Smart energy practices

Examining the ways in which households shape - and are shaped by - smart energy systems

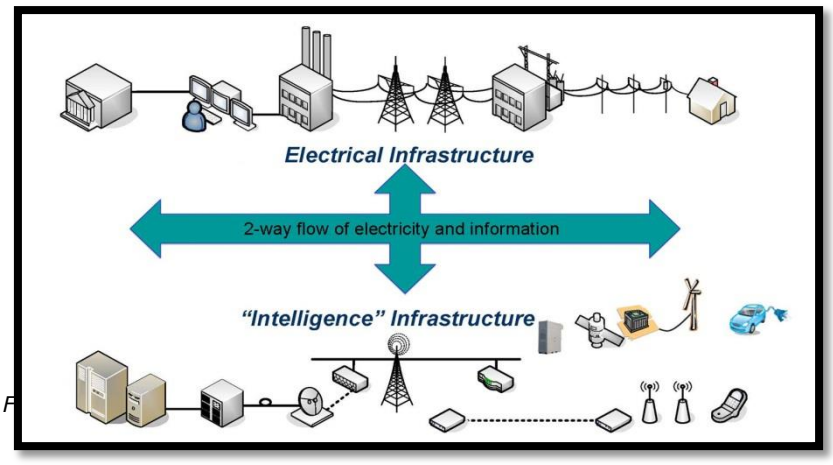
Informational Governance

Background

With energy demand continuing to rise and the effects of climate change becoming increasingly apparent, pressure is mounting to reconsider the ways in which we produce and consume energy. A large-scale sustainability transition is needed towards an energy future that is low-carbon and more decentralised than the centralised and carbon intensive energy system that is dominant today.

Smart grids and smart meters

The development of smart energy grids is considered an essential step towards a more sustainable energy future. A smart grid is an energy grid that is made 'intelligent' though the addition of advanced information and communication technologies. This intelligence is needed, among other things, to facilitate the efficient use of an increasing share of dispersed and weather dependent renewable energy sources, such as solar and wind power. Smart grids enable the (automatic) balancing of energy supply and demand, not only by adjusting production, but also by reconfiguring demand. Particularly important nodes in the future smart grid are digital smart meters, which replace the analogue meters that are installed in most households today. Smart meters enable detailed monitoring of energy production and consumption at household level, and allow for the two-way exchange of energy and information between households and energy providers.



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Highlights

- Smart energy systems are expected to facilitate the transition towards a sustainable energy future.
- While opening up new opportunities for households to reduce their carbon footprint, these technologies also give rise to concerns over consumer surveillance and the effective use of information.
- This research project seeks to acquire a better understanding of the roles and practices of households in the development of smart energy systems.

Problem description

Smart grids and smart meters open up new opportunities for households. With the help of new information flows they can start to reduce their carbon footprint by changing old carbon-intensive routines, and by adopting new more sustainable practices. Smart electric appliances can facilitate this by automatically responding to the availability of renewable energy.
However, the use of information and smart technologies can also be problematic: First, the disclosure of energy data can expose details about everyday life to outsiders. From present debates it becomes clear that questions regarding information disclosure, privacy and surveillance can hamper the roll-out of smart meters, and potentially compromise sustainability benefits. Second, it cannot be assumed that householders start using new information and smart energy technologies in 'optimal' and 'effective' ways. Previous research reveals that savings are often lower than commonly expected, inter alia, due to a lack of continued interest in energy data and the complex nature of everyday life and daily routines.

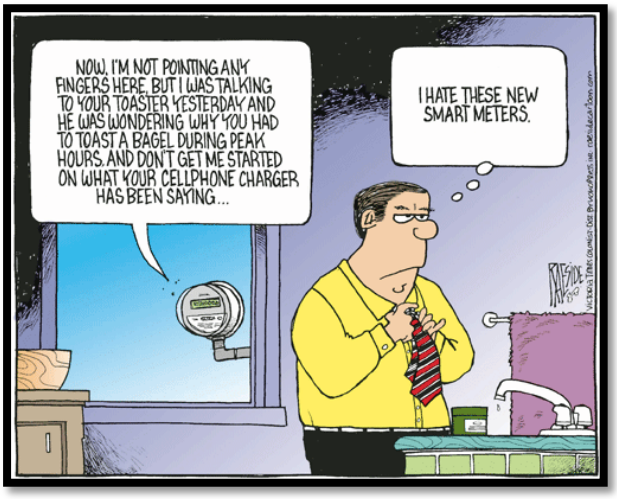

Figure 2: smart meter surveillance

Research focus

This project investigates the roles and practices of households in the emergence of a smart energy future. In particular, it examines the ways in which households make use of information, and the opportunities and threats that come along with new forms of communication and transparency: How do householders put information to work? And when do they start to share information with energy providers and other households?

Theory and conceptual framework

This research project makes use two main theories. First, the theory of informational governance highlights social transformations that come along with new possibilities for information generation, processing and use. Second, social practice theory centres on the stability and change of routine-like activities in everyday life. In the first study a framework has been developed to better understand the new interactions, practices and social relationships taking place in smart energy systems. It distinguishes three categories of energy and information flows: 1) flows between household-members, 2) flows between households and energy providers, and 3) flows between local and distant households. The framework is used as a basis for further research.

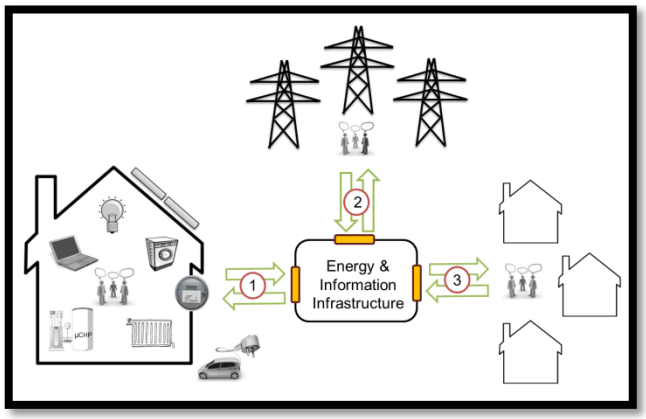

Figure 3: Conceptual framework of three information flows

Studies and data gathering

The Netherlands serves as the primary site of investigation. Each of the four studies uses a different set of research methods. The first study employs interviews with households, energy providers and institutional actors to illustrate the different categories of information flows as discerned in the conceptual model. The second study uses an online survey and a focus group to better understand householder privacy and participation in a smart energy future. The third study looks into the role of a citizen-led energy cooperative through participative observation in a series of workshops and interviews with project participants. The fourth and final study combines internet-based research with site visits to explore the uptake of environmental communication in smart grid pilot projects.

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