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Integrated Modeling of Energy Consumption Behavior in French Households: Combining Approaches to Align Needs and Consumption

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The energy consumption behavior of French households presents a complex puzzle, influenced by an interplay of socio-economic, environmental, and technological factors. This article introduces an innovative approach aimed at untangling this puzzle by integrating multiple methods to model energy consumption behavior. Our goal is to comprehend the gaps between needs and energy consumption, thereby providing insights for more effective energy policies and sustainable practices.

By combining behavioral models, dynamic simulation techniques, longitudinal data analyses,machine learning methods, and feedback loop models, our integrated model strives to capture the complexity of underlying factors influencing energy consumption decisions. By identifying the key determinants of gaps between needs and consumption, this approach will enable better guidance of energy policies aimed at promoting more efficient and sustainable energy utilization among French households.

The energy consumption behavior of households is a multifaceted phenomenon, shaped by various socio-economic characteristics, environmental considerations, technological advancements, and policy interventions. However, existing models often fall short in capturing the full spectrum of influences and interactions between variables. To address this gap, our integrated modeling approach synthesizes methodologies to provide a comprehensive understanding of energy consumption patterns.

Our methodology involves the use of behavioral models to elucidate the underlying motivations and decision-making processes driving energy consumption choices. Additionally, dynamic simulation techniques allow for modeling temporal dynamics and feedback loops within energy consumption systems. By incorporating longitudinal data analyses, our approach captures the evolution of energy consumption behavior over time and identifies trends and patterns that may not be apparent in cross-sectional analyses. Lastly, machine learning methods are leveraged to uncover complex relationships and nonlinear interactions between variables, enabling more accurate predictions and insights into future energy consumption trajectories.

Moreover, feedback loop models are integrated to assess how variations in environmental conditions influence household consumption behaviors and vice versa. By comparing consumption behavior forecasts with actual consumption data, we can identify the factors contributing to the gap between needs and consumption.

By combining these methodologies, our integrated modeling approach provides a framework for understanding the complexities of energy consumption behavior in French households and offers valuable insights for informing targeted energy policies and interventions.

Topic

Environmental informatics: Climate Change/Environment

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