EXTENDED ABSTRACT

Strategizing for Sustainability: Cognitive Architecture and Regional Governance in Voluntary Renewable Energy Participation

1. Introduction

The global sustainability transition increasingly depends on voluntary citizen engagement alongside regulatory and technological expansion. While renewable energy capacity continues to grow, participation in voluntary renewable electricity programs remains limited. Utility Green Pricing (UGP) programs in the United States allow households to support renewable generation through modest price premiums. Yet enrollment rates remain relatively modest despite widespread environmental concern.

This persistent discrepancy between pro-environmental orientation and financial commitment is often framed as an attitude behavior gap. This study suggests that in voluntary policy contexts, the gap may reflect not a lack of environmental concern but limited institutional operational clarity. Participation requires citizens to navigate regionally structured electricity markets shaped by decentralized regulatory arrangements.

2. Regional Context: Texas as a Regulatory Laboratory

Texas provides a particularly relevant empirical context. As one of the most liberalized electricity markets in the United States, it functions as a quasi-laboratory for voluntary renewable governance under market competition. The coexistence of competitive retail providers, municipal utilities, and voluntary green pricing programs creates institutional heterogeneity within a single regional energy system.

In regionally differentiated electricity markets, consumers encounter varying pricing structures, enrollment procedures, and informational architecture. Texas therefore offers a setting in which the interaction between institutional design and citizen cognition can be examined within a decentralized governance framework. The regional dimension is integral to understanding voluntary climate policy uptake.

3. Theoretical Framework

The study is built on the Theory of Planned Behavior (TPB), which posits that behavior is predicted by attitude, subjective norms, and perceived behavioral control. In voluntary policy environments, participation requires proactive financial engagement and comprehension of institutional mechanisms.

Rather than introducing additional predictors without conceptual distinction, this study refines TPB for decentralized governance contexts by differentiating between abstract

environmental literacy (Environmental Knowledge) and institutional-operational literacy (Green Pricing Program Knowledge). While abstract environmental knowledge informs evaluative orientation, institutional operational knowledge strengthens perceived behavioral control and facilitates behavioral activation.

This distinction enables a more precise interpretation of the attitude–behavior gap. Instead of viewing it solely as a motivational shortfall, the findings suggest that participation may be constrained by limited cognitive accessibility within regionally structured regulatory systems.

4. Methodology

Data were collected from a representative sample of Texas residents (N = 405). The survey measured TPB constructs, environmental knowledge, and program specific knowledge. Structural Equation Modeling (SEM) was used to estimate direct and indirect pathways.

5. Findings

Environmental knowledge significantly strengthens attitudes and subjective norms but does not directly predict participation. Its influence operates indirectly through evaluative pathways.

Green Pricing Program Knowledge emerges as a central structural driver. It substantially enhances perceived behavioral control and strengthens subjective norms. Perceived behavioral control is the strongest direct predictor of renewable electricity purchasing behavior, indicating that institutional-operational clarity reduces cognitive barriers and enables behavioral engagement.

The results suggest a structured activation pathway:
Institutional Operational Knowledge → Perceived Behavioral Control → Behavioral Engagement.

6. Implications for Regional Sustainability Governance

In decentralized energy systems, regulatory architecture shapes cognitive accessibility. Market liberalization increases consumer choice but also increases informational complexity. Voluntary renewable instruments are most effective when institutional arrangements reduce cognitive friction and enhance perceived control.

Policy implications include improving transparency of program mechanics, simplifying enrollment procedures, designing regionally tailored informational strategies, and recognizing institutional clarity as a complementary governance instrument.

7. Theoretical Contribution

This study refines TPB for voluntary governance contexts by distinguishing between abstract environmental literacy and institutional-operational literacy. It identifies institutional-operational knowledge as a key mechanism that enhances perceived behavioral control, which functions as the primary activation channel for participation. By bridging behavioral public policy and regional sustainability governance, the study demonstrates that decentralized regulatory systems shape the cognitive conditions under which voluntary policy instruments succeed.

8. Conclusion

Voluntary renewable energy participation depends not only on environmental orientation but also on institutional-operational clarity within regionally structured governance systems. The renewable transition therefore requires governance architectures that align cognitive accessibility with behavioral opportunity. Texas demonstrates how decentralized regulatory design shapes the pathways through which voluntary climate policy becomes actionable.