that actually have the highest capacity (e.g. devices for heating or cooling). Although people don't need a deep

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understanding of the energy usage for their day-to-day routines, many participants did express an interest in being able to monitor and manage their energy usage. This would enable them to better control their costs and the impact on the environment. Many people expressed that the current communication and services from their energy providers did not sufficiently support them in building up this better understanding or monitoring their actual consumption (figure 1). This clearly indicates an opportunity space for energy companies to provide new services.

Another finding that came up across various local samples was the fact that complex and dynamic circumstances in households make it difficult to pay much attention to everyday energy consump-

tion. Especially in households with children there are so many things that call for immediate attention that energy consumption is often one of the last things to get it (figure 2). In some households individual family members are taking care of charging their own devices, often in various places in the home, while in other households the charging of devices is concentrated in a few places (figure 3). Various participants expressed that despite their lingering interest in better monitoring and managing their energy usage, they find it difficult to spend the time necessary for it. This finding calls for services and tools that support consumers to monitor and manage their energy usage in an easy accessible way; another opportunity space for energy companies.



»Some Japanese houses have social sockets for guests to use. "My sons' friends often bring their PSPs here, and they are free to use our chargers"« figure 3. Example from Japan

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»I usually plug them in to charge in the evening and leave them overnight. If I wake up in the middle of the night, say to go to the bathroom, I might see that they are fully charged and unplug them.«

figure 4. Example from Hungary

One of the aspects wherein the findings across the local samples differed was related to home infrastructure. In many countries the traditional infrastructure in houses does not sufficiently support the charging of various mobile devices. People often have to make do with too few sockets in awkward places in the home (figure 4). Most houses are not built with the amount of electric devices we now use in mind. An exception to this are Japanese homes, where the infrastructure seems to be better in tune with the amount of electrical devices used. Even though the homes are very compact, people tend to have sufficient facilities to store and charge their devices.

Services to support understanding and translation to actionable results

In the Immersion and Insights stages of this study some interesting opportuni-

ties for energy providers to offer new services to their customers were identified. The most important opportunity is to give customers more control over their daily energy consumption through better facilitation of their understanding. It seems key to provide a higher level of transparency of individual energy consumption, for instance through an in-house monitor with a clear visual representation of usage feedback and options for self-tracking and comparisons over time. This tool will need to be paired with easy accessible services that reward consumers for being actively involved in managing their energy consumption, such as local community or school programs. Various energy suppliers are currently exploring the possibilities of smart metering, but often the main focus is on the technology involved and on internal implementation procedures. This approach is fairly top-down

and device-focused. From a Service Design point of view it would be more effective to widen the focus to a more two-way and engaging relationship with customers. This study helps energy companies to broaden their focus to include the customer perspective and make a clear link to people's daily practices and understanding, as this is a precondition to potential behavioural changes.

The participants in the study indicated to welcome new services and tools that will support them in gaining a better understanding and adapting their routines. In this light it is useful to connect to top-of-mind moments and practices, such as the charging of mobile devices. These are not the devices that use most energy, but the ones people are most personally involved with. They offer a starting point for raising awareness and behavioural change. Although the use of mobile devices does not put a big strain on the peak loads of energy usage, and changing people's behaviour around the use and management of these devices may not be the most effective way forward to balance the load, mobile devices seem to be an entry point into people's awareness and understanding of energy usage. In the study mobile devices were the trigger for conversation during data collection, but the data and findings were clearly more general. People are interested in a wider understanding and more control over their energy usage, but they require easy accessible information and support. Future services need to be geared to enable more general monitoring and managing, while

people's initial interest may be triggered in relation to their most personal electric devices.

In terms of Service Design processes, this study contributes to the early stage of developing a strategic framework of thinking that guides the design and implementation of new services. The results of the study provide a shared reference point that is firmly grounded in the perspective of the customers and clearly marks out opportunities and measures for successful new services. This is a relatively new approach in the utility sector, so the effects may take a while to materialise in various projects. An extensive list of opportunities and ideas has been discussed with EDF, and a selection of the insights is available to energy providers in other countries as well. As the results from this study may also be relevant to other service providers in related domains, such as domestic appliances, architecture and electric transportation, we are keen to share the results of the study in this wider context. Finally, we expect the research methodology and process to be of interest to the international community of Service Designers, because of the collaborative approach among the REACH partners with backgrounds in both research and design. ●

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This research was conducted in a close collaboration between the partners of the REACH network. More information on the network can be found at www.globaldesignresearch.com

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