

# Smart energy practices

Examining how householders shape – and are shaped by – smart energy systems

Informational Governance



This project analyses the ways in which householders start making use of new energy and information flows, and the opportunities and threats that come along with new forms of communication and transparency.

## Background

With energy demand continuing to rise and the effects of climate change becoming increasingly apparent, there is increasing societal and political consensus that large-scale change is needed in the way that societies produce and consume energy. This systemic transformation has been captured under the header of 'the sustainable energy transition'. A sustainable energy transition presents a vision of the 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 next step towards a more sustainable energy future. A smart grid is an energy grid that is made 'intelligent' through 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 intervening in 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.

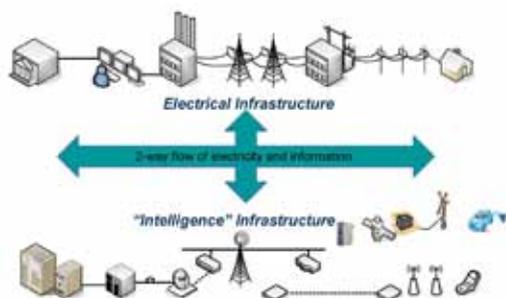


Figure 1. The smart grid.

## Highlights project

- Smart energy grids and smart meters are expected to facilitate the transition towards a sustainable energy future.
- While opening up new opportunities for (European) householders to reduce their carbon footprint, these information technologies also give rise to concerns over privacy and surveillance.
- This PhD project seeks to examine the ways in which households can – and do – contribute to a more sustainable and smart energy system.
- A conceptual framework around three sets of information flows is developed to acquire a better understanding of the different roles and actions of householders in smart grid development.

## Problem description

Smart grids and smart meters open up new opportunities for householders. With the help of new information flows they can reduce their carbon footprint by changing old carbon-intensive routines, and by adopting new and more sustainable ones. Smart appliances, such as smart washing machines or smart refrigerators, can help in this respect by responding (automatically) to information about the availability of renewable energy.

However, the use of smart energy technologies is also problematic. First, the disclosure of energy data can expose details about everyday life (e.g. consumption behaviour, whereabouts) 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. Secondly, it cannot be assumed that householders start using new information and smart energy technologies in 'efficient' and 'optimal' ways. Previous research reveals that energy savings are often lower than expected, inter alia, due to a lack of continued interest in energy data and the complex nature of everyday life and daily routines.

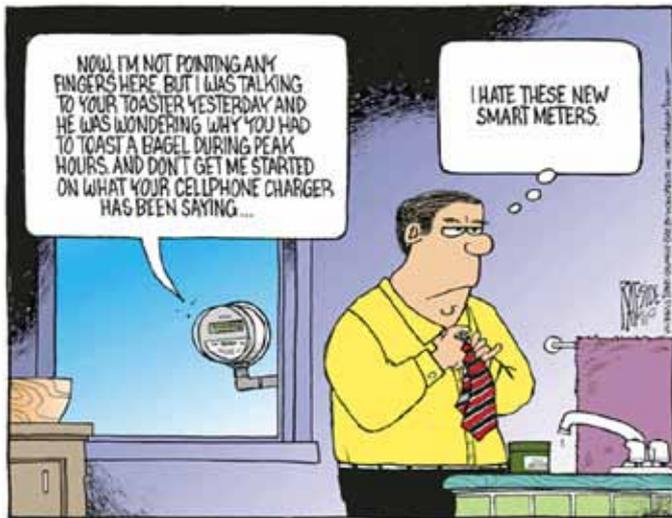


Figure 2. Smart meters as surveillance tools?

## Research focus

This research project investigates the roles and practices of householders in the development of a sustainable smart grid future. In particular, it examines the ways in which householders start making use of information, and the opportunities and threats that come along with new forms of communication and transparency: In what ways do householders put new information flows to work?

And what are the key social conditions for householders to disclose or share information?

## Theory and conceptual framework

This research project makes use of informational governance theory as well as theories of social practice, as developed in sociology. While informational governance highlights transformational processes of information generation, processing and use, a practice-based approach centres on the persistence and reconfiguration of routine-like activities in everyday life.

In the first study a conceptual framework has been developed around three categories of information flows: 1) flows between household-members, 2) flows between households and energy providers, and 3) flows between local and distant households. This framework is used to better understand the new interactions, practices and social relationships taking place in a smart energy system.

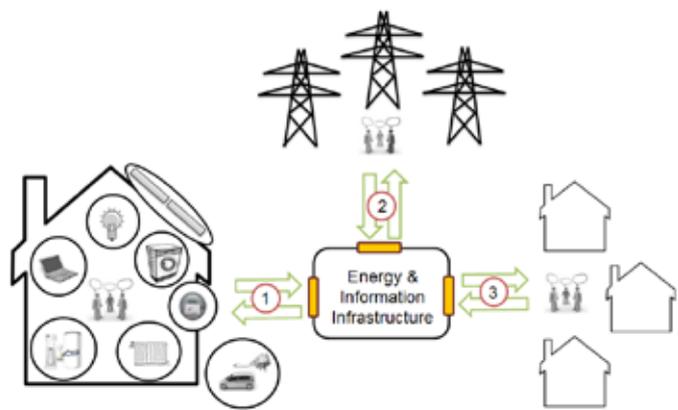


Figure 3. Conceptual framework of three information flows.

## Data gathering

Different research methods are employed in this project. The first study is largely based on interviews with Dutch householders, energy providers and other institutional actors. These are used to explore and illustrate the different categories of information flows as discerned in the conceptual model.

Subsequent in-depth research into the roles and practices of households includes an online questionnaire, focus groups and a longitudinal study of (smart) energy cooperatives. Finally, we are planning for an inventory of smart energy projects in the Netherlands and elsewhere in the EU, and for a comparative study of institutional structures in different countries.

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