The power to make power happen
Intelligent, digitally managed power transmission and distribution

usa.siemens.com/energy-management
Electrical energy makes the world go round.

No matter where power comes from or where it has to go, we make sure it makes its way – every step of the way.
Agility in energy
An open and flexible architecture of Siemens solutions and services that enable a multitude of customized applications for smarter grids, system stabilization, the development of new business models, and optimized energy trade.

Connecting grids
Solutions from Siemens that help master the new challenges emerging from the convergence of grid infrastructures, such as the efficient long-distance transmission of green power, power exchange between grids, and the connection of microgrids to the main grid.

Agility in energy
An open and flexible architecture of Siemens solutions and services that enable a multitude of customized applications for smarter grids, system stabilization, the development of new business models, and optimized energy trade.

Services and trusted partnership
From the first planning and design steps to commissioning, operation, and all the way to maintenance, updates, and dismantling, Siemens as a consultant, system integrator, supplier, and partner provides a comprehensive range of customized services, such as training and financing. They ensure the reliable, efficient, value-adding operation of any power transmission and distribution asset.

Expertise you can rely on
A steady stream of innovation in power technology for more than 160 years has made Siemens a trusted, valued partner of leading energy, industrial, and infrastructure companies worldwide. Continuing this tradition, Siemens addresses the new challenges of the energy system in three areas:

- Connecting grids
- Agility in energy
- Totally Integrated Power

Products, solutions, and services from Siemens cover the entire value chain in these areas of activity. They help actively shape the future of energy and make it a success story for all stakeholders from the point of grid infed all the way to the consumer.

Demanding challenges, promising prospects
The pace of innovation is accelerating

The future is electric
Electrical power has become one of the most important commodities of our time. Now a more distributed energy infrastructure is evolving. This entails fundamental technical and economic change, and it makes grid operation more complex than ever before. While electrification and automation have provided a reliable basis for today’s energy landscape, digitalization holds the key to mastering these new challenges:

- a changing generation mix
- generation capacity additions
- the growing distance between source and load
- public and private decentralization
- the need for refurbishments and upgrades
Our high-quality products, solutions, and services, backed by the capabilities of a global energy technology powerhouse, help connecting grids in order to meet the complex requirements the future holds for power transmission, create the agility in energy that is key to coping with today’s and tomorrow’s power distribution challenges, and enable the reliable, safe, and efficient power supply of industries, buildings, and facilities with Totally Integrated Power.
New links to complement established structures

Power generation, especially from renewable sources, often takes place far from the centers of load, where resources such as water and wind are abundant and can be exploited efficiently. In addition, there is a tendency to interconnect existing transmission grids. The power transmission infrastructure needs to be prepared for this coalescence as well as for the new challenges that arise from the establishment of increasingly multilayered structures and processes. Aging grid infrastructures need to be replaced and updated. In addition, new solutions that help increase transmission capacity, power quality, and system stability need to be applied.

Innovative solutions on a reliable basis

One example is the full bridge converter, a technology for high-voltage direct current (HVDC) power transmission. The full-bridge topology with HVDC PLUS (multilevel voltage-sourced converter technology) provides significant benefits and excellent performance, allowing selective fault clearing on overhead lines in radial multiterminal systems.

Siemens FACTS (flexible AC transmission) systems – such as SVC PLUS – supply reactive power to AC grids to improve transmission quality and efficiency. A new grid-access solution for offshore wind power plants helps significantly reduce the levelized cost of offshore wind power. Customized, state-of-the-art high-voltage turnkey substations are the one-stop solution for the node points of the increasingly complex power transmission infrastructure. Air and gas-insulated switchgear, transformers for various applications, and high-voltage products – such as circuit breakers, surge arresters, disconnectors, and bushings – provide the technically sound and reliable basis for mastering the challenges posed by increasing demands and growing complexity. Transformer Lifecycle Management™ and continuous condition monitoring are among the expert services that cover the entire lifecycle of products and applications, ensuring minimum total cost of ownership and creating added value.

An efficient highway for clean power

In 2009, the transmission system operator China Southern Power Grid put the world’s first ultra-high-voltage direct current (UHV DC) transmission system into operation. It connects the two provinces and transmits five gigawatts of eco-friendly power over a distance of 1,418 kilometers from the Chuxiong substation in Yunnan to Zengcheng in Guangdong. The UHV DC system, based on Siemens technology and awarded the silver Asian Power Award 2011 as one of the best fast-track power projects in Asia, operates on a voltage level of 800 kV. Commercial operation of the first 800 kV pole started in December 2009, and the complete bipole has been in operation since June 2010. The system uses two series-connected 12-valve pulse groups per pole.

In comparison with local power generation based on fossil sources, which would have been the alternative, the transmission of hydropower from the Yunnan province to the Pearl River Delta reduces emissions by more than 30 million tons of CO₂ per year.
Agility – a new core capability in the energy business
Change has become a constant for utilities over the past years. Trends such as distributed energy systems, renewables, changing customer behavior, and new forms of competition must be taken into account and managed. Smart automation and digitalization technologies are proving to be extremely valuable in this regard. But as the pace of change continues to accelerate, we’re also witnessing the increasing importance of one specific ingredient for success: agility.

Optimal use of all resources and technologies – optimum results
Agility in energy translates into more open, transparent, adaptable, manageable, and lean systems, structures, and strategies that enable utilities to stay ahead of the challenges and out in front of change. As such, agility is the key to keeping any power supply system efficient, reliable, and sustainable in a world that is spinning ever faster. What’s more, it turns the evolution of the energy system into a clear opportunity rather than a threat. It contributes to the streamlining and reorganization of workflows, value chains, and revenue streams. It enhances existing operations and helps create new business models and markets.

Siemens’ comprehensive expertise is the basis for unique added value
Our customers benefit from our distinct ability to support and enable the digital convergence of information technology and operation technology in a manner and to a degree that is unique. We enable the seamless integration of renewable energy and distributed power generation, a high degree of adaptability, unprecedented sustainability, and optimal asset protection – in short: agility in energy.

Agility in demand management
The farsighted decision by NB Power to bring Siemens in as a partner resulted in a ten-year agreement that is the first of its kind in Canada.

Intensive work is currently underway on building NB Power’s smart grid, which is leading to a fundamental transformation of the utility. Among the major initiatives being rolled out is special software that will enable NB Power to control the amount and timing of electricity used by specific devices, such as electrical thermal storage units and baseboard heaters. In addition, billing and customer service programs are being overhauled. And in the coming years, powerful new tools will be added, such as outage automation to make service disruptions shorter and less impactful. The final aim is to boost NB Power’s efficiency to the higher levels that will serve as a global model for where the industry is headed: agility in energy.

Agility in energy
Ahead of the challenge, ahead of the change

Copyright: PJM Interconnection

Agility in energy
Ahead of the challenge, ahead of the change

Copyright: Siemens AG
Totally Integrated Power

Power for challenging environments

Tailored solutions for industry-specific requirements

Totally Integrated Power (TIP) provides customized answers to the most diverse power supply demands in any industrial or infrastructure context. The consistent TIP product range enables comprehensive, integrated one-stop solutions that cover all aspects of reliable, safe, and efficient power distribution – from planning and design to operation, monitoring, and control, from software to hardware, from intelligent distribution substations to uninterruptible power supply systems and all the way to reliable, cost-efficient components, such as the new 3VA molded case circuit breaker.

TIP is seamlessly integrated into digital environments through Totally Integrated Automation (TIA) and Total Building Solutions (TBS). It supports automated engineering processes with an extensive range of software and data, interacts with industrial automation through communication-enabled devices and open interfaces, and provides the basis for universal energy-efficiency concepts through systems, components, and software for energy data collection.

A comprehensive range of value-added services covers the entire life cycle of products and solutions and helps make even more of an investment while ensuring full compliance with the strictest technical as well as environment, health, and safety (EHS) standards. Tailored one-stop solutions for many different industries and facility applications ensure that industry-specific requirements are met precisely and that the power-supply system of an industrial or infrastructure facility integrates seamlessly with the automation environment and its operational IT.

Outstanding performance, efficiency, and sustainability

Erbognone is also considered to be one of the most reliable data centers in the world. Its maximum downtime of 48 minutes per year translates into an availability rate of 99.995 percent – a performance rate that is directly comparable to that of the world’s largest IT providers, such as Google and Facebook.

To ensure that the high cooling requirements of the data center do not adversely affect energy consumption, the green data center uses an integrated combination of highly efficient TIP electrical equipment, air conditioning technology, and building automation solutions from Siemens. In addition to its impressive and energy-saving cooling system, the data center benefits from significant energy efficiency improvements in the uninterruptible power supply and in power distribution: While losses can amount to approximately 13 percent of the total energy demand in conventional data centers, they may not exceed 0.6 percent in a green data center.

Totally Integrated Power for the world’s most energy-efficient data center

The Italian company Eni S.p.A recently opened its green data center, the world’s most energy-efficient facility of its type. It houses Eni’s central computer processing systems for information management and for seismic simulation processing. With its TIER IV classification compliance, the data center in the Lombardian municipality of Ferrara...
Our unique engineering and solution expertise makes us a trusted partner who ensures our customers’ lasting success. Together we shape power infrastructures in a sustainable, profitable, and socially responsible way.

Energy Management all the way.
One stop for power

Trendsetting ways of getting power to where it is needed

Exceptionally broad, long-standing expertise and experience in the fields of electrification, automation, and digitalization is what makes Siemens stand out. This unique position translates into a comprehensive range of products, solutions, and services that provide the basis for lasting success in the new energy landscape.

Customers benefit from Siemens’ unique ability to support and make possible the digitally enabled convergence of information technology and operation technology. Meaningful, workable technology, processes, and financing options enable outstanding flexibility, consistency, and response speed, which are the essentials in shaping efficient power infrastructures that will stand the test of time.

Changing generation mix
The growing share of renewable power in the energy mix also means increasingly volatile generation. New technical approaches are required to ensure stability and availability.

- DC interconnectors
- Flexible AC transmission systems (FACTS)
- Energy storage
- Network control systems
- Generation and demand management systems

Generation capacity additions
The demand for electrical power keeps rising, and so does the need for adequate grid capacity to ensure a reliable, safe, and efficient power supply.

- High-voltage AC transmission technology
- Intelligent distribution grid technology
- Consulting services

Growing distance between source and load
Large-scale resources of renewable energy are often located far away from the centers of load. It takes powerful technology to get the power to where it is needed.

- High-voltage direct current (HVDC) systems
- Flexible AC transmission systems (FACTS)

Public and private decentralization
Today’s increasingly complex, more and more distributed energy systems need to be managed with intelligent technology and backed by storage facilities.

- Distribution grid automation technology
- Technology for microgrids
- Energy storage and electrolyzers
- Consulting services

Need for refurbishments and upgrades
The prevention of bottlenecks, overload, and overstress requires cutting-edge equipment as was well as solutions for cyber security and improved resilience.

- Refurbishment, retrofit, and overhaul products and services
- Cyber security solutions
- Integrated grid management systems
- Smart grid solutions

Reliable, safe, efficient power supply
The basis for today’s industrial processes, infrastructure solutions, buildings, and even private life is dependable and affordable power in all circumstances.

- High-, medium-, and low-voltage power supply solutions, switchgear, and devices
- Low-voltage distribution systems and devices for all applications
- Power quality, measurement, and monitoring devices
- Integration into industrial and building automation through TIA and TBS
Setting the pace

Expertise that creates value added

A tradition of excellence

Bringing to the table unique experience in the area of energy and electrification plus comprehensive expertise on all voltage levels – not to forget world market leadership in industry automation and a leading role in digitalization – Siemens is in a unique position to keep the lead in addressing the energy challenge and to drive innovation. And innovation has always been the lifeblood of Siemens. Developing the best answers for the customers’ toughest questions made the company the global powerhouse it is today. And the story continues: Products, solutions, and services from Siemens support the development and delivery of viable business approaches and reliable, efficient power supply infrastructures. A comprehensive end-to-end approach that addresses all relevant verticals with a unique one-stop portfolio helps ensure lasting commercial success against the backdrop of an evolving energy system.

The Siemens Energy Management Division: Core figures

- ~ €12 bn Revenue
- ~ 53,000 Employees
- ~ 100 Production sites
- 755 Inventions
- 386 Patent first-filings
- ~ €375 m R&D investments

Research and development

Siemens is a company that lives research and development. It means securing our technological basis, helping shape the future with innovative solutions, and strengthening our position in the market. The following figures provide some evidence.

All figures worldwide as of financial year 2017
The technical data presented in this document is based on an actual case or on as-designed parameters, and therefore should not be relied upon for any specific application and does not constitute a performance guarantee for any projects. Actual results are dependent on variable conditions. Accordingly, Siemens does not make representations, warranties, or assurances as to the accuracy, currency or completeness of the content contained herein. If requested, we will provide specific technical data or specifications with respect to any customer’s particular applications. Our company is constantly involved in engineering and development. For that reason, we reserve the right to modify, at any time, the technology and product specifications contained herein.

Siemens Industry, Inc.
Energy Management Division
800 North Point Parkway
Suite 450
Alpharetta, GA 30005

Subject to change without prior notice
Order No.: EMBR-EMDBR-0518
Article No.: EMCG-B10005-00-4AUS
Printed in USA
© 2018 Siemens Industry, Inc.