

Editorial

The Role of Energy Behaviors in Designing Energy Policies for a Sustainable Future

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Energy behaviors have increasing importance in the design of policies and programs that promote transitions to a low-carbon and more sustainable future. In this setting, the focus has moved from predominantly technological and financial issues (the so-called physical–technical–economic model) to the pursuit of more integrative approaches encompassing social changes.

Energy behaviors can be broadly understood as the role of people, organizations and technology in energy use across sectors; this includes households, non-domestic buildings, industry, transportation, communities, and cities.

This Special Issue of *Energies* on “The role of Energy Behaviors in designing energy policies for a sustainable future” comprises six papers, which have been recommended for publication after a thorough reviewing process. The papers address the influence of different variables on household energy consumption, including: activities and working patterns; end-users’ willingness to participate in demand-response programs and adopt Time-of-Use (TOU) tariffs; and the challenges of promoting energy efficiency in buildings and engaging users to increase their self-consumption in an energy community setting.

Trotta et al. investigate electricity consumption patterns in vulnerable households, combining population-based register data with hourly electricity-consumption data. The results indicate four distinct vulnerable household profiles characterized by different peak/off-peak periods and energy consumption profiles, also varying across seasons. These profiles are discussed with reference to the performance of everyday practices and the design of demand-side management strategies targeted at vulnerable households.

Lórinicz et al. exploit the relationship between working patterns and energy consumption from the perspective of time-use, using time-use survey data. An approach for estimating residential energy consumption with regard to activity timing, activity location and coordination, and appliance type is proposed. In addition, patterns in residential activities and energy consumption, as well as the causal relationship between residential energy consumption and work patterns, are analyzed. The results suggest that full-time employees have higher potential for reducing their energy use compared to part-time employees. Time-use data are discussed as a valuable tool for evaluating and designing energy and labor-market policies.

Iliopoulos et al. examine the influence of the interpersonal, intrapersonal, and socio-demographic characteristics of households on their willingness to participate in demand-response programs. The authors also explore the willingness of households to receive non-electricity-related information and participate in a peer-to-peer energy platform. The findings suggest that household income, ownership of electric vehicles, socio-environmental awareness, perceived sense of comfort, control, complexity, and philanthropic inclinations are drivers of demand flexibility. The results are discussed and policy recommendations proposed, to expand the participation in demand-response programs.



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Sundt analyses how attitudes drive end-users' willingness to choose Time-of-Use (TOU) tariffs, conducting an exploratory factor analysis on attitudes towards these tariffs, climate change awareness, and belief in energy-saving measures. Three factors were found to be significant: positive and negative attitudes towards TOU tariffs, and climate change awareness. The results are discussed with an emphasis on the need to improve end-users' information about the positive impacts of TOU tariffs on climate change mitigation, grid stability, and energy savings.

Using a qualitative approach, Hewitt explores the influence of informal leaders in shaping the culture and motivation for conserving energy in buildings. The findings suggest that leadership can shape the perception of energy and the culture around it but can also be leveraged to craft a more environmentally motivated conservation culture. The author also argues that leadership can be complementary to decentralized organizational structures, and that creative mechanisms in residential buildings can capitalize on both, allowing for members at all levels of the organization to have more influence on shaping a building's culture. A thorough discussion of the impact of framing buildings as organizations is held as a contribution to the design of energy efficiency approaches.

Using quantitative and qualitative methods, Gohary et al. explore the challenges of engaging users to increase self-consumption in a microgrid equipped with photovoltaic panels. The authors address the limitations of price signals and financial incentives and emphasize the need for a broader approach that incorporates a wider set of motivators while appealing to collective and community-based settings. The results are discussed with an emphasis on the role of price signals and legislative frameworks, and to support and strengthen the autonomy of energy communities.

These papers offer a broad view of the diversified and integrative approaches employed in studying energy behaviors, as well as their role in energy demand, to promote energy efficiency and enable the energy transition, which deserve further research.

We hope that the readers appreciate this Special Issue and its offering of new ideas for further research and interventions in practice.

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