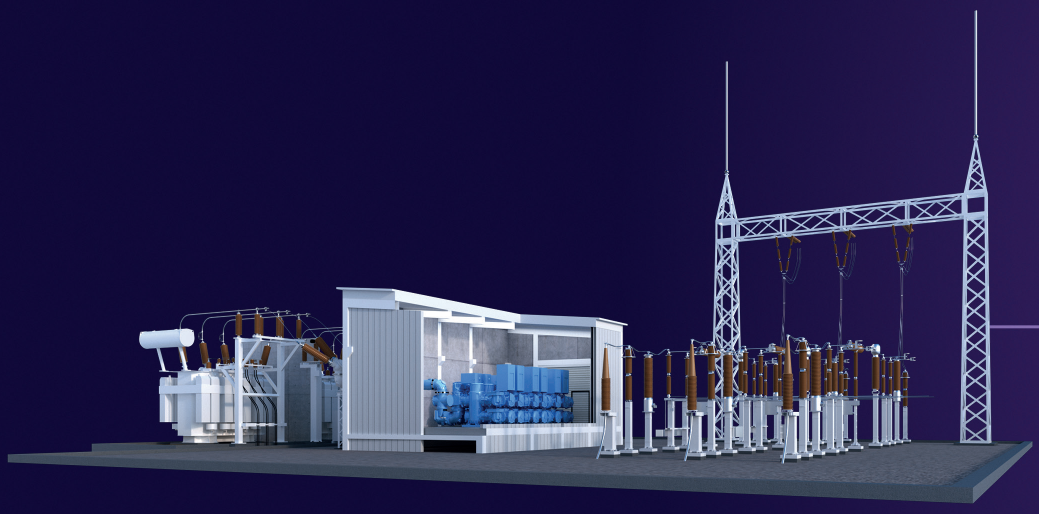
SIEMENS energy

Switchgear digitalization

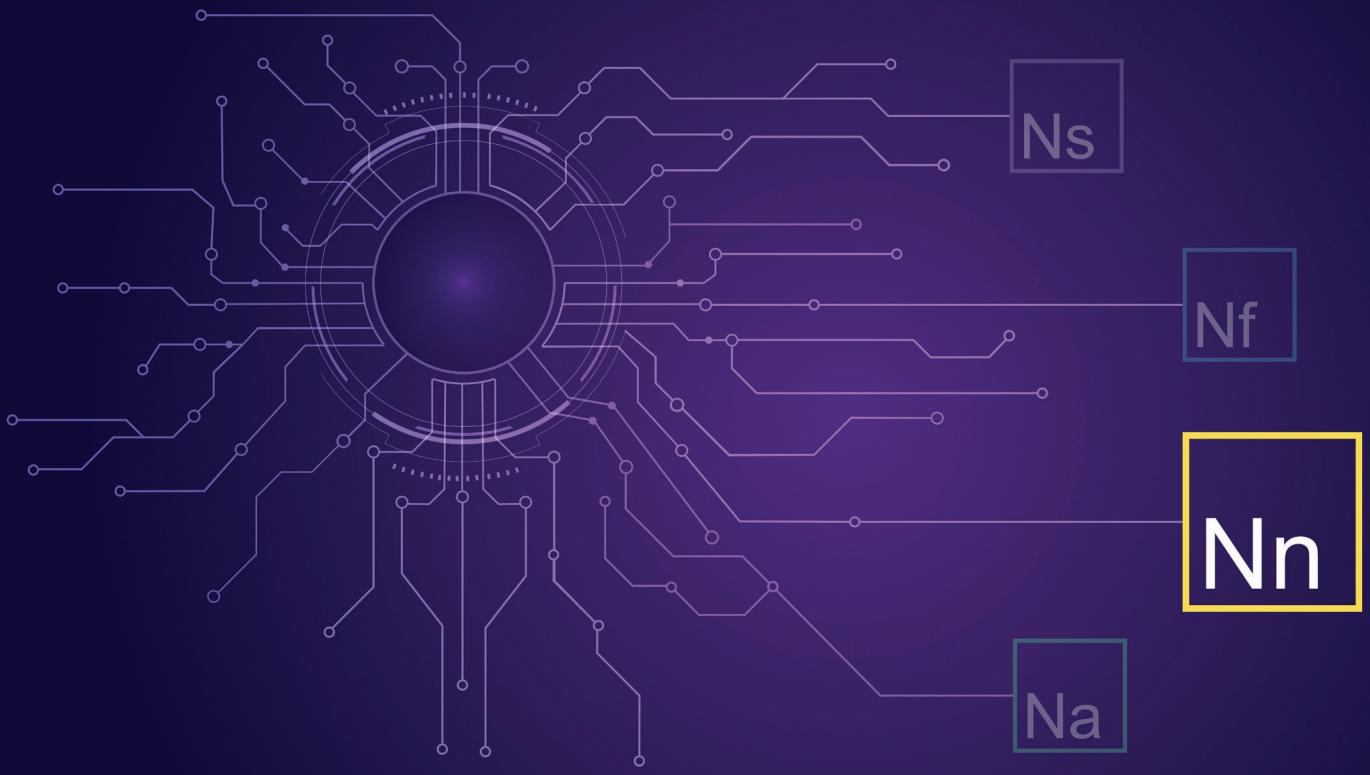
Noedra Node suite for substation digitalization

Listen to the grid's heartbeat.



Nn

Noedra Node
Substation Digitalization



The Noedra framework

Noedra is Siemens Energy's digital framework – the Mind of the Grid – connecting Grid Technologies' intelligent solutions, from sensing and control systems to software and advisory, into one coherent ecosystem.

By transforming data into clarity, coordination, and confident action, Noedra enables operators to manage grid complexity with intelligence and control.

Each Noedra suite represents a specific way this intelligence acts across the grid.

Together, they protect, sense, connect, and foresee the grid of today and tomorrow.

Node suite – Intelligence inside the substation

Within the Noedra ecosystem, Node brings intelligence inside the substation.

The Node suite focuses on substation digitalization, integrating sensing, inspection, predictive analytics, protection, and automation into a coordinated layer of intelligence.

Connected with the other Noedra suites, Node transforms visibility into foresight – enabling substations to monitor their condition, anticipate risks, and support confident operational decisions.



From Switchgear condition to operational confidence

Substations are the core of the power grid. Their health determines the stability, safety, and reliability of power transmission and distribution. But operators today face mounting challenges:

- Ageing assets and infrastructure.
- Increasing demand and fluctuating loads.
- Integration of renewables and distributed resources.
- Rising requirements for transparency, safety, and reliability.
- Pressure to reduce outages, maintenance costs, and environmental impact.

Traditional inspection and maintenance methods provide limited visibility and are often reactive.

Without continuous condition insight, early signs of degradation can remain unnoticed until failures occur.

The Noedra Node Suite for Switchgear digitalization addresses these challenges by delivering continuous monitoring, advanced diagnostics, and predictive intelligence – enabling operators to move from reactive intervention to proactive, data-driven asset management.

Our solutions

Switchgear is the backbone of safe and reliable grid operation – but ageing assets, rising load demands, and the complexity of renewable integration are pushing traditional maintenance to its limits. Mechanical wear, insulation degradation, or gas leaks can escalate quickly, causing costly outages and safety risks.

The Noedra Node suite changes that. It continuously monitors the mechanical, electrical, and insulation health of switchgear – identifying anomalies early, reducing forced outages, and streamlining maintenance across both Air-Insulated (AIS) and Gas-Insulated Switchgear (GIS) environments. With real time condition monitoring, advanced diagnostics, and predictive analytics, operators gain the actionable insight needed to intervene before issues escalate and asset performance is compromised.

Key features & benefits

Monitoring

Maintain continuous visibility of switchgear health and operating conditions through comprehensive partial discharge monitoring, circuit breaker monitoring, bay-level status monitoring, thermal and environmental monitoring, and gas monitoring. Real-time access to PD activity, PD trends, CB position, operation count, mechanism timing, temperature, humidity, and gas density data helps operators identify emerging issues at an early stage and maintain reliable asset performance. By consolidating condition and operational information into a single view, utilities can improve situational awareness, enhance operational safety, and support proactive asset management across the substation.

Diagnostics

Move beyond condition monitoring with advanced diagnostics that transform raw data into actionable insights. PD diagnostics, breaker mechanism diagnostics, contact wear diagnostics, fault/event analysis, and gas leakage diagnostics provide a deeper understanding of equipment behavior and degradation mechanisms. Through capabilities such as PD pattern classification, insulation degradation interpretation, coil and motor current signature analysis, travel curve interpretation, contact wear estimation, and event sequence interpretation, operators can more quickly identify root causes, assess asset condition, and prioritize corrective actions. This supports condition-based maintenance strategies while helping reduce the risk of unexpected failures and operational disruptions.

Analytics

Unlock greater value from switchgear data with advanced analytics designed to support asset performance, maintenance optimization, and investment planning. Switchgear health intelligence, event analytics, predictive maintenance, and operational and fleet analytics combine condition, operational, and event data to deliver meaningful asset intelligence. Switchgear health indices, bay health indices, and subsystem health scores provide a clear view of equipment condition, while switching event analysis, fault event analytics, and breaker operation performance help uncover recurring issues and performance trends. Predictive insights including failure probability, condition-based maintenance recommendations, and maintenance prioritization enable more targeted interventions, while asset risk ranking, bay criticality ranking, and cross-substation performance comparisons support informed lifecycle management and investment decisions.



Technical highlights

Integrated, real-time condition monitoring across key switchgear assets Siemens Energy delivers end-to-end, real-time monitoring for gas density, partial discharge, and circuit breaker performance. This integrated approach enables predictive maintenance, improves operational efficiency, and enhances safety across both Air Insulated (AIS) and Gas Insulated Switchgear (GIS). With seamless data acquisition, advanced analytics, and secure remote access, the system strengthens reliability and extends the lifecycle of high voltage assets.

Advanced diagnostic and prognostic capabilities with expert systems

Our modular monitoring solutions – mechanical, insulation condition, and electrical – incorporate sophisticated diagnostic tools, including:

- Pattern recognition and root cause analysis using neural networks (especially in electrical).
- High-frequency signal sampling (up to 10 kHz) for detailed event capture.
- Predictive features such as “Time to Next Alarm” and trend analysis for proactive maintenance planning.

Connectivity & security

The platform supports encrypted data transmission to web and mobile dashboards, read only secure gateways, and seamless API integration with SCADA and asset management systems. It is compatible with key industrial protocols – including Modbus-RTU, Modbus-TCP, IEC 61850, OPC UA (optional via gateway: DNP3, IEC60870-5-104).



Why Siemens Energy

Choosing Siemens Energy means partnering with a global leader committed to powering progress and shaping a sustainable energy future. More than a technology provider, we bring vision, reliability, and long term partnership – helping you navigate the evolving energy landscape with confidence.

Proven expertise

Benefit from decades of experience in power systems and grid modernization, ensuring reliable and forward-thinking solutions.

Global reach

Leverage our worldwide presence and deep industry knowledge to address local requirements while meeting global standards.

Tailored solution

Our teams collaborate closely with customers to deliver solutions customized to your unique operational needs.

Trusted partnership

Rely on Siemens Energy as your advisor, dedicated to building long-term relationships and supporting your journey toward a reliable, secure, and sustainable energy future.

Continuous innovation

Experience ongoing support and innovation, ensuring your organization stays ahead in a rapidly.

Turn switchgear condition into operational confidence.

Bring visibility, intelligence, and foresight to AIS and GIS environments with Noedra Node.

Discover Siemens Energy’s integrated solutions for digital substations.



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