



The Solution: Microgrids Run by Markets

Transactive Energy Operating System

Executive Overview · Oct 10, 2026

A software platform that lets homes, buildings, campuses and data centers buy, sell and manage power among themselves — balancing local energy autonomously, without central control.

The Problem: A Fragile, Centralized Grid

Today's grid was built as one large, centralized system, and it is reaching its limits.

- **Renewables don't fit.** Solar and wind output is intermittent, destabilizing and costly to integrate at scale.
- **Demand is outrunning supply.** Electric vehicles and AI data centers are adding load the grid was never sized for.
- **Power is lost in transit.** Every mile of transmission and every transformer step wastes energy.
- **Storage and baseload are strained.** Utility-scale storage remains expensive, and retiring large base generators further destabilizes the system.
- **Centralization is a vulnerability.** A single, interconnected system is exposed to both physical and cyber attack.

The Solution: Microgrids Run by Markets

Microgrids produce, store and manage power close to where it is used. The goal is resilience — keeping an acceptable standard of living and operations even when the wider grid falters. Microgrids are most cost-effective when they support one another, but coordinating many of them has been the unsolved problem.

Transactive energy solves it by replacing central control with markets. Every participant can both consume and produce power, and each trades according to its own needs and policies:

- When local power is **scarce**, prices rise — participants cut use or sell what they have.
- When local power is **plentiful**, prices fall — participants use more or buy to store.

Each participant acts on its own, in real time and for the future. The result is a microgrid that balances itself.

Platform Capabilities

The platform is an operating system for transactive energy: it runs the markets, manages the devices and enforces the operator's policies at every level.

Capability	What it delivers
Markets in time	Spot and forward markets, so participants react to live supply and demand <i>and</i> contract power days ahead
Fractal architecture	The same building block — a "node" — scales from a single device to a building, a campus, a town or a region
Fully autonomous	Each node manages its own load, storage and generation based on policy, with no central program
True-cost pricing	Every buy and sell decision reflects cost of ownership, time of production and environmental impact
Graceful load management	When supply tightens, it computes the best mix of load and generation changes and distributes power by priority and commitment
Grid interoperability	Works alongside the existing utility grid — and can actively support it
Operator control	Policies for charging, discharging, event priority, scheduling and special modes such as islanding can be changed at any time

Use Case: AI Data Center with On-Site Generation

Consider an AI data center powered in part by a small modular reactor, with two utility connections for backup. Inside are three microgrids — AI servers, a cooling plant and a bank of batteries — each running its own market.

Following the operator's policies, every node autonomously manages utility draw, power distribution, battery state and AI workload. The number of possible operating combinations is astronomical, yet there is no central logic and no single point of failure. Operators can adjust any node or market policy at any time.

Simulation and Planning

Before committing capital or changing policy, operators can simulate a single node, one microgrid or many interconnected microgrids over periods from hours to years — at more than 100x real time.

- **Normal operations:** trading policies, device behavior, market prices, weather, scheduled events, billing and quantified resilience.
- **Extreme events:** equipment failures, utility disconnects, islanding, shortages, blackouts, price shocks, severe weather and custom scenarios.
- **Built-in device library:** models for batteries, generators, solar and a growing range of loads, with advanced predictive control to hold a stable power target.

Scenarios can replay any past date or project forward, with snapshots that can be saved, restored and shared.

Why It Matters

Managing interconnected microgrids demands expertise across energy, physics, engineering, finance, economics and software. With no off-the-shelf foundation available, the platform's core — distributed transactions, secure messaging and long-running workflows at massive scale — was purpose-built, backed by five years of use-case analysis and design validation.

For owners and operators, the value is direct:

1. **Resilience** — keep critical operations running through outages, shortages and attacks.
2. **Lower cost** — buy when power is cheap, sell or curtail when it is expensive, and share resilience across neighbors.
3. **Renewable-ready** — absorb intermittent solar, storage and on-site generation without destabilizing the system.
4. **Future-proof** — an architecture designed to adapt to new regulations, deployment models, devices and scale.