

Policy brief based on the findings of the research project “Smart grid – a future electricity for all?”

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Summary

Smart grid users are often envisioned as rational actors that have economic resources and IT skills for engaging with smart energy products and services. This project focuses on groups of prospective smart grid users that differ from the ideas of “typical” users. Based on the qualitative interviews, this project aims to identify social groups that risk becoming marginalized and more vulnerable in smart grids and to describe barriers that can hinder them from fully benefitting from smart grids. The project findings urge to mainstream diversity of user perspectives, interests and needs in smart grid development.

Statement of the problem

Smart grids are one of the prioritized strategies in climate and energy policy in Sweden. Smart grids are often understood as more digitalized grids that are expected to contribute to increasing energy efficiency and to accommodating larger shares of intermittent energy sources in the energy systems. Household users sometimes occupy a central place in smart grid visions. Smart grid users are anticipated to have digital competences, technological interests and economic resources to become active users. At the same time, there are electricity consumers that would not fit to this description, for instance, due to their limited economic resources to invest in smart energy products and services or limited digital competences. Interests and needs of these electricity consumers may be neglected and marginalized in smart grids. Considering the significant public investments in smart grid development and the fact that smart grids may need as many users as possible to operate properly, it is crucial to explore how some electricity consumers may become marginalized in smart grids and to put forward strategies that can reduce risks of consumer marginalization in smart grids.

Aims of the research project are to:

- identify types of household consumers that risk becoming marginalized and neglected in smart grids
- describe barriers that can hinder household consumers from fully benefitting from smart grids
- develop strategies for a broader inclusion of household consumers in smart grids

Implementation

The project is designed as interdisciplinary social science inquiry based on qualitative semi-structured interviews. The interviews were carried out with (a) the energy companies, public authorities that work with energy matters, test environments and housing companies that have tested various smart energy products and services (12 in total) and (b) interest organizations and public authorities that represent or work with social groups that could potentially be marginalized in smart grids (8 in total). Apart from the interviews, focus groups were conducted with people that had recently received resident permits in Sweden and the ones that had lived in Sweden for several years on two occasions. The project has been carried out from October 2017 to September 2021.

Key findings:

Electricity consumers at risk of becoming marginalized in smart grids

Electricity consumers that are elderly, the ones with disabilities and health conditions, inhabitants of rural areas, tenants in rented accommodation, living in low-income households, with low levels of education, sole parents, people with immigration background are considered to have higher risks of becoming marginalized and more vulnerable in smart grids. At the same time, these social groups are heterogenous and broad. These groups cannot be seen as generally vulnerable in smart grids. It is only some people within these social groups that are considered to have increased risks of marginalization in smart grids. To identify consumers that have higher risks of becoming marginalized in smart grids, two approaches are suggested. The first approach is to focus on consumers that fall under two or more categories described above. For instance, elderly in rural areas, elderly with immigration background and people with low income and low education are regarded as having higher risks of becoming marginalized and more vulnerable in smart grids. The second approach is to target conditions and circumstances of electricity consumers that can potentially lead to increased vulnerability and marginalization in smart grids. In case conditions and circumstances are insufficient and unfavorable, they may hinder consumers’ adaptation to smart grids, smart energy products and services.

Conditions and circumstances potentially leading to increased consumer vulnerability and marginalization in smart grids

Structural level	Individual level
<ul style="list-style-type: none"> • Policies and regulations • Opportunities for public participation in smart grid development (political decision-making and design practices) • Access to infrastructure (broadband Internet) • Authority to install smart products and services at home 	<ul style="list-style-type: none"> • Competences and knowledge (digital and energy literacy, Swedish language skills) • Economic resources (access to hard- and software and the Internet connection) • Incentives and interest in energy questions and smart energy products and services

Flexible smart grids that accommodate diverse interests and needs are required

Households are expected to have different levels of interests, motivation and incentives to engage in smart grids through smart energy products and services. Many respondents consider that economic incentives are crucial for consumers to engage with smart energy products and services, while others argue that economic incentives are not the dominant ones for consumers and other incentives may play a higher role (e.g., environmental concerns and gamification). In Swedish context, single-family houses with electric heating are indicated as having economic incentives to engage with smart grids. Other consumers seem to be less in focus. Electricity consumers may have different levels of digital and energy literacy, competences, Swedish language skills and economic resources to invest in smart energy products and services. Diversity of consumer needs and interests needs to be mainstreamed in smart grid development. Interest and disinterest in smart energy technologies may be crucial for adaptation to smart grids. Therefore, it is especially important to make smart grids flexible with respect to different levels of consumer interest. Even if electricity consumers are not expected to engage with smart grids on everyday basis, it is important that various user perspectives are considered when smart energy technologies are being developed.

Strategies that can contribute to reducing risks of marginalization of some groups of electricity consumers in smart grids:

For regulatory authorities

- Launch information campaigns targeting different social groups for motivating electricity users to change energy behavior to a more sustainable one, including explanations why it matters and why change is needed, how it works and how it can improve people's lives.
- In case flexible tariffs are introduced, ensure that there are sufficient incentives for electricity consumers for adjusting their daily use of electricity.
- In case flexible tariffs are introduced, carry out an information campaign about this change that specifically target social groups that risk being marginalized in smart grids, including those with less proficiency in Swedish language and understanding of how Swedish electricity markets operate.

For energy companies

- In case costs of new smart meters are passed on to electricity consumers, make them visible in electricity bills and provide different options for consumers to pay for them.
- In case flexible tariffs are introduced, make sure that information about tariffs is available through different media and in easy Swedish (lättsvenska).

For technology/service providers (smart grid related products and services)

- Configure smart energy products and services in such a way that they can accommodate different levels of digital competences, interest, and motivation to use them.
- Follow principles of universal design in creating new smart energy products and services which will contribute to their accessibility.

- Diversify enrolment of electricity consumers and include specifically groups that risk being marginalized in smart grids that take part in tests and trials of smart energy products and services.
- Invite organizations that represent or work with social groups that risk being marginalized in smart grids to cooperate in development of smart energy products and services.

For test environments

- Encourage focus on diverse consumer perspectives in smart grid development, including most vulnerable groups, in calls for research projects that can be carried out at a test environment.

For housing companies that test smart energy products and services

- Calculate and take into consideration how installation of smart energy products and services in apartments may affect most vulnerable groups of tenants economically as well as in terms of their access to rented apartments.

For municipalities

- Organize services of digital help and energy advisors in such a way that they are available even in remote areas, e.g., through temporary visits to these areas.
- Organize proactive programs of reaching out to consumer groups that can be marginalized in smart grids, specifically, for increasing energy literacy and raising awareness about smart energy products and service.