University of Groningen

Consumer behavior why engineers need to read about it

Schuitema, Geertje; Steg, Linda; O'Malley, Mark

Published in:
IEEE Power and Energy Magazine

DOI:
[10.1109/MPE.2017.2762378](https://doi.org/10.1109/MPE.2017.2762378)

IMPORTANT NOTE: You are advised to consult the publisher's version (publisher's PDF) if you wish to cite from it. Please check the document version below.

Document Version
Publisher's PDF, also known as Version of record

Publication date:
2018

[Link to publication in University of Groningen/UMCG research database](#)

Citation for published version (APA):
Schuitema, G., Steg, L., & O'Malley, M. (2018). Consumer behavior why engineers need to read about it. *IEEE Power and Energy Magazine*, 16(1), 14-18. <https://doi.org/10.1109/MPE.2017.2762378>

Copyright

Other than for strictly personal use, it is not permitted to download or to forward/distribute the text or part of it without the consent of the author(s) and/or copyright holder(s), unless the work is under an open content license (like Creative Commons).

The publication may also be distributed here under the terms of Article 25fa of the Dutch Copyright Act, indicated by the "Taverne" license. More information can be found on the University of Groningen website: <https://www.rug.nl/library/open-access/self-archiving-pure/taverne-amendment>.

Take-down policy

If you believe that this document breaches copyright please contact us providing details, and we will remove access to the work immediately and investigate your claim.

Downloaded from the University of Groningen/UMCG research database (Pure): <http://www.rug.nl/research/portal>. For technical reasons the number of authors shown on this cover page is limited to 10 maximum.

consumer behavior

why engineers need to read about it

ENERGY INVOLVES EVERYBODY.

Current changes in energy and power systems, including the distributed production of renewables, an increasing need for flexibility of operations, and energy storage and transmission, affect consumers in one way or another. Changes often require the active participation and support of consumers, who may become prosumers. All the new systems and technologies developed by electrical engineers may influence consumer behavior and trigger positive or negative responses. Hence, it is important for electrical engineers to understand how their work may affect consumers, which behavior changes their solutions involve, and which consumer needs and preferences must be considered when developing new technology. This issue encourages a conversation among electrical engineers and social scientists and facilitates the integration of their different expertise.

There are many different disciplines in social sciences and humanities, just as there are various types of engineers. The role of “consumers” in energy systems is studied by many of these disciplines, and they often use different concepts, theories, and methods. The articles in this issue are primarily written by psychologists and sociologists, who provide their views on the topics therein. One discussion within social sciences and humanities is about how to refer to individuals and whether or not to

consider different roles of individuals. Terms used are, among others, people, consumers, citizens, activists, or voters.

While acknowledging the importance of the differences among these terms, reflecting different roles of individuals, the authors in this issue use *people* or *consumers* as umbrella terms for all sorts of roles of individuals, to avoid overly complicating the message.

This issue of *IEEE Power & Energy Magazine* contains five articles that all focus on the role of consumer behavior in energy research. The articles give engi-

neers a sense of why it is important to understand consumer perspectives and behavior in energy systems. Common misunderstandings and simplifications are highlighted about why consumers respond or act in the way they do and how this may be changed. Comprehensive approaches to understanding consumer behavior and tools to change their responses and behavior are offered.

The first article by Steg, Shwom, and Dietz, “What Drives Energy Consumers?,” discusses how consumers may be encouraged to actively engage in a sustainable energy transition by targeting important drivers of their behavior and removing significant barriers for change. Drivers and barriers that are discussed include individual character-

istics, such as knowledge, awareness, values, identity, and habits. Contextual factors are discussed: spatial, infrastruc-

tural, economic, and cultural factors; institutional arrangements; and access to technology, products, services and information. Strategies to change consumer behavior are presented, including those aimed at changing the context and knowledge and motivation, and the added value of tailored approaches. Finally, the relationship between behavior change and quality of life is given.

In the second article, “Communication Is Key,” authors Abrahamse, Darby, and McComas critically discuss three commonly used “fixes” of individuals’ behavior that may lead to environmental and energy problems. Each fix approaches consumer behavior in a different way and has different assumptions. The technological fix aims to modify the physical surroundings, which is assumed to lead to behavioral changes in line with these physical changes. Structural fixes attempt to modify behavior by changing the social context in which decisions are made, e.g., by implementing regulations. Cognitive fixes try to change people’s behavior by targeting cognitive factors that steer those behaviors, such as attitudes, beliefs, and values. The authors argue that none

There are many different disciplines in social sciences and humanities, just as there are many different types of engineers.

of these three fixes on their own are likely to solve energy-conservation challenges because consumer behavior is influenced by all three aspects. A combined approach, however, offers a greater probability of success in the long term, which is referred to as a sociotechnical approach.

The third article, “A Part of the Energy ‘In Crowd’” by Jans, Bouman, and Fielding, reasons that consumers are part of one or more social groups and that these groups influence their decision-making processes, attitudes, and behavior. The authors propose that social identities, i.e., a per-

The articles give engineers a sense of why it is important to understand consumer perspectives and behavior in energy systems.

son’s sense of who they are based on his or her group membership(s), are crucial in this respect. Social identities will particularly affect energy attitudes and behavior when energy issues are an important part of one’s social identity and when individuals strongly identify with the relevant group. The authors contend that community approaches may be very promising in changing people’s energy behavior, followed by approaches focusing on individuals. To that end, the authors conclude that targeting values and norms in groups may be the basis for successful community-based interventions.

The fourth contribution is from van der Werff, Thøgersen, and Bruine de Bruin, “Changing Household Energy Behavior.” In this article, a common strategy to change consumer behavior is critically discussed: monetary incentives. The authors present when monetary incentives are likely to be effective and elaborate on three downsides of such incentives. First, when financial rewards (e.g., subsidies) are employed, the money saved may be spent in such a way (e.g., on energy-inefficient goods) that the system will not benefit, reflecting the so-called rebound effect. Second, incentives may be too small to be worth the effort and thus not motivate people to change their behavior. Third, monetary incentives may lead to crowding out intrinsic motivation, which means that other (intrinsic) motivations to support a reliable sustainable energy system may be undermined,

What do you want to do?

Perform real-time contingency analysis outside your EMS?

Train multiple operators simultaneously on the same model with great graphics?

Use the same software suite for transient stability and power market analysis?

Enable your operators and planners to use the same models and diagrams?

Distribute calculations across multiple machines for faster simulation?

PowerWorld Corporation: The Visual Approach to Analyzing Power Systems
We can help.

PowerWorld
Corporation

+1.217.384.6330
www.powerworld.com

and, as a result, such incentives may not be effective and may even be countereffective. The authors then present alternative strategies to change the behavior of energy consumers and discuss how and when monetary incentives may strengthen or undermine these strategies.

In the final article, “At the Heart of a Sustainable Energy Transition” by Perlaviciute, Schuitema, Devine-Wright, and Ram, the authors contend that public engagement and acceptance are crucial for realizing sustainable-energy projects. They argue that misguided, inaccurate, and simplified assumptions about public acceptability often lead to ineffective policies that lack public support. Various misperceptions of policy makers and engineers are discussed, such as interpreting all public resistance to

energy projects as a not-in-my-backyard response and assuming that financial incentives or information provision will always enhance public acceptance. The belief that initial resistance to change will automatically be overcome when changes are made is debated. Finally, the idea of a one-size-fits-all approach is critically discussed. The authors state that public acceptance depends on the characteristics of energy projects, the qualities and meanings of places where projects are sited, and general psychological and social factors. Taking such different factors into account, they outline concrete steps for progress, alternative approaches that take public acceptability as a necessary and valuable building block for the development of energy projects.

The issue concludes with an “In My View” column by Gerd Schönwälder from the European Commission, who makes the case for empowering people and putting them at the center of the new, greener energy system of the future. He discusses why empowering people is needed, which knowledge gaps and research challenges are out there, and why they need to be addressed. In his role in the European Commission, Schönwälder works on embedding socioeconomic aspects of the transition to a decarbonized energy system in EU policy directions.

We hope that this issue of *IEEE Power & Energy Magazine* will broaden your horizon and, most of all, stimulates debate among engineers, social scientists, and humanists.

DSATools™

Dynamic Security Assessment Software

Offering a simple, user-friendly interface with extensive analysis options, DSATools™ is a suite of software tools for power system analysis. The software is designed for applications in both off-line studies and on-line dynamic security assessment.

www.dsatools.com

Contact us:
dsainfo@powertechlabs.com

Advanced modeling and analysis features include:

- Comprehensive capabilities for voltage, transient, small signal, and frequency stability assessment
- Integration with EMS/WAMS for on-line DSA to assess security of real-time system conditions
- Computation of secure operation regions (stability limits)
- Recommendation of remedial actions

Experience and support:

- Prominent provider of the on-line DSA technology with over 40 installations worldwide including 7 out of 9 ISOs in North America
- Consulting services for custom software and model development, system studies, and training

Powertech

81022-0005