



The NUDGE Project: Unlocking sustainable energy behaviours through nudges



Tiziana Toto and Mariano Votta from Cittadinanzattiva detail the NUDGE project's exploration of behavioural interventions in encouraging consumers to make energy-efficient choices

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SUSTAINABLE energy behaviours are paramount for addressing our planet's pressing environmental challenges. By embracing sustainable energy practices, individuals and communities contribute to mitigating climate change, reducing greenhouse gas emissions, and preserving natural resources.

Moreover, sustainable energy behaviours promote energy efficiency, leading to cost savings, improved energy security, and enhanced resilience to energy shocks. Beyond the environmental and economic benefits, embracing sustainable energy behaviours fosters social equity by ensuring access to clean and affordable energy for all.

However, how do we help consumers gravitate towards more sustainable energy practices?

The Horizon Europe-funded NUDGE¹ (NUDging consumers towards enerGy Efficiency through behavioural science) project sought to explore the potential of behavioural interventions, also known as behavioural nudges, at incentivising consumers to make energy-saving choices.

To understand consumer energy behaviours, the project started by conducting a comprehensive survey spanning 29 countries and available in 15 languages. This survey, completed by over 3,000 individuals, yielded invaluable insights into the complexities of energy consumption patterns, identifying six distinct consumer profiles and corresponding behavioural nudges necessary to promote sustainable energy behaviour effectively.²

Understanding energy consumer profiles

The survey revealed six primary consumer profiles, each characterised by unique attitudes, knowledge levels, and motivations regarding energy consumption:

1. **Environmentally conscious and well-informed energy consumers:** This group demonstrates a profound concern for environmental issues and possesses a strong awareness of energy-saving strategies. They prioritise energy efficiency and are willing to make sacrifices for environmental preservation.
2. **Concerned but comfort-oriented energy consumers:** While acknowledging the importance of energy conservation, individuals in this group may prioritise



Consumer profile	Type of Nudge	Description
Environmentally conscious and well-informed energy consumers	Reinforcement	Feedback and awareness: Maintaining interest through regular but infrequent information on energy saving.
Concerned but comfort-oriented energy consumers	Comparison	Remind of the consequences: Invite the user to consider the consequences of an action, e.g. raising the temperature of the thermostat or air conditioning, insisting on the additional cost involved.
Concerned but unaware energy consumers	Facilitating	Default: Turn the energy-saving settings of devices (thermostats, air conditioning systems) into default settings, to spare the user the 'burden' of learning what is appropriate and what is not.
	Reinforcement	Real-time hints and tips: Provide users with hints and tips exactly when they interact with device settings that have an impact on energy consumption.
Materialistic energy consumers who shirk their personal responsibilities	Comparison	Remind of the consequences: Invite the user to consider the consequences of an action, e.g. raising the temperature of the thermostat or air conditioning, insisting on the additional cost involved.
Energy consumers prone to social influence	Social influence	Enabling social comparison: Using different means to facilitate comparison with other peers (friends, neighbours, consumers with similar demographic characteristics).
	Social influence	Target setting and commitment: Getting consumers to make a formal commitment to reduce the energy they consume, often in exchange for a (non-monetary) reward.
Indifferent energy consumers	Facilitating	Default: Turn the energy-saving settings of devices (thermostats, air conditioning systems) into default settings, to spare the user the 'burden' of learning what is appropriate and what is not.
	Reinforcement	Feedback and awareness: Use suggestions, notifications, marketing campaigns, to raise awareness among this group of users and overcome their reservations about the effectiveness of their behaviour.
	Reinforcement	Hedonistic goal: Emphasise the big picture and the impact on the big issues, possibly with some exaggeration, in order to turn energy saving into a goal.

personal comfort over energy-saving measures, particularly concerning heating and cooling.

3. Concerned but lacking awareness energy consumers: Despite expressing intentions to save energy, this group lacks specific knowledge about practical energy-saving methods, hindering their ability to take concrete actions.

4. Materialistic energy consumers escaping personal responsibility: Despite understanding the environmental consequences of energy consumption, these individuals prioritise financial concerns over environmental responsibility. Nudges focusing on monetary savings may effectively promote energy-saving behaviours among them.

5. Prone to social influence energy consumers: This segment values social approval and is influenced by societal norms. Leveraging social pressure and setting clear goals could effectively promote energy-saving behaviours among these individuals.

6. Indifferent energy consumers: Individuals in this group demonstrate low intentions for energy-saving and lack environmental concern or awareness. Addressing their indifference may require multifaceted approaches to encourage behavioural changes.

From environmentally conscious to indifferent energy consumers, these six profiles embody the features that hinder energy-saving behaviours and encourage specific interventions on them.

Implementing behavioural interventions

Building upon the insights from the survey, the NUDGE project initiated field initiatives across five EU countries, targeting diverse demographics and energy contexts.

The pilots targeted consumers in Greece, Belgium, Germany, Portugal, and Croatia, in different environments (residential, energy communities, schools), belonging to different age groups (including young children), belonging to different income classes (low, medium, high), served by different energy carriers (electricity, natural gas), with the inclusion of prosumers and drivers of electric vehicles.

The pilot projects employed sequential nudging interventions, such as feedback mechanisms, awareness campaigns, gamification, goal setting, and push notifications tailored to each consumer profile. Aims of the pilots included:

- Increasing self-consumption (Germany, Croatia);
- Improving energy knowledge (Belgium);
- Optimising the charging of electric vehicles with self-generated photovoltaic energy (Germany);
- Reducing heating-related consumption (Belgium, Portugal, and Greece);
- Reducing electricity consumption (Portugal); and
- Improving indoor air quality (Portugal).

	Germany	Croatia	Belgium	Portugal	Greece
Nudge 1	Feedback and awareness	Stimulating empathy		Feedback and awareness	Feedback and awareness
Nudge 2	Gamification and goal setting	Feedback and awareness	Educational nudges and pupils as multipliers for two school cohorts	Push notifications	Just in time suggestions
Nudge 3	Default	Gamification and goal setting		Push notifications, feedback and awareness	Push notifications



Croatia:
Promoting distributed self-production for local Energy communities



Greece:
Efficient control of heating and DHW preparation for Natural Gas boilers



Germany:
Optimization of EV charging with self-produced PV power



Belgium:
Interdisciplinary, project-based education on home energy consumption for children



Portugal:
Healthy homes for long-lasting energy efficiency behavior

Energy monitoring and management tools

Digital user interfaces

Long-term energy efficiency behavior change potential

Three nudging interventions were tested in sequence in the four pilot projects, excluding the Belgian one, which provides educational nudges through courses during the school year.

Most of the pilot projects started with nudging interventions that provided feedback on participants' energy consumption and aimed to increase their awareness. These were followed by more interactive nudges, particularly those with push notifications, just-in-time prompts, gamification, or goal setting.

While the results showed promising energy savings ranging from 0.4% to 3.5% and as high as 15% in the case of nudges aimed at electric vehicle smart charging, they highlight the importance of understanding diverse energy user profiles for effective intervention strategies.

Policy recommendations for promoting sustainable energy behaviours

Drawing from the findings of the NUDGE project, several policy recommendations - focused on consumers and consumer associations - emerge to facilitate sustainable energy behaviours.³

Enhancing environmental awareness

Continued investment in information and awareness campaigns, coordinated at both European and national levels, is essential for fostering greater environmental consciousness among citizens. Collaborative efforts involving various stakeholders, including consumer and environmental associations, can amplify the impact of these initiatives.

Improving energy knowledge

Implementing educational initiatives, particularly within school curricula, can enhance understanding of energy consumption issues from an early age, empowering

individuals to adopt energy-saving behaviours. Peer education programmes and community involvement can further reinforce these efforts.

Improving consumer perceptions

Promoting awareness of the impact of specific behaviours, such as lowering thermostat temperature by two degrees to save 15%, enhances individuals' sense of personal efficacy in energy conservation efforts.

Regulators and energy suppliers should prioritise disseminating information on accessible tools for monitoring consumption, such as simplified bills and smart meters, to empower consumers to make informed decisions about their energy usage in real-time.

Designing tailored approaches

Conflicting motivations can hinder the adoption of sustainable behaviours, as personal comfort often takes precedence over environmental concerns, such as adjusting home temperatures for energy savings.

To address this, energy service providers should engage in prior consultations to understand users' knowledge gaps and facilitate behaviour change. Training initiatives involving multiple stakeholders are effective, particularly with adult citizens, while early educational interventions can bridge the intention-action gap, especially among younger populations.

Providing effective feedback

Habits strongly influence behaviour, often more than intentions, as they are deeply ingrained and challenging to change. Nudges are most effective when creating new behaviours rather than altering existing habits. Therefore, prioritising timely and personalised feedback is recommended, with higher frequency and content tailored to individual energy consumption patterns.



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Comparisons with others' performance can enhance effectiveness, while focusing solely on economic benefits may be counterproductive due to the perceived insignificance of savings.

Ensure access to technology

The pilots demonstrated that households with tools to monitor energy usage could consciously change their consumption habits. It's recommended to make tools like smart meters accessible to all income groups to address energy poverty by enabling conscious energy consumption behaviour for those who need it most.

Data confidentiality

The NUDGE project survey revealed that the majority seems unwilling to share detailed energy data, i.e., on a daily to real-time basis. Concerning this aspect, the recommendation is to provide consumers with adequate information and evidence on how their data are processed in accordance with the legislation in their respective countries and to protect their right to privacy.

In conclusion, the NUDGE project underscores the complexity of altering energy consumption behaviours and emphasises the importance of tailored interventions, education, and collaboration across stakeholders. Addressing these challenges collectively is vital for promoting sustainable energy practices and achieving a lasting shift towards energy-conscious behaviours across diverse populations.

By implementing targeted strategies and fostering a culture of energy awareness, policymakers, energy service providers, and regulators can pave the way for a greener and more sustainable future.



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