



Managing networks – Optimizing energy flows – Boosting efficiency: Spectrum Power network control system

Answers for energy.

SIEMENS

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A world full of energy ...



Whether in bustling cities or developing regions, prosperity and progress in our modern society are inconceivable without energy. Energy is the driving force and lifeline of our civilization – in households as much as in industry, transportation or healthcare.

One of the greatest challenges of the 21st century is to supply the required energy **efficiently**, economically, and with minimal impact on the environment – a challenge that involves the entire chain of **energy logistics** from generation to transportation and distribution.

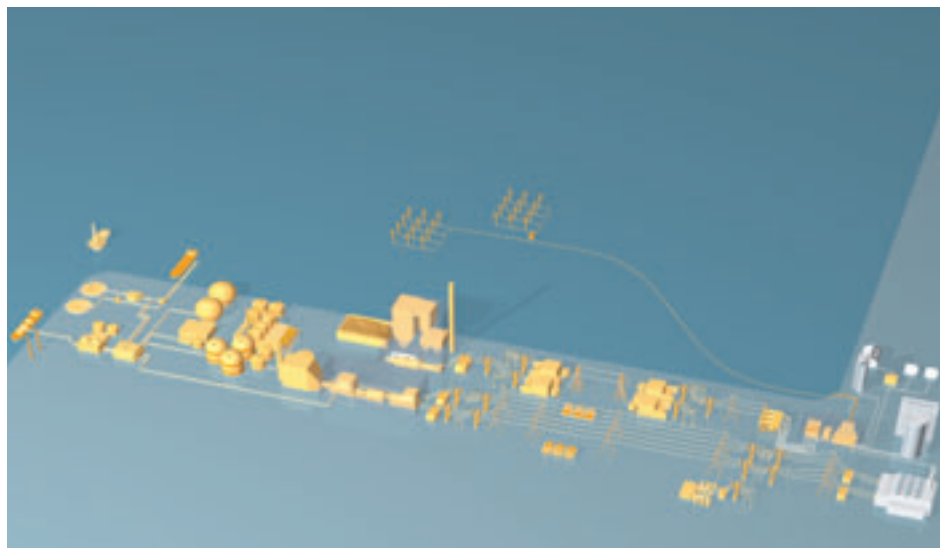
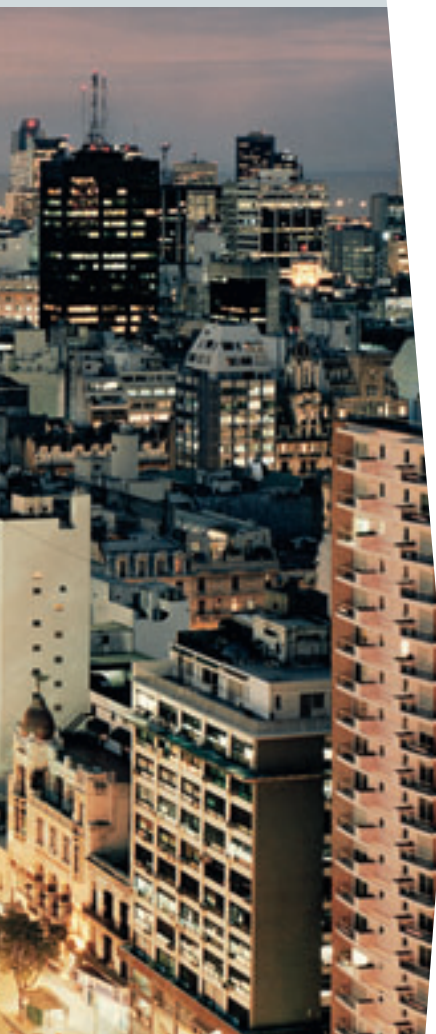
These efforts will be affected by four major factors in the **coming decades**: worldwide growth in energy demand, increasing urbanization, dwindling fossil energy resources, and the effects of climate change.

**What needs to be done?
And not just today, but in the future?**

Power network operators around the globe are investing knowledge and capital to meet these new challenges. Success will depend on a number of factors, including **optimized utilization** of existing resources and networks, further expansion of infrastructures, and integration of decentralized and **regenerative** energy production with renewables.

Energy automation plays an important role in this increasingly complex landscape. It facilitates improved energy management, more flexible responses to changing demands, and increased efficiency throughout the networks – all of which ensures a **high level of energy reliability** at reduced cost.

... needs efficient network management.



Spectrum Power: Power Control System for the energy systems of the future

In any electric power system, **the network control system** is indispensable for secure, economical and reliable operation.

With Spectrum Power™, we offer you a future-oriented solution for centralized and decentralized **energy management**. It gives you the tools to increase the availability of your network, to respond faster and more effectively to malfunctions, and to reduce the risk of system disturbances and outages.

Spectrum Power is integrated into a powerful, end-to-end **range of products and solutions** which allows you to swiftly adapt your electric power system to new conditions – both today and tomorrow. Our technical and innovative concepts ensure that your network control system will continue to meet your requirements well into the future.

An excellent partnership for your success

Siemens stands for a “Partnership with Power” – for four reasons:

- Leading position in energy automation
- 160 years of experience
- A powerful, end-to-end range of products and solutions – from the field device level to the energy management system
- Broad installed base with more than 1,800 energy management systems worldwide

Your requirements – our experience ...



With Spectrum Power you benefit from our experience, which is based on the installation of more than 1,800 network control systems worldwide. That's an impressive number – and so is the wide range of requirements these systems meet.

Whether for traditional utility companies, industrial companies or independent network operators, network control systems from Siemens fulfill **extremely diverse requirements** in different areas of power generation, transmission and distribution.

The scope and complexity of our solutions are **determined entirely by your requirements**. The range of solutions extends from the smallest all-in-one solution to large distributed systems with many workstations and thousands of remote access devices and field devices. This flexibility is based on a comprehensive **range of consistent products and solutions** that can be tailored to your individual requirements.

Global presence – local expertise

A multitude of factors must be taken into account to design your network control system correctly. Our presence in about **90 different countries** ensures that we know and understand your specific requirements. And you can rely not only on our expertise but on our **services**, which assure the reliable operation of your network around the clock.

Innovation – for advanced development of network control systems.

Today the general requirements for electrical power systems are changing at a much faster pace than even a few years ago, and your infrastructure must keep pace with these developments. Here we support you through **continual further development** in all fields of energy automation. Within our global network of knowledge, we're working today on the technologies and solutions you'll need tomorrow.

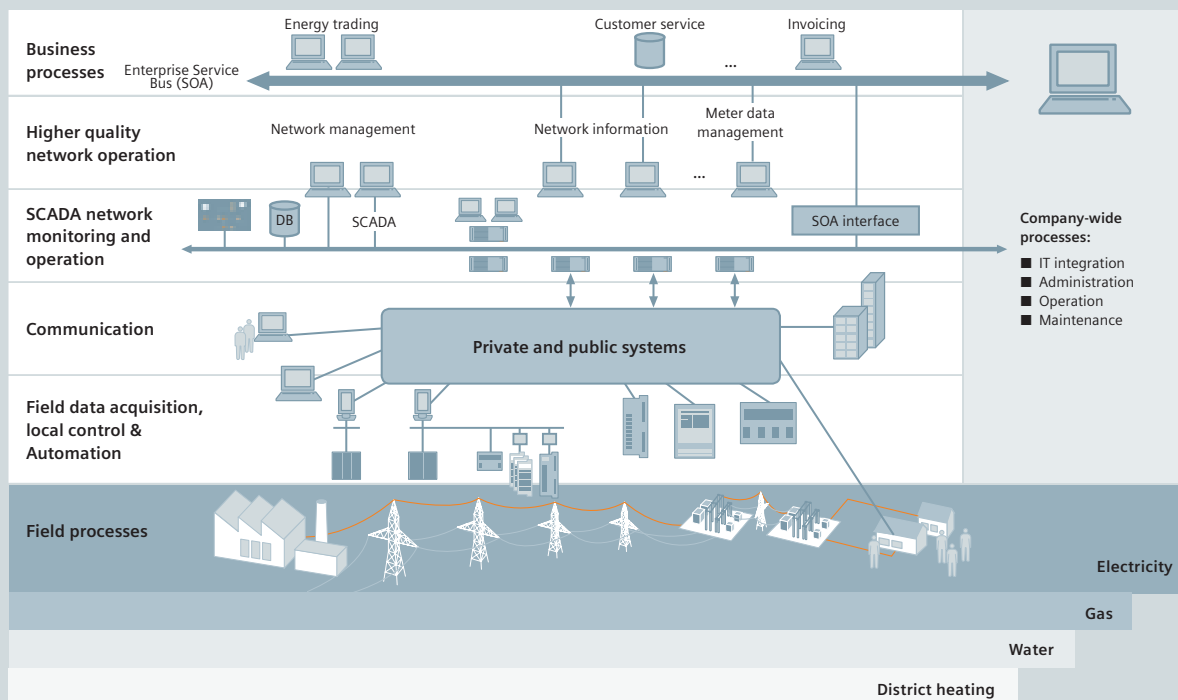
Of course, innovation must always go hand in hand with protecting your existing investments – and we ensure that it does through the rigorous application of international standards and technology trends.

Competitive throughout the entire life cycle

Your goal in investing in a network control system is to increase your long-term competitiveness. That's why Siemens offers you a **reliable partnership** throughout the entire life cycle of your system. It covers everything from professional consulting for projects of any size to **configuration, installation and commissioning** of the solution and its individual components. Of course we'll also train your personal – either onsite or in our educational center.

Our worldwide service – including remote diagnosis and remote access – efficiently ensures high **systems availability**. And of course you can also rely on us for upgrading, expanding and replacing your power control system.

...bundled in a single family of systems: Spectrum Power



For all tasks, requirements and goals

As the name implies, “Spectrum Power” covers all aspects of power management. From a range of solutions based on proven and innovative components, we configure your network control system as a **tailored solution**. Basic components for SCADA, communications, and data modeling are provided for controlling and monitoring your networks. Plus we provide additional applications to optimize your network and generation management – for everything from analytical functions for your distribution or transportation network to forecasting and optimization applications, as well as scheduling applications for generation companies.

How much performance is needed?

In addition to its functional adaptation, Spectrum Power can also be tailored to your requirements when it comes to **hardware**. If you’re starting out today with an all-in-one system you can **expand** it anytime stepwise – all the way to a redundant multi-server system.

Redundant configurations deliver the highest level of reliability for you and your customers, ensuring dependable network management around the clock.

Security for your investments too

The data in your network control system is important and must be preserved, regardless of how technologies and platforms may develop in the future. That’s why the Spectrum Power product family relies on internationally valid standards – from data modeling compliant with IEC 61970 (CIM) to communications standards such as IEC 60870-5-101, -104, DNP, IEC 61850 or OPC. So you’ll be ready for the future.

Thanks to open interfaces such as these, all your existing data can be simply migrated to Spectrum Power as needed. You benefit from the capabilities of new, powerful technologies – while we protect your existing investments.

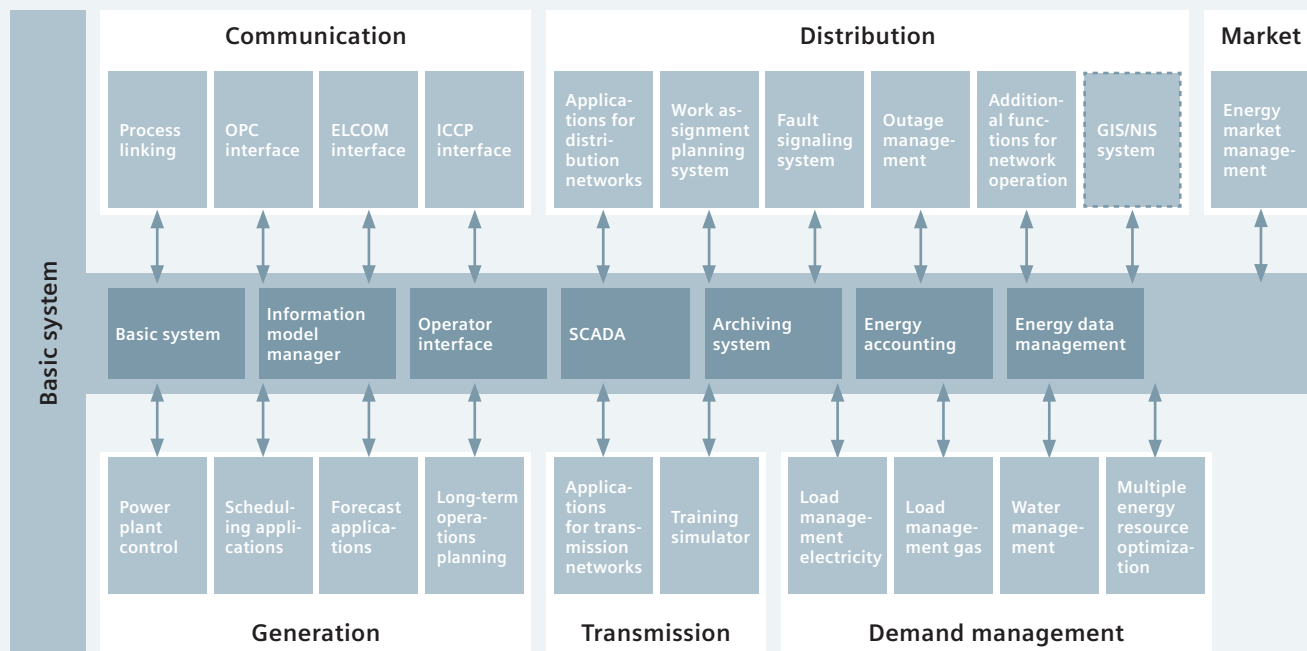
Outstanding capabilities

Spectrum Power network control system offers:

- Tailored system scope and functionality – based on a modular product range
- Openness thanks to the use of international standards
- Continual updating to the current state of technology – throughout the entire life cycle of the system
- Protection of your investments

Spectrum Power: One solution with many possibilities ...

Spectrum Power CC – components overview



Spectrum Power offers you a **comprehensive range** of functions for requirements in energy generation, network operations management and communications, including:

- Supervisory Control and Data Acquisition (SCADA).
- Data input and data modeling:
 - Data modeling compliant with IEC 61970 using the Common Information Model (CIM)
 - Powerful graphics editor
 - Parallel multi-station engineering with job management and undo functions
 - Powerful online data activation
- Extensive communications options with communication protocols
- Maintenance and outage management:
 - Fault report handling
 - Planning and monitoring
 - Fault correction
- Functions for managing transmission networks:
 - State estimation
 - Load flow calculation or short circuit calculation
 - Contingency Analysis
- Functions for managing distribution networks:
 - Fault isolation and restoration of power
 - Load flow calculation
 - Short circuit calculation
 - Expert system
- Functions for energy data management
 - Schedule management
 - Forecasting
 - Archiving
 - Reporting
- Functions for demand side management
 - Load management for electricity and gas
 - Water supply management
- Functions for electric power producers
 - Automatic generation control with load frequency control
 - Scheduling applications

... for efficient, future-oriented network and energy management

Spectrum Power – for the right decision in every situation

Spectrum Power gives operators a fast, reliable overview of their network, so they can swiftly know and assess its status. This fast assessment is an excellent basis for avoiding wrong decisions – and the costs that could result.

Intelligent user guidance also contributes to reliable, efficient operation. With its modern user interface and simple, consistent operational concepts, the network control system supports operational processes as well as correct actions in critical situations.

Assured access to information – anytime and anywhere

A Web-based architecture with mobile online access to all data supports **decentralized operation** of Spectrum Power – whether it's for mobile system administration, fast restoration of power, or to support active participation in energy trading.

Your maintenance people receive any alarm messages simply via phone call or SMS. So you can respond from any location – from outside the plant, from workstations outside the control center or, if you're on call, even from your home.

Improving company-wide information flows – with a service-oriented architecture

Thanks to a service-oriented architecture (SOA), Spectrum Power is able to use other IT systems in your power system – and those systems in turn can access the services of the network control system. Standardized process, interface and messaging specifications based on the IEC 61968 and IEC 61970 standards support **trouble-free data exchange** between the systems.

These services include:

- data services with capabilities such as identifying the affected resources in the event of a fault
- function logic services with the capability of starting certain energy management functionalities – such as computational programs for load flow calculation
- business logic services; these coordinate the business logic functions in the different systems in relation to energy management – such as malfunction management in the network control system with the operator-owned customer information system.

These examples demonstrate how Spectrum Power **integrates itself** into your company's heterogeneous IT systems landscapes and **into your operational processes** – so you can optimize both the power supply and communications with your customers.

With open standards you get **excellent flexibility** and simple handling for data migration, IT integration or system expansions. What's more, powerful import/export interfaces support you in connecting with GIS systems.

Reducing maintenance and operating costs – increasing network availability

Reducing maintenance and operating costs is an important way to ensure economical operation of your network. Spectrum Power contributes extensively to such cost reductions – through **improved assessment** of your network's status and **optimized utilization** of your resources.

Maintenance management makes it possible to perform planned maintenance with perfect timing. The correction of disturbances and outages is supported by applications for fast fault localization and isolation. And the automation of switching sequences helps you restore power as quickly as possible.

You can use a **simulation mode** to examine planned actions and their effect on the network, without affecting real-time operations.



You benefit from unsurpassed experience

What you can count on when working with Siemens:

- Leading position in energy automation
- 160 years of experience in power engineering
- More than 1,800 network control systems installed worldwide
- Vertical integration through standardization (IEC, CIM)
- Powerful products, applications and solutions with clear-cut migration and innovation strategies – from a driving force in innovation for network control technology
- Siemens Energy supports you around the world – in over 90 countries.

Siemens AG
Energy Sector
Energy Automation
P.O. Box 48 06
90026 Nuremberg
Germany

www.siemens.com/energy-automation

For questions on power transmission and distribution, please contact our Customer Support Center, 24 hours a day.

Tel.: +49 180 / 524 70 00
Fax: +49 180 / 524 24 71
(Charges depending on provider)

E-mail: support.energy@siemens.com
www.siemens.com/energy-support

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