

REVISITING THE ROLE OF CONSUMERS IN THE ENERGY TRANSITION

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Overview

The significance of consumer behaviour in the energy transition is multifaceted and profound. The International Energy Agency (IEA) underscores that achieving global net-zero emissions by 2050 is an endeavour that transcends technological and financial domains; it necessitates considerable behavioural shifts within society (IEA, 2020). This call to action stems from the inherent interconnectedness of various sectors; a lag in one cannot be offset by expedited progress in another. Thus, the energy transition is contingent not only on advancements across all sectors but also on harmonized and collective behavioural changes.

Technological solutions, while indispensable, are not a panacea. They are bound by constraints such as scalability, the maturity of the technology, the speed of deployment, and their intrinsic capacity to reduce emissions. Furthermore, as global energy demand is projected to grow in tandem with economic and population expansion, the scale of the energy system will be considerably larger by 2050. This growth presents additional challenges for decarbonization efforts. Consumer behaviour that leads to reduced energy consumption, increased energy efficiency, and a greater demand for renewable energy sources will be essential to curbing the growth in energy demand and ensuring that it is met in a sustainable manner.

Consumer behaviour exerts a profound influence on the energy transition, primarily through market signals and policy responsiveness. The collective decisions and preferences of consumers act as a powerful force, steering energy production and investment away from traditional fossil fuels and towards renewable sources. Preferences for sustainable energy, manifested through choices that favour reduced fossil fuel reliance—like opting for shorter flights, increased reliance on walking, cycling, and micro-mobility systems, and even moderating road speeds—send clear signals to energy producers, investors, and policymakers. These market signals can catalyse a shift in energy production priorities, spur innovation in low-carbon technologies, and influence the strategic direction of infrastructure development.

Moreover, the effectiveness of energy transition policies is intricately linked to how consumers respond to them. Subsidies, taxes, and other policy instruments are designed to nudge consumers towards more sustainable energy usage. The success of such policies hinges on the understanding of consumer behaviour, which is a determinant of the adoption rates of new technologies like electric vehicles or solar panels. High adoption rates can accelerate the scalability of these technologies, significantly impacting the energy system. Consumers also contribute to demand-side flexibility, which is vital for integrating intermittent renewable energy sources into the grid, thus ensuring stability. Additionally, consumers' investment decisions in renewable technologies are crucial; they not only fuel the development and deployment of these technologies but also set the tempo for the energy transition. Lastly, social acceptance is indispensable, particularly as green energy policies might result in elevated energy costs. It is also a pivotal driver for the realization of infrastructure projects such as wind farms or transmission lines. Addressing and aligning with consumer concerns is therefore integral to achieving widespread support and ensuring the success of the energy transition.

Methods

In this paper, we methodically explore the multifaceted impact of consumer behaviour on the energy transition, conceptualizing it through four distinct channels: investment behaviour, consumption behaviour, market participation, and political participation. By employing consumer theory, we dissect the primary drivers influencing each type of behaviour, thereby unravelling the complex tapestry of consumer dynamics in the energy domain. This theoretical framework serves as a foundation for discerning the nuanced implications these behaviours have for the formulation of effective energy transition policies. Further enriching our analysis, we delve into two pertinent case studies—the Covid-19 global pandemic and the recent energy price crisis. These cases provide a fertile ground for extracting real-world insights into consumer behaviour under extraordinary circumstances, allowing us to distil key lessons that can refine policy-making strategies and enhance the efficacy of interventions aimed at facilitating the transition to a sustainable energy future.

Results

The analysis within this paper reveals that consumer investment behaviour in the energy sector is significantly influenced by a confluence of factors, among which technology cost reductions, energy costs, and financial incentives emerge as the most consequential. The decreasing costs of renewable technologies, such as solar panels and batteries, play a pivotal role in lowering the barriers to entry for consumers. Energy costs, which encompass the price of conventional energy sources in relation to renewable options, serve as a compelling driver for consumers to invest in low carbon solutions. Financial incentives, exemplified by mechanisms like Feed-in Tariffs or net metering, critically enhance the financial attractiveness of investing in renewable energy technologies. Additionally, the availability of loans and leasing options further catalyses consumer investment by easing the initial financial burden. Climate awareness, peer effects, social norms, and the increasing desire for self-sufficiency also contribute to shaping consumer investment behaviours, albeit to a lesser extent compared to the leading trio of drivers.

Our examination of consumption behaviour underscores that economic factors, particularly price and income levels, alongside policy and regulation, hold paramount significance. The interplay of these factors determines the extent to which consumers engage with energy-efficient products and renewable energy sources. The availability, usability, and performance of technology stand out as critical enablers, facilitating or impeding consumer energy use patterns. Environmental awareness, particularly the knowledge of climate change impacts, informs and often motivates consumption decisions, as do social and cultural factors, which shape norms and attitudes towards energy use. Information and education, through targeted access to information and educational campaigns, have a marked impact on consumption behaviour, as do psychological factors such as perceived effectiveness, habits, and motivation. Lastly, demographic variables, including age and urbanization, are identified as influencers, yet their impact is overshadowed by the more immediate economic and policy-driven considerations.

In terms of market participation, the paper emphasizes the burgeoning role of consumer flexibility as a product. This concept underlines the potential for consumers to influence the energy market by adapting their energy usage patterns, contributing to grid stability, and facilitating the integration of renewable energy. Meanwhile, political participation is characterized through activities such as voting, engaging in policy petitions, and litigation. These forms of participation are critical levers through which consumers can exert influence on the energy transition, shaping policies, and fostering an environment conducive to sustainable energy practices. The aggregate effect of these behaviours on the energy transition underscores the vital role of consumers as active agents in steering the global shift towards renewable energy.

Conclusions

In the grand narrative of the energy transition, consumers emerge as the unsung titans whose behaviours—ranging from investment decisions and consumption patterns to market and political actions—hold the keys to transformative change. The pandemic demonstrated how swiftly health and safety imperatives can pivot behaviours, offering a parallel to how environmental regulations and incentives are poised to reshape our energy landscape. Effective policies, such as carbon pricing, rebates, and renewable energy subsidies, are instrumental in steering these consumer behaviours, provided they are crafted with precision. The transient shifts witnessed during the pandemic underscore the necessity for enduring changes in mindset, cultivated through unwavering policy cues and a cultural embrace of sustainable living. Moreover, the agility consumers displayed in adapting to demand response programs amid the recent energy price crises points to an underutilized potential for harmonizing the intermittency of renewable sources. Empowerment through access to information and decision-making tools is critical, allowing consumers to grasp the significance of their choices and to act with intentionality. Recognizing the intricacy and fluidity of consumer behaviour, it is imperative to persistently engage in research, refine approaches, and gauge the outcomes to navigate consumers towards deliberate, impactful actions that harmonize with decarbonization goals.

References

IEA (2020) “World Energy Outlook”, International Energy Agency, October 2020.