Control, Cooperation, and Resilience of Rural Energy Communities

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ABSTRACT

As global energy demands grow more complex, an increasing number of citizens are becoming **energy prosumers**—those who both consume and produce energy. This shift is visible in individuals, such as households with solar panels, and in groups, like **Energy Communities**, where people come together to generate local, clean energy. These communities play a key role in helping us meet renewable energy targets while reducing dependence on fossil fuels like gas, oil, and coal. With their vast open space, rural areas offer tremendous potential for developing renewable energy projects, placing **the so-called rural energy communities (RECs)** at the forefront of the future of energy.

This special session aims to challenge conventional approaches to control, optimize, and build **RECs.**

We invite original articles from scholars and practitioners presenting theoretical concepts and practical approaches. Submissions must emphasize novelty, originality, and mathematical rigor. We welcome contributions that focus on the internal functioning of individual communities and their relationships with neighboring ones, emphasizing strategies that blend innovative control methods, optimization tools, and communication technologies.

TOPICS

– Decentralized control strategies for RECs

– Optimization of energy systems in rural areas with limited infrastructure

– Cooperation models for RECs

– Machine learning and AI for improving RECs

– Energy resilience strategies for rural and remote communities

– Peer-to-peer energy sharing within RECs

– Technological solutions for integrating renewable energy in rural areas

– Cybersecurity and protecting rural energy networks