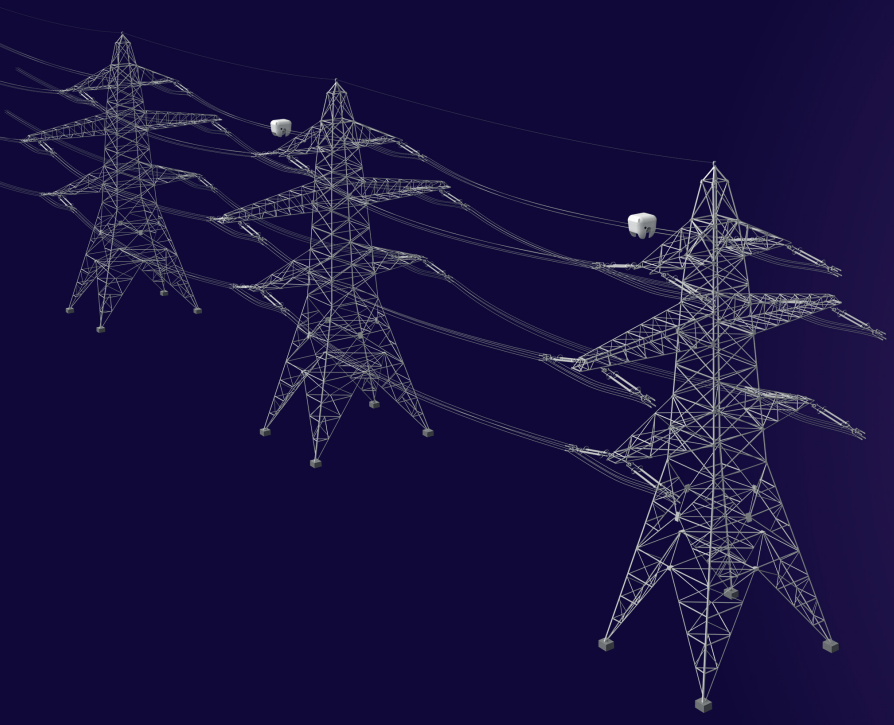
SIEMENS energy

# Dynamic line rating and Situational awareness & Weather resilience solutions for OHL

## Noedra Flow suite for line digitalization

Bringing clarity, control, and confidence from above.



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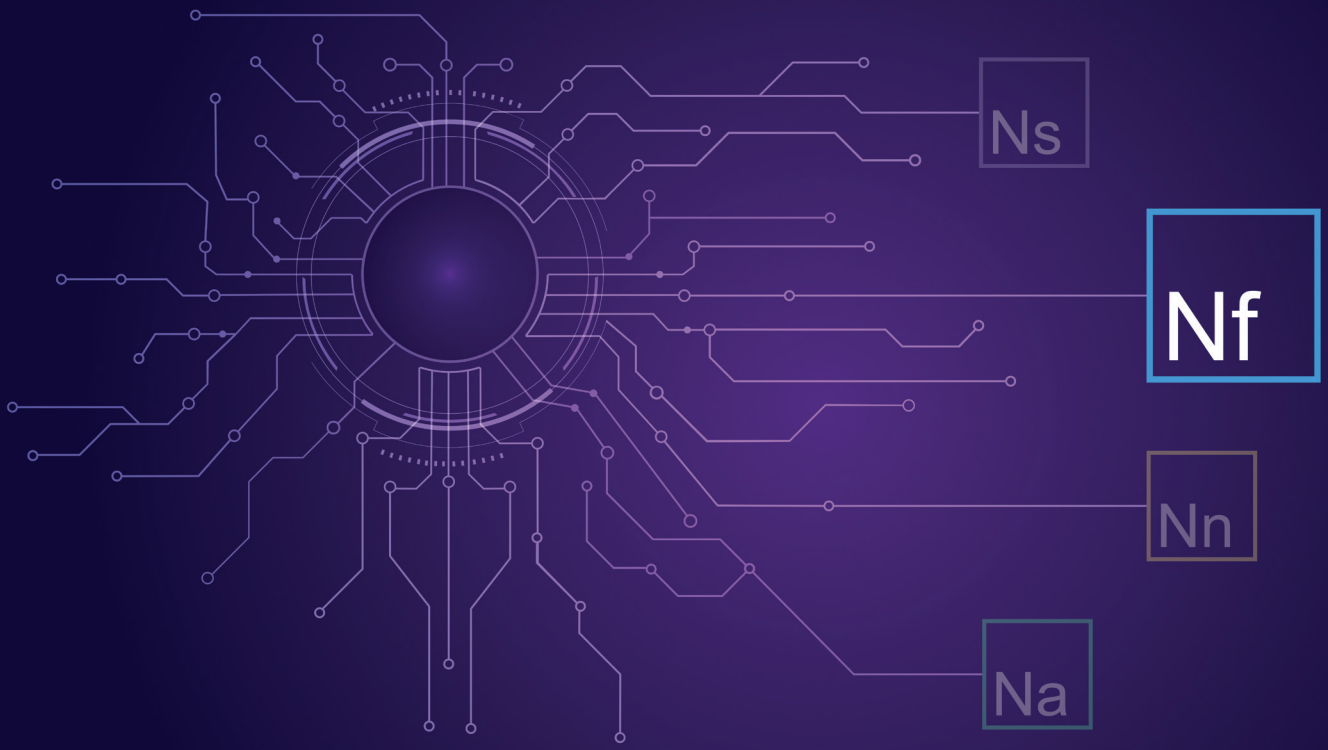
**Noedra Flow**
Line Digitalization




# The Noedra framework

Noedra is Siemens Energy's digital framework - the Mind of the Grid - bringing together Grid Technologies' intelligent solutions, from sensors and control systems to software and advisory, into one connected ecosystem.

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

Each Noedra Suite expresses a specific way this intelligence acts across the grid.

Together, they protect, sense, structure, and guide energy systems toward a resilient future.

# Flow suite - From visibility to capacity control

Within the Noedra ecosystem, Flow delivers intelligence from above.

The Flow suite focuses on line digitalization, enabling operators to continuously see, understand, and anticipate the condition and performance of overhead transmission assets.

Dynamic line rating (DLR) extends this intelligence into real-time operational control, allowing operators to safely optimize line capacity based on actual conditions - not static assumptions.

Situational awareness & weather resilience capabilities provide real-time detection and alerts for weather-related and mechanical risks. Operators gain early warnings for threats such as icing, abnormal vibrations, and extreme weather events, enabling proactive maintenance and rapid response to minimize outages and asset damage.

# From static limits to real-time capacity

Traditional line ratings are based on conservative, static assumptions.

They do not reflect real-world operating conditions such as wind, temperature, solar radiation, or conductor behavior.

As a result:

- Available transmission capacity often remains unused.
- Bottlenecks limit renewable integration.
- Costly grid reinforcements are triggered prematurely.

At the same time, operators face increasing regulatory pressure to maximize existing assets while maintaining safety and reliability.

The Noedra Flow suite - DLR / AAR addresses this challenge by enabling **continuous, data-driven assessment of safe operating limits**, turning real-time environmental and conductor data into actionable capacity insights.

# Our solutions

## Dynamic line rating (DLR) & Ambient adjusted ratings (AAR)

### Unlock the true capacity of your power lines by using real-time data, not just static assumptions.

Dynamic line rating (DLR) / ambient adjusted ratings (AAR) use advanced sensor networks and analytics to continuously assess the safe, real-time capacity of overhead lines. This enables operators to maximize asset utilization, ensure regulatory compliance, and make smarter operational decisions.

## Key features & benefits

### Real-time capacity optimization

Real-time ampacity calculation using sensors directly mounted on overhead lines to measure conductor temperature, wind speed/direction, current, and ambient conditions. This enables operators to safely maximise line capacity based on actual conditions rather than static limits – unlocking hidden capacity and deferring costly upgrades.

### Live insights and scenario analysis

Dashboards, alerts, and “what-if” simulations deliver real-time visibility, bottleneck identification, and proactive decision support. Operators can evaluate scenarios, anticipate constraints, and proactively optimise line performance.

### Predictive maintenance

Continuously monitors the physical behavior or overhead lines, including conductor condition, sag, tension, galloping, ageing, and ice formation. Provides early warnings and data-driven maintenance planning to reduce unexpected failures.

### Regulatory compliance

Supports compliance with regulations such as FERC 881 by adjusting ratings based on real-time ambient temperature, ensuring operators meet required standards while maintaining safe, reliable operation.

## Technical highlights

### Real-time monitoring

Current, conductor temperature, wind speed/direction, humidity, and ambient temperature; optional cameras for inclination and visual inspection.

### Analytics

Automated algorithms for dynamic line rating and ambient adjusted rating; sag, tension, galloping, ageing, and ice detection; AI-powered vegetation management and wildfire detection.

### Data Processing

Continuous measurement and correlation of line parameters; diagnostics, prognostics, and trending for incipient failures; overload guidance.

### Connectivity & Security

Encrypted data to web dashboards; API integration with SCADA and asset management systems; supports standard protocols for seamless integration.

# Situational awareness & weather resilience

**From Risk exposure to operational foresight.**

Situational awareness & weather resilience provides real-time detection and alerts for weather-related and mechanical risks, helping operators maintain grid reliability and prevent outages before they occur.

## Key features & benefits

### Icing detection

Combines sensor data and weather models to detect and quantify ice build-up on power lines. Prevents mechanical stress and overload, reducing the risk of line failure and outages.

### Vibration monitoring

High-frequency sensors detect abnormal vibrations caused by wind or mechanical issues. Identifies risks such as galloping or aeolian vibration early, avoiding conductor damage and costly repairs.

### Extreme weather transparency

Enables rapid response to severe events such as wildfires, hurricanes, and heatwaves. Minimises outage risk, protects assets, and ensures grid stability during extreme conditions.

## Technical highlights

### Real-time monitoring

Multi-sensor system for continuous overhead line condition monitoring, including icing and vibration detection.

### Analytics

Automated alerts and predictive algorithms for rapid operational response and risk mitigation.

### Connectivity & Integration

Integration-ready with grid control and maintenance systems; secure data transfer to dashboards for live visibility and decision support.

# Why Siemens Energy

Partnering with Siemens Energy means more than just choosing a technology provider. Our value goes far beyond technology - we bring vision, reliability, and partnership to every project.

## 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 evolving energy landscape.

## Unlock real-time capacity and operational resilience.

Maximize transmission performance and grid reliability with Noedra Flow - DLR / AAR and situational awareness & weather resilience.

Discover how Siemens Energy empowers smarter, safer, and more flexible grid operations for a sustainable energy future.

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