

The background of the entire page is a night-time aerial view of a city, with lights from buildings and streets creating a warm, glowing atmosphere. Overlaid on this scene are several digital and technical elements. A network of white lines connects various nodes, some of which are highlighted with glowing orange and red light trails that curve across the city. In the upper-middle section, there is a semi-transparent rectangular panel containing several data visualization elements: a line graph with a fluctuating white line, a bar chart with vertical bars of varying heights, and a network diagram with nodes and connecting lines. A small icon of a truck is also visible within this panel. The overall aesthetic is futuristic and data-driven, representing smart infrastructure and automation.

SIEMENS

Ingenuity for life

Distribution Automation (DA)

A cost-effective investment for grid modernization challenges

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Grid modernization and utility challenges

The power industry is evolving. New policies, market conditions and the advent of grid modernization presents utilities with numerous challenges



With numerous trends impacting the power industry today, competitive utilities are adopting DA. Some of these trends include:

- **Environmentally-driven policy and consumer adoption of distributed energy resources (DER):** The advent of technologies such as micro grids, solar sites and electric vehicles requires bi-directional power flows on the distribution grid and utilities to have new tools to manage this flow.
- **Deregulation:** This is empowering third-party alternatives to utility-based power provision, providing consumers with more options. Thus, utilities need to engage consumers with new value propositions and programs to retain their allegiance.
- **Extreme weather events:** According to the U.S. Energy Information Administration, these are increasing in frequency, adding new urgency to improvements in system reliability and resiliency to meet regulatory performance metrics.

- **Digital-age consumers:** Your customers are accustomed to having options, diverse value propositions, rapid resolution of issues, and communications tailored to their specific needs. Utilities must adopt new business processes and models and operational strategies supported by technology to meet these expectations.
- **Industrial Internet of Things (IIoT):** IIoT and an increase in intelligent devices at the grid's edge require a future-facing design for distribution system monitoring and control schemes.

DA, supported by a high-bandwidth, low latency, communication system is a cost-effective investment that will meet many of these challenges through automated responses to power network anomalies and improved system visibility for grid operators.

The true challenge lies in selecting a trusted, authoritative advisor with domain expertise in cyber-secure critical infrastructure, industrial control systems (ICS) and strategic data communication networks designed for utilities.

DA benefits utilities: From cybersecurity to the bottom line

Cyber-secure operational networks with the ability to detect, isolate and mitigate network intrusions and attacks, minimizing system impacts and boosting investor and consumer confidence that the power grid is secure.

Asset management capabilities that increase system efficiencies and detect and prevent impending asset failures, improving reliability metrics and consumer satisfaction. Lower Operating Expense (OpEx), as labor and truck rolls are reduced

Fault location, isolation and service restoration minimizes the impacts of inevitable outages and speeds restoration, improving reliability metrics and consumer satisfaction.

Integrated volt/var control optimizes distribution feeders to shave peak loads, reduce power losses and avoid voltage violations, operational strategies that lower OpEx and, by managing problematic feeders, can reduce or delay Capital Expense (CapEx).

“Smart” interval meters/advanced metering infrastructure locate nested outages, enable remote activation/deactivation of accounts, improves revenue assurance and load forecasts and supports online consumer access to their energy use data, increasing consumer engagement.

DER integration and anti-islanding measures enable remote monitoring and control of interconnections for micro grids, solar arrays, wind turbines, energy storage to prevent operational challenges from distributed resources.

Distribution SCADA systems are augmented by proper integration with Distribution Automation and a FAN to achieve a greater degree of functionality in monitoring, controlling and protecting distribution system assets and performance.

Substation Visibility refers to grid operators’ ability to monitor substation assets and their status, performance and condition – is strengthened when a FAN is implemented in support of Distribution Automation.

Mobile workforce automation enables field technicians to remotely receive work orders, access technical information and securely communicate with their operations center, cutting time, labor and OpEx.

Capabilities that address future challenges, including consumer engagement, transactive energy markets and integration with the IIoT, provide the basis for future applications that will enable new business models, greater cybersecurity, optimization, efficiencies, and other functionalities to address CapEx, OpEx, meet and exceed regulatory mandates and prevent violations.

The Siemens Advantage

Through our domain expertise, experience, and solutions and products, Siemens offers a unique value proposition in assisting power utilities of all business models and sizes to adopt DA.



Trusted advisor – Siemens has an established heritage and domain expertise in critical infrastructure and industrial control systems architecture. We can securely design the network as the strategic backbone specifically supporting DA applications.



Robust Network Components – Our extensive RUGGEDCOM portfolio supports FAN use of legacy serial communications to preserve value, along with advanced, digital Ethernet communications – including wired and wireless connectivity. Designed for the harshest environments, our components meet or exceed the industry’s best specifications



Professional Services – We listen to our utility clients to understand their specific challenges and design customized solutions. Siemens Professional Services can assist your utility in the design, implementation and growth planning phases. We also provide training that enables clients to confidently manage DA operations post-implementation.



Extensive Partner Network – Siemens draws upon a network of partners with domain expertise in complementary areas, including, for example, systems integration to preserve the value of existing assets, and the design of wireless applications through radio-frequency propagation studies.

Siemens DA solutions

Siemens has a deep heritage in designing, implementing and securing critical infrastructure, including electrical power distribution, and the strategic communication networks that support these operations.

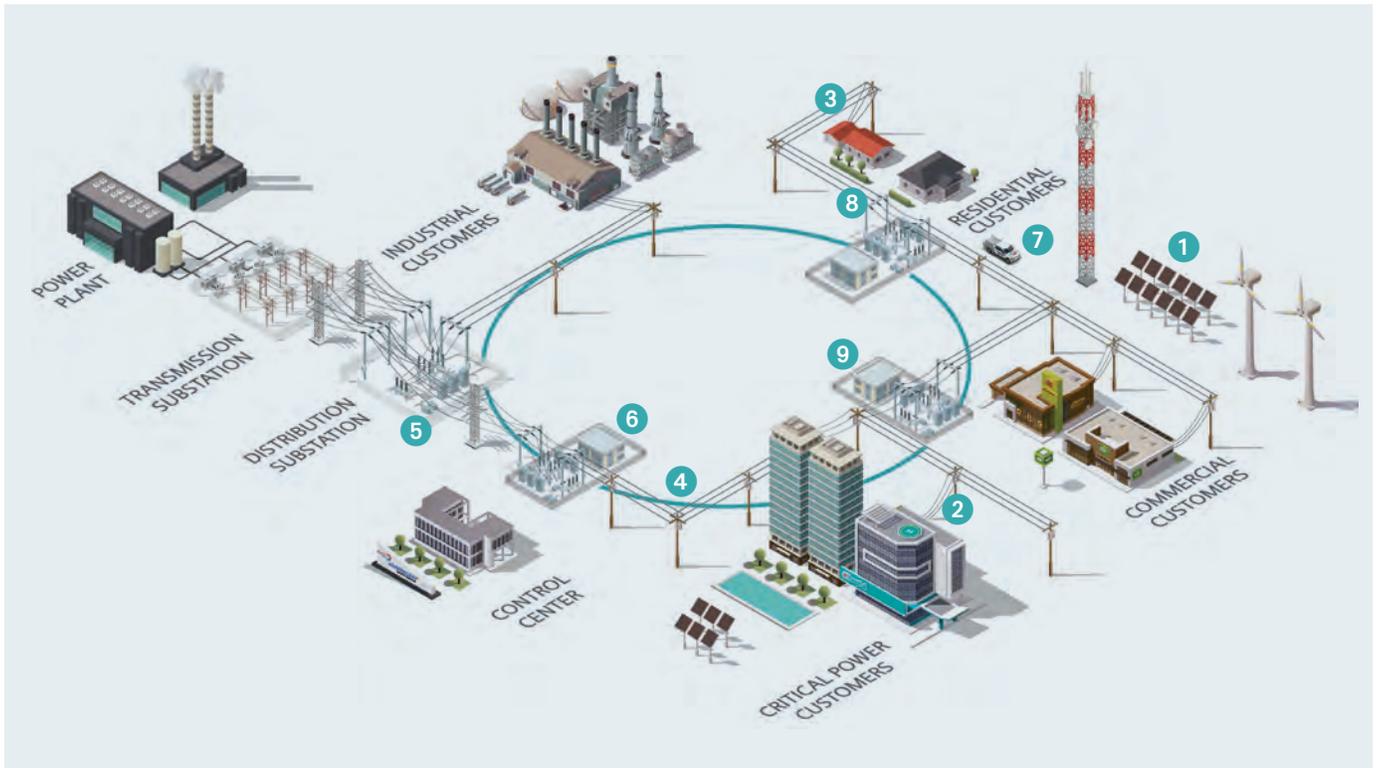
We believe – and the market confirms – that DA is the next, most cost-effective investment in grid modernization. Properly designed and implemented, DA can enable an intelligent, self-healing grid by digitizing the operations, monitoring and control of power distribution. Implementing DA not only optimizes the grid, it also increases Quality of Service (QoS), lowers the Total Cost of Ownership (TCO), and enables multiple layers of cybersecurity protection.

DA applications can improve distribution system safety, efficiency, optimal performance, day-to-day reliability and the resiliency needed to swiftly restore service after an outage.

Siemens recommended first step is the proper design and implementation of a scalable communication system – the Field Area Network (FAN), which can link from two to dozens of distribution substations within a utility's service territory.

It serves as a network management platform in support of DA applications and the development tools to implement current and future functionalities. The FAN is connected to the data communication backbone, allowing for both local and central monitoring and control of all grid assets. While backhaul applications – such as AMI backhaul or even Substation backhaul, could be designed on the periphery to address mass amounts of data transfer for Control Center analytics without affecting primary control functionality of the FAN.

Applications over a Field Area Network



- 1 Direct Transfer Trip / Distributed Generation
- 2 Automatic Transfer Systems
- 3 Fault Location, Isolation, and Service Restoration

- 4 Volt/VAR Optimization
- 5 Substation Automation
- 6 Distribution SCADA

- 7 Mobile Workforce
- 8 AMI Backhaul
- 9 Substation Backhaul

RUGGEDCOM Product Guarantee



Our products are at their best, when the environment around them is at its worst! With RUGGEDCOM, the name speaks for itself. RUGGEDCOM products set new standards for quality and reliability for communication networks deployed in harsh environments. Covering an extremely wide temperature range, they offer zero-packet-loss technology under high electromagnetic interference and enhanced Rapid Spanning Tree Protocol (eRSTP™) for ultra-high-speed network fault recovery. Additionally, our Application Solutions address the increasing demand for edge computing, enabling users to run third party applications directly on our hardware, offering

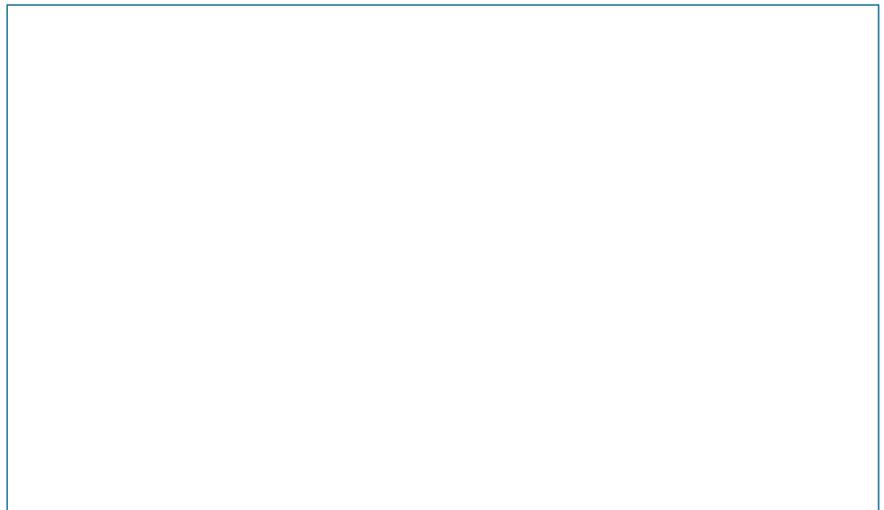
increased response times to local events while relieving the traffic burden on the network or data center. RUGGEDCOM products perform reliably in virtually all types of mission-critical networks – in substation automation, self-healing power grids and “smart grid” systems.

As your partner, Siemens understands your need for fast, reliable, and standardized communications. We are one of the world’s most tightly meshed service and support providers. Our innovation and focus on rugged communications will help you to meet these needs now and in the future!

Let’s talk.

We are here to answer any questions you may have about your project. For general inquiries, please email us at:

siemensci.us@siemens.com





Rugged Networks Professional Services

Every possible aspect must be considered when designing and implementing communication networks. To ensure that the solution fulfills all requirements in terms of performance, reliability, and future-proofing, you need a partner with extensive network experience and comprehensive industrial and technological expertise. And these are just the qualities that define the experts from Siemens Professional Services.

Our services include:

- Network Audits
- Network Security Assessments
- Network Design Services
- Radio Frequency (RF) Planning and Site Survey Services
- Pre-Configuration and Testing Services
- Implementation Services

usa.siemens.com/industrial-networks-services



Rugged Networks Education

We are the partner that will help you build or expand the expertise you need, whether it's fundamental knowledge of industrial communication networks or a detailed understanding of data communication via Industrial Ethernet – thanks to a comprehensive range of targeted training programs that we can adapt to your specific needs on request.

Through our Siemens Industrial Networks Education Program, we offer professional certifications which are aligned with the international Industrial Ethernet standards.

Our certifications include:

- Switching and Routing in Industrial Networks with RUGGEDCOM
- WiMAX with RUGGEDCOM
- Security with RUGGEDCOM

For companies with unique requirements, we offer a custom training option, where we design a course to meet your specific needs.

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