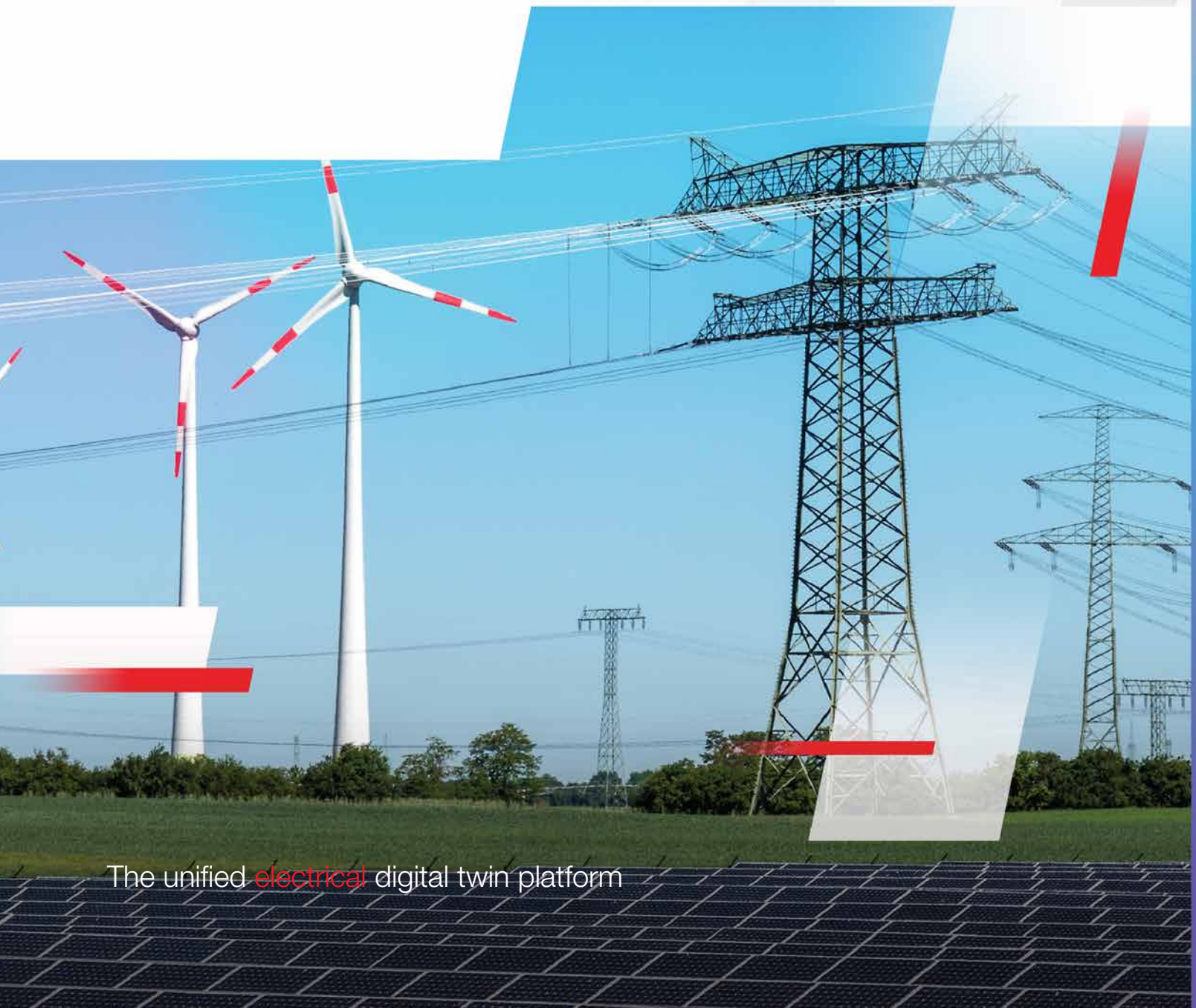
etap®

etap µGrid™

Microgrid Energy Management Solution

Maximize Resiliency, Reliability & Energy Efficiency



The unified electrical digital twin platform

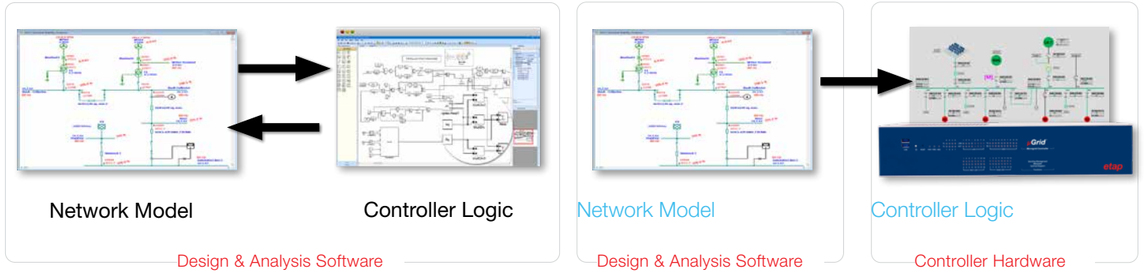
µGrid™

Microgrid Management System

An integrated model-driven design software and control hardware solution to develop, simulate, optimize, test, and deploy microgrid controllers with inherent capabilities to fine-tune the logic for maximum system resiliency.

Controller Design & Logic Parameterization

Deploy, Tune & Validate Logic



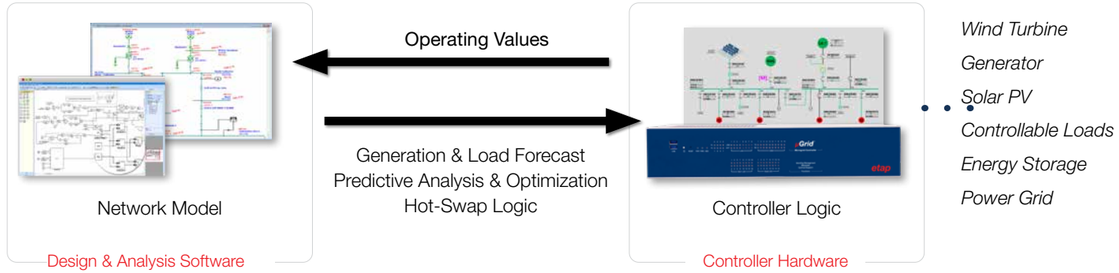
Controller logic is validated using ETAP Software-in-the-Loop (SIL) technology

Edge Control Solution for Microgrids

Model-Driven Microgrid

Deploy and validate hardware controller logic with SIL, steady-state or dynamic analysis. Utilize controller and electrical operations twins to optimize microgrid and hot-swap modified logic to meet performance standards.

Optimize, Tune & Hot-Swap Logic



Controller Design Twin to Operations Twin

Generation Optimization

Real-time regulation of generation levels to maintain power exchanges with neighboring areas at scheduled values. Optimization algorithms consider system constraints and multiple objectives such as minimizing energy costs, renewable energy availability, fuel costs, and more.

Generation & Load Forecasting

Intelligent real-time situational awareness and forecast-driven predictive simulations techniques are used to determine reliable and accurate short-term loading and generation, especially from variable energy sources such as wind and solar.

Grid Power Interchange Control

Microgrid Controller regulates real and reactive power interchange between the microgrid and utility service, based on a programmable set point. Importing or exporting power levels are controlled by the system operator or utility.

Energy Storage Management

Microgrid Controller manages control strategies to improve the quality of power production and consumption through renewable energy generation-smoothing by regulating active and reactive power using batteries, Superconducting Magnetic Energy Storage (SMES), STATCOM, and other energy storage devices.

Black Start

Microgrid Controller is capable of manual black start operations to restore the microgrid from a de-energized state. As loads are brought back online, Microgrid Controller automatically adds and increases generation to meet the load demand.

Islanding Management

Proactive generation dispatch and switching control to regulate voltage and frequency for system preservation during and after an islanded condition.

Demand Side Management

Evaluate energy-reducing strategies to implement on-peak to off-peak load shifting and rate schedule changes to optimize energy usage and reduce cost.

Master Controller

Microgrid Master Controller integrates photovoltaic systems, generator sets, and energy storage systems to maximize usage of renewable energy sources and system reliability.

The master controller is a secure Linux-based hardware that may be configured remotely, including monitoring and parameterization.

Remote eSCADA Interface

Microgrid controller integrates with ETAP eSCADA to monitor, analyze, and provide KPIs for the complete microgrid.

- Renewable smoothing
- Generator transient assist
- Grid firming / grid stabilization
- Facility backup
- Grid forming
- Spinning reserve
- Time shifting of renewable energy
- Peak shaving

nanoGrid™

Energy Management System

etap nanoGrid EMS (nEMS) is a multi-site remote management solution, interfacing with IoT devices to monitor, automate, control, optimize, determine health indices, and generate optimal maintenance schedules while minimizing OPEX.

- ✓ Remote management of decentralized nanogrids
- ✓ Reduce power consumption with automated, intelligent controls
- ✓ Reduce maintenance & replacement service visits
- ✓ Extend equipment lifetime by maintaining stable environmental conditions
- ✓ Improve reliability & operation of backup power
- ✓ Minimize transportation & onsite fuel losses
- ✓ Consolidate data from multiple sites via vendor agnostic platform
- ✓ Immediate return-on-investment through easy configuration & quick deployment

Automatic Islanding Detection & Nanogrid Control

Effective operation and control are determined based on the priority of energy generation resources. Utilizing renewable energy resources first, followed by energy storage, ensuring effective energy management for a stable and reliable power system at the lowest cost possible.

Equipment Condition Monitoring & Health Estimation

nEMS is designed for quick time-to-market for preventive maintenance initiatives. Data is collected across multiple sites from similar devices to learn equipment behavior patterns and identify performance deterioration. nEMS applies machine learning and big data mining algorithms for predicting equipment health and schedule maintenance under degraded conditions.

IoT Aggregation & Integration Platform

The platform utilizes distributed architecture for open scalability by connecting multitudes of data acquisition devices, storage, processing, advanced analytics tools, visualization interfaces, and enterprise-level applications integrated in a unified multi-site solution.

Energy Accounting

Energy Accounting software provides energy usage analysis and cost allocation for individual generation units, areas, and the entire system. nEMS can track and create energy billing reports based on user-definable energy cost functions and energy tariffs.

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