Power Technologies from ABB
Innovative products, dependable systems and integrated solutions
As one of the world’s leading technology companies, we support our customers in using electricity more efficiently, upgrading industrial productivity, saving energy, and achieving sustainable reductions in environmental impact.

ABB is a responsively supportive vendor to energy utilities and industrial companies. Our paramount concern is to assure a dependable and efficient supply of electricity, heat, gas and water.

The energy sector is currently undergoing the most significant changes in recent history. We are seeing a transformation from centralized, mainly carbon-based and controllable power generation to less centralized, less predictable generation that is more difficult to control effectively, with a larger proportion of low-carbon energy sources. This entails special challenges in regard to the integration of renewable energies, reliability, efficiency and network quality.

The goal of ABB’s technologies is to reconcile the rising demand for electric power with growing levels of environmental awareness. ABB’s products, systems and services cover the entire value creation chain, from generation, transmission and distribution of electricity, all the way through to its final utilization, ensuring a more efficient supply with a reduced environmental impact. ABB’s technologies play a vital role in optimizing power generation and developing networks that are more flexible, more reliable and more intelligent.
Energy supply systems of the future

Electricity supply operations have undergone a radical transformation due to the increasing use of renewable energies for power generation:

- remote power generation, not least at offshore wind energy installations, means the electricity has to be transported over long distances, for which the networks concerned have not been designed.
- The rising proportion of decentralized feed-in from very many, very small installations, particularly in Germany, is already causing problems for compliance with voltage bands.
- The volatility of the generating process means that randomness inside the supply system is rapidly increasing. An unwanted effect in a system in which generation and consumption always have to be in equilibrium.

In this matrix of imponderabilities, we are therefore having to redefine the modalities of supplying electricity: the power grids of the future will be more flexible and more closely intermeshed. The result will be a stronger and more intelligent network for meeting our rising demand for energy – coupled with a minimized environmental impact.

The technologies already in place have to be utilized to optimum effect, and fresh options have to be explored. In broad and diverse spectrum of the concepts being envisaged, we feel totally at home, thanks to our profound comprehension of the systems involved and our holistic fund of corporate expertise. We at ABB, with our technologies and our in-depth corporate experience, are proactively engaged in co-creating the energy supply systems of the future.

New approaches in the world of energy

Energy is a valuable commodity: economical use of energy against the background of steeply rising demand, coupled with the need to reduce environmental impact, is consequently among the vital issues of our time. We are committed to sustainability and to our corporate responsibility for the natural environment – as indeed we have always been. Today, we are even more proactive in progressing energy-efficiency and climate protection. Ways to reduce CO₂ emissions include optimized use of energy and power generation from renewable energies.

Our goal at ABB is to develop and harness technologies that help our customers to upgrade their corporate competitiveness by enhancing their efficiency, upsizing their capacities and improving their dependability, while at the same time reducing their environmental impact. During the development phase, we draw up a detailed environmental analysis covering the entire life-cycle of our products, in which we examine the direct and indirect effects of a product on the natural environment.

With the aid of ABB’s solutions based on existing technologies, the losses at every step along the energy value creation chain can be downsized. When power generation is successfully rendered more efficient, and renewable energies utilized to better effect, environmental impact and the concomitant costs can be downsized quite significantly. The same applies for reducing transmission losses, ensuring more intelligent distribution network management and more productive utilization of electricity. With our can-do corporate capabilities and innovative solutions, we help our customers in the energy supply and industrial sectors to harness energy to optimum effect and reduce their CO₂ emissions.
Solutions for the world of power technologies

State-of-the-art control systems for power and heat generation and water facilities
We are an important partner for main contractors, plant manufacturers and process vendors, offering sophisticated and efficient solutions for managing and improving these systems. Our integration experts contribute their specialized knowledge of instrumentation and control technology and the concomitant electrical engineering, underpinned by their comprehensive mastery of power plant process engineering. Numerous solutions combine to create holistic optimization – all of it single-sourced: engineering and turnkey delivery.

Optimum support for network infrastructure
Dependable operation of transmission, distribution and industrial networks for power, heat, gas and water is of crucial importance for the entire economy. We provide holistically fit-for-purpose control of the complex and dynamic processes operated by our customers at energy utilities and industrial facilities.

Supporting network control to meet the challenges of both today and tomorrow in terms of energy supply requires intelligent information technology solutions.
With our extensive experience in network control and network management, coupled with our in-depth comprehension of the requirements concerned, we are the ideal partner for network operators who concentrate on cross-divisional core expertise in planning, building, operating and maintaining the networks concerned.

The life-cycle in focus
We assure our customers’ success by providing integrated solutions, purposefully geared to mastering the complexity of the multifarious tasks involved.

The modalities of our customers’ processes are the focal point of our thoughts and actions. We support them on all levels and over the entire life-cycle involved, from fundamental analysis, planning and implementation all the way through to service support, thus offering the requisite protection for your investment by retaining your existing systems.

Our high-quality products, featuring maximized availability, long useful lifetimes and low maintenance outlay, are cost-efficient throughout their entire useful lifetimes, minimizing environmental impact by maximizing resource-economy.
ABB has been writing engineering history for more than 100 years now: since the invention of the three-phase system for generators, transformers and motors, significant innovations in energy technology have been developed by ABB. Our people’s inventiveness is crucial in progressing technical advances.

Path-breaking technologies and quality are the key features of our products and systems, and the foundation for the high degree of investment security so essential to our partners of today’s and tomorrow’s world. Our lengthy traditions make sure that we are fully at home on our customers’ sectors.

**Power generation**

We rank among the leading vendors of automation solutions and electrical equipment in power plants. With our comprehensive portfolio of systems, products and services, we are able to meet the requirements of well-nigh any kind of plant. Our range of systems for electrical equipment, automation and optimization supports our customers in upgrading the dependability and cost-efficiency of their operations.

And, of course, our expertise also covers power generation from renewable energies using thermal processes like biomass or waste incineration, plus generating hydro-electric power including pumped-storage power plants.

For photovoltaic power generation, we offer not only turnkey installations with all the requisite service support, but also subsystems like network links, automation or storage solutions for improving network stability.
The wind power industry
ABB has for more than 30 years been a dependable partner of the wind power industry as the world’s biggest vendor of electrical components for wind energy installations. Here, the portfolio includes generators, inverters, low and medium-voltage products, transformers and substations. As the technology leader for High Voltage Direct Current (HVDC) transmission, ABB also specializes in network links for offshore wind farms.

Power transmission and distribution
For power transmission and distribution, in the utilities sector, and all segments of industry, we offer a comprehensive portfolio of low, medium and high-voltage products, transformers, power semiconductors, power cables and cable accessories.

And for building cable routes, e.g. for transporting electricity from offshore wind farms in the north to the consumer centers in the middle and south of Germany, ABB’s portfolio includes the appropriate technologies. The new routes can be implemented either by expanding the existing AC grid or by using HVDC.

Railways
ABB is one of the world’s leading vendors of rail vehicle equipment and infrastructural systems for traction current networks. Our path-breaking technology and eco-friendly, energy-efficient products thus support the most sustainable form of travel: the railways.

Water
ABB is a partner for the entire water management circuit – from procurement until the water is finally returned to the natural environment. For around five decades now, we have been equipping thousands of water management facilities and networks with optimized products and solutions.

Oil and gas industries
As a tried-and-tested service provider to the oil and gas industries, we create holistically conceived solutions for production, processing, transport, storage and distribution in the hydrocarbon supply chain.

Marine
In high-performance ships, the owners put their trust in our dependable products and solutions, and in ABB’s consummate corporate competence. Their reward is an operation of cost-efficiently enhanced dependability.
In order to maximize customer satisfaction, we have incorporated into top-quality products the feedback from our long years of experience gained in daily operation. The range of ABB’s products is modularized in structure and opens up a broad diversity of design options. System-focused product families significantly simplify ordering, erection and installation.

We offer you a broad portfolio of competitive and innovative high-voltage products from 60 to 800 kV, including the world’s most compactly dimensioned high-voltage substations. With our comprehensive range of transformers in different voltage and power classes, we rank among the planet’s biggest manufacturers.

Our long years of experience with the technology of HVDC transmission has been incorporated in our innovative solution called HVDC Light®, which enables reactive power to be regulated very swiftly and voltage stability reliably assured.

Our up-to-the-future HVDC transmission technology brings electricity from offshore wind energy installations to the mainland with eco-compatible cost-efficiency, and is a path-breaking innovation for tomorrow’s transmission technology.

Our broadly diversified portfolio of medium-voltage products for primary and secondary power distribution ensures cost-efficient, dependable equipment operation for their users.

Our digital protection and control technology, sensors and plug-in components are unrestrictedly future-compatible and meet even the most stringent of requirements in terms of dependability, operational reliability, functionality and customizable flexibility, coupled with a high degree of standardization.

As a globally operating company, we also offer not only access to international expertise, but also comprehensive solutions for disparate standards and requirements.
Low voltage
- Switching and control devices
- Control cubicles
- Substations
- Distribution systems
- Power quality products

Medium voltage
- Inductive current and voltage transformers, sensors
- Capacitors and filters
- Fuses
- Surge arresters
- Vacuum interrupters and embedded poles
- Switch-disconnectors, disconnectors and earthing switches
- Switchgear for motors and drives
- Circuit-breakers
- UFES™ (active arcing-fault protection)
- Short-circuit current limiters
- Plastic-insulated power cables, cable accessories
- Distribution transformers (IEC and ANSI)
- Generator circuit-breakers
- Air- and gas-insulated switchgear
- High-speed transfer systems
- Compact substations
High and extra-high voltage
- Capacitors and filters
- Instrument transformers
- Surge arresters
- Cable accessories
- Circuit-breakers
- Switchgear modules
- Gas-insulated switchgear
- Industrial transformers
- Power transformers
- Phase-shifter transformers

Turnkey systems
- Complete high and extra-high-voltage cable systems
- High and medium-voltage substations for indoor and outdoor installation
- Modularized, prefabricated systems
- HVDC systems
- Network integration of wind energy installations
- Network links for offshore wind farms
- Photovoltaic systems
- Transformer substations
- Flexible three-phase current transmission systems FACTS
- Traction current supply systems
- Shoreside power supply for ships
- Power supply for data centers
- Electro-mobility solutions
- Energy storage systems
- Compensation systems
Flexible systems
From protection and I&C on the process level all the way through to complete systems

We offer one of the world’s largest portfolios of mutually harmonized products for close-to-process automation and data acquisition in power and heat generating facilities, in the transmission and distribution of electricity and gas, and in water facilities and networks.

In thermal power plants, state-of-the-art control processes not only minimize fuel consumption and emissions, but also improve power plants’ amenability to control. The processes involved thus make an important contribution towards dependability of supply and climate protection.

When it comes to managing both power plants and networks, it is crucial that far-reaching decisions can be taken quickly and on the basis of verified information, particularly regarding optimum deployment of the equipment concerned.

Our response to these challenges is an array of products and systems that enable the right information to be provided in the right place at the right time.

With “Ventyx, an ABB company”, we have expanded our portfolio to include leading-edge software solutions in the fields of asset management, mobile workforce management, energy analysis, planning and trading, plus business intelligence.

With these innovative applications and services, we support our customers in their drive to further upgrade their operative and financial performance capabilities.

In addition, Ventyx offers an extensive IT platform that closes the gap between operational technology (OT) and information technology (IT). We are thus addressing our customers’ growing need for safety, dependability and cost-efficiency.
Protection and I&C systems on the process level
– Metrological, drive, switching and actuation systems
– Telecontrol technology
– Instrumentation and control systems for water and wastewater facilities
– Instrumentation and control systems for waterways
– Power plant instrumentation and control systems
– Protection and control units for substations
– Station control systems
– Network control systems
– Information management and optimization

Complete systems
– Entire electrical, metrological, open and closed-loop control systems for
  – power plants
  – photovoltaics
  – water and wastewater facilities
  – waterways
  – pumping stations
  – Network management systems for
    – transport and distribution networks for power and gas
    – multi-utility

Software solutions and services
– Asset management
– Mobile workforce management
– Energy planning and analysis
– Energy trading
– Smart grids, virtual power plants and demand response programs
– Business intelligence
Comprehensive service support
Service support for the entire lifetime involved

We back up our products and systems by a comprehensive range of service support capabilities available round the clock. Our goal is to upgrade the availability levels of the systems concerned and thus improve our customers’ corporate competitiveness for sustainable efficacy. Together with our customers, we formulate the appropriate strategy for extending the useful lifetimes of products and systems. We take a holistic approach to the plants we support, and are always there for our customers over the equipment’s entire lifetime, beyond the warranty period as such.

When it comes to service support, too, we are working on innovative solutions for minimizing maintenance requirements by means of intelligent sensors, so as to render our service support even more cost-effective and achieve further reductions in CO₂ emissions.

**Services provided**
- Consultancy
- Diagnostics
- Remote diagnostics and service support
- Network studies and tools
- System planning
- System expansion jobs
- Erection and commissioning
- Tools for maintenance planning
- Repairs
- Retrofit jobs
- High-voltage and high-power testing
- Cable laying and accessory installation
- Service for offshore installations
- Software upgrades
- Cyber-security
- ERP integration
- Training simulators
- Maintenance agreements
- Training and skilling
- Attestation of competence for SF₆ recovery
- Spare parts
- Disposal and recycling
- Pollutant clean-up
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