

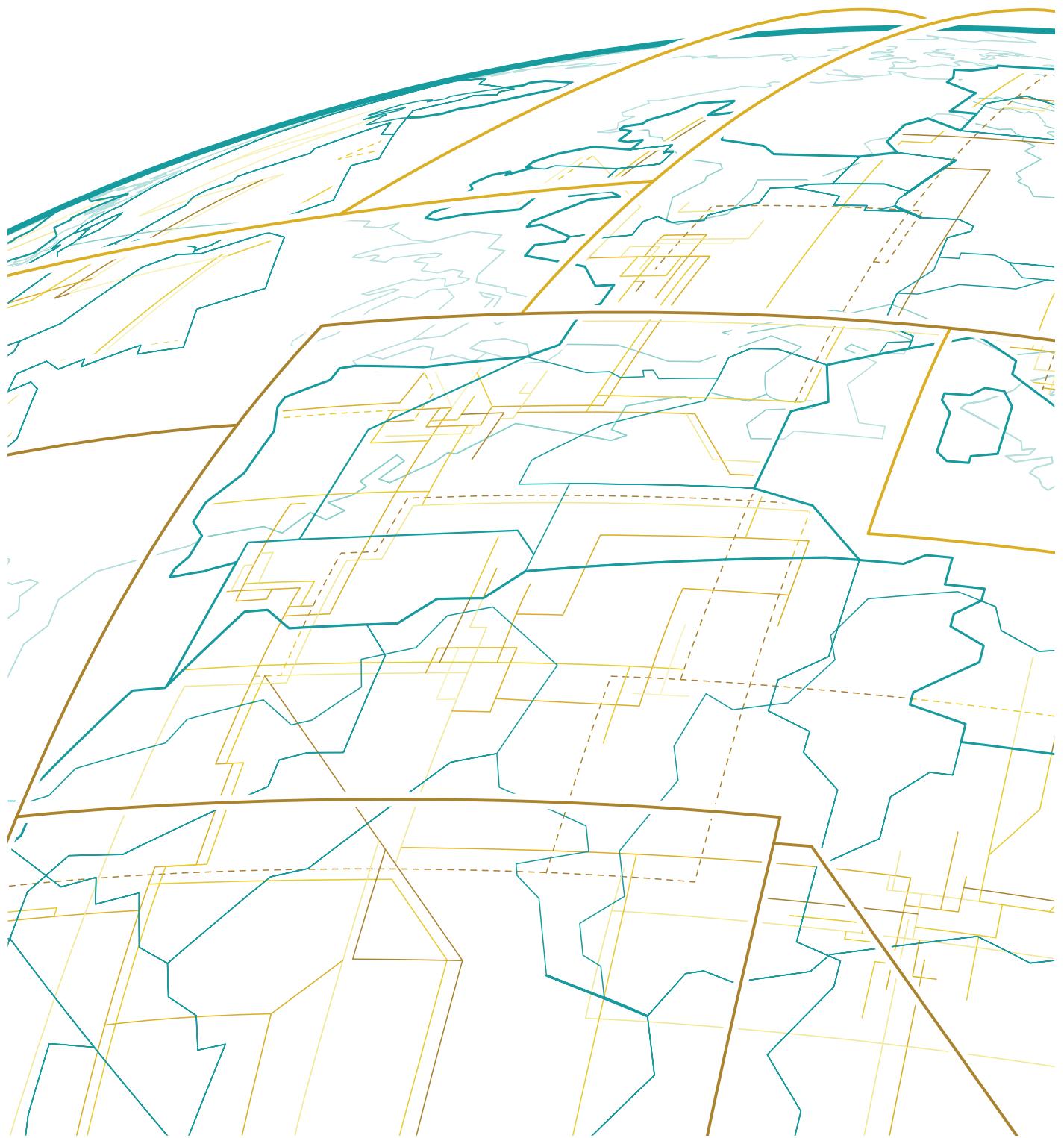


Power management system
Reliable and energy efficient

Power and productivity
for a better world™

ABB

Power management systems



With ABB and the worldwide implementations of the power management system, you can rely on engineering execution centers on every continent across the globe. ABB is always right there.

Energy is vital for every industry. So is energy management. Industry's dependence on scarce energy resources, the volatility of energy costs, the growing environmental consciousness and more stringent legislation are just a few of the factors influencing the global drive for improved energy management.

The power management system (PMS) prevents blackouts and disturbances of your operations – while at the same time it controls energy costs, enhances safety and mitigates both environmental and health impacts.

ABB's power management system has been specifically designed for the most energy-intensive sectors in which you operate, such as the oil and gas and the petrochemical industries. In many areas around the world, your operations face an insufficient or unreliable public power supply. In large part, you must therefore depend on your own energy generation and distribution capabilities. ABB's PMS manages your energy vulnerability and ensures sustainable energy for your plant operations by reconciling efficiency, economic, health, safety and environmental considerations.

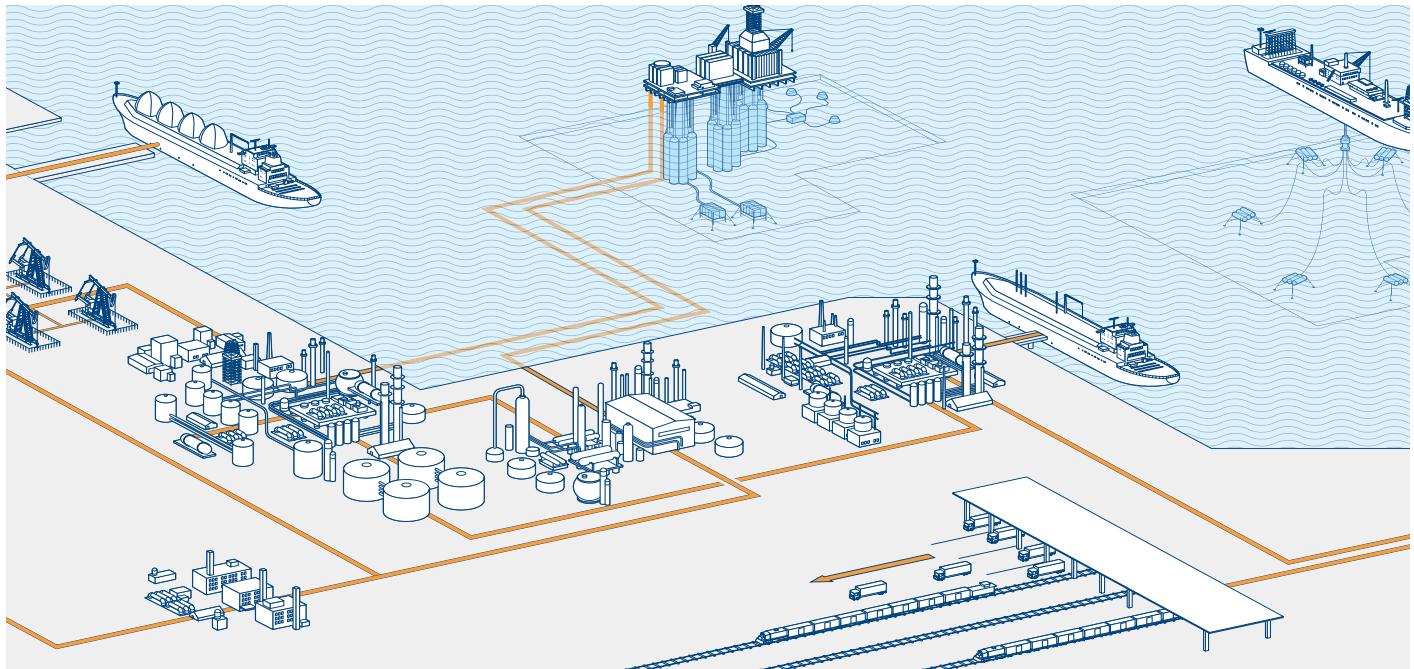
ABB has a track record of successful PMS implementations around the world, including:

- offshore platforms
- Floating production, storage and offloading vessels (FPSO)
- refineries
- LNG complexes
- large industrial complexes

The PMS provides an integrated set of control, supervision and management functions for power generation, distribution and supply in industrial plants. In this context, the PMS encompasses functions that are available in (sub)systems that are also known under alternative names, such as:

- Power Distribution Control System (PDCS)
- Load Management System (LMS)
- Electrical Network Monitoring & Control System (ENMCS)
- Electrical Control System (ECS)
- Electrical Integrated Control System (ELICS)
- Integrated Protection and Control System (IPCS)

Proven power management functions



Proven power management functions

Industrial plants require a stable and optimized electrical network. To achieve that goal, the PMS controls and supervises power generation and supply with proven features.

Fast load shedding (40 to 150 ms, depending on the configuration) is based on fast network determination and energy balance calculations. The system's protection/control units can also monitor and, if necessary, invoke frequency-based load shedding. Re-acceleration by the motor control centers are also featured. The extended load shedding report is for operator assistance in trouble shooting in case of incidents. In addition to supervisory control and data acquisition (SCADA), the system offers generator control (including integration with the governor and excitation controller); transformer control (including tap changer control); circuit breaker control (including integration with protection); motor control (including integration with motor control centers); and power control (including peak shaving and load sharing). Manual and automatic synchronization, re-starting, and monitoring.

Operational advantages

The PMS also allows for a more critical design of your plants' electrical equipment. It rearranges generation, importation and loading so that the individual generators, reactors, transformers and tie-lines operate well within their specification limits. Tight integration and serial communication – with motor control centers (MCCs), protection units, governor and excitation controllers, variable speed drives and other sub-systems – reduce both wiring and maintenance costs, creating substantial savings.

Power import, generation and frequency and voltage control are optimized by means of active and reactive power con-

trol. Because of the large number of load shedding groups and priorities that can be set, load shed actions are limited to the exact minimum required. As a result, critical process units keep receiving power that would otherwise be shed. The restarting function ensures safe recovery after load-shed actions. As a further operational benefit, the system provides advanced control of DLN turbines with low NOx emissions levels. Operators are also given the tools and access they need for better control over the configuration of the electrical network, the set points and statuses of all machines (transformers and generators), and the startup of big motors from the central control room. At the same time they receive a clear overview of the network configuration (main circuit breakers and substation configurations), the network loads and the control system health.

Innovative extended capabilities

Going well beyond the standard power management features, the PMS offers:

- multi-site power management, including load sharing and load shedding. Off-line simulation of the impacts of electrical network control operations
- millisecond analysis of electrical upsets
- root cause analysis of events
- sms messaging for distant substations
- web access to PMS and switchgear protection and control units
- full utilization of IEC61850 and GOOSE communication to form a fully integrated solution with DCS and ECS on the 800xA standard.
- extensive reduction of utilization of IEC61850 and profinet

Business benefits of the ABB power management system

In addition to the advantages that ABB's PMS delivers in day-to-day operations, it generates important business benefits that significantly affect the bottom line of your enterprise. For example, the system enables you to reduce electrical investment costs by 10 to 25%. Minimized cabling, engineering and optimized network design remove the need for oversizing of substation equipment, such as transformers and switchgear. At the same time, you'll offload risks because ABB takes responsibility for the PMS and its interfaces to electrical equipment.

Electricity costs are reduced in several ways: by optimizing on-site generation and reducing the need for over-dimensioning of energy generating capacities; by maintaining a good power factor; and by limiting electrical import during peak times to avoid peak-based charges.

PMS ensures the operation and safety of mission-critical and safety-critical processes through the prevention of energy blackouts and associated plant shutdowns (for savings of up to \$500,000 per production hour lost). It improves plant lifecycle availability and extends equipment lifetimes through event-driven maintenance. It eliminates safety hazards and prevents adverse environmental effects.

The system improves energy forecasting and purchasing by furnishing detailed information on an operation's energy needs. There's less need for operator presence and interventions through automated execution of routine and standard actions. You'll need fewer operators and they'll keep their focus on the exceptions.

An Integrated Project and Services Approach

We carry out power management projects world-wide through various engineering execution centers and deliver best-in-class services throughout the complete project life cycle.

Our services include:

- consulting
- basic and detailed design
- hardware and software engineering
- project management: risk management
- planning, co-ordination and fulfilment of shipment, installation, testing and commissioning
- On-site services, installation and commissioning including documentation and training

Complete Electrical Systems Delivery

The Power Management System can also be part of a broader electrical system delivery by ABB. In this context ABB shares your risks and assumes responsibility as a single point of contact for defined activities and deliverables, including administration and procurement; supply of electrical equipment (including HV, MV and LV switchgear, motors and drives, transformers and generators); electrical engineering and electrification; on-site construction, installation and commission-

ing; service and support during operations; spare parts and maintenance services; and modifications and revamps.

Advanced features

The PMS is a state-of-the-art solution with advanced features which exceed the capabilities of traditional automation systems. These include:

- extensive scalability in size, performance and functionality
- redundancy at all levels
- multiple language support
- support of legacy, standard and ongoing developments in the area of communication
- protocols, including OPC, Modbus, PROFIBUS, PROFINET, TCP/IP, IEC 60870, DNP3, IEC 61850
- high-speed communication capabilities
- support of IEC 61131-3 programming languages
- 800xA library with standardized modules for plug and play engineering and test.
- integration with supervisory systems
- integration with subordinate systems, including GPS, meteorological stations and motor control centers
- extended security and access control

Based on 800xA technology

The power management system is based on ABB's Extended Automation System 800xA and makes use of the 800xA system components.

Process portal HSI

Process portal is the human system interface (HSI) of the power management system. process portal provides accurate and timely information that is critical for making the right decisions. Reducing the time it takes to make time-critical actions improves the bottom line. Efficient use of both manpower and production resources increases overall plant productivity.

The process portal provides:

Personalized workplaces for focused information access
Intuitive and flexible navigation for fast information access
Integrated data for informed decision-making
Comprehensive operator functionality for reliable control

Real-Time Information Integration

System 800xA Engineering provides real-time information integration for better and faster access. Working within a common engineering environment, 800xA Engineering supports a consistent information flow from design, through installation and commissioning, to operation and maintenance.

Power management system

ABB's power management system helps you secure a reliable and steady electrical power supply.

Control and I/O products

ABB controllers can be used to easily design simple to complex control strategies to fit any application, including continuous, sequential, batch and advanced control. Designed from the ground up to leverage the power of industry-standard fieldbuses and open communication protocols, ABB controllers provide a full range of controls, scalability, and fault-tolerant redundancy options.

In addition, ABB offers a full line of industrial I/O for remote and local installations, with options such as small footprints, rail mounting and a broad range of I/O types, including intrinsically safe I/O. Our products ensure better control, higher output and lower costs.

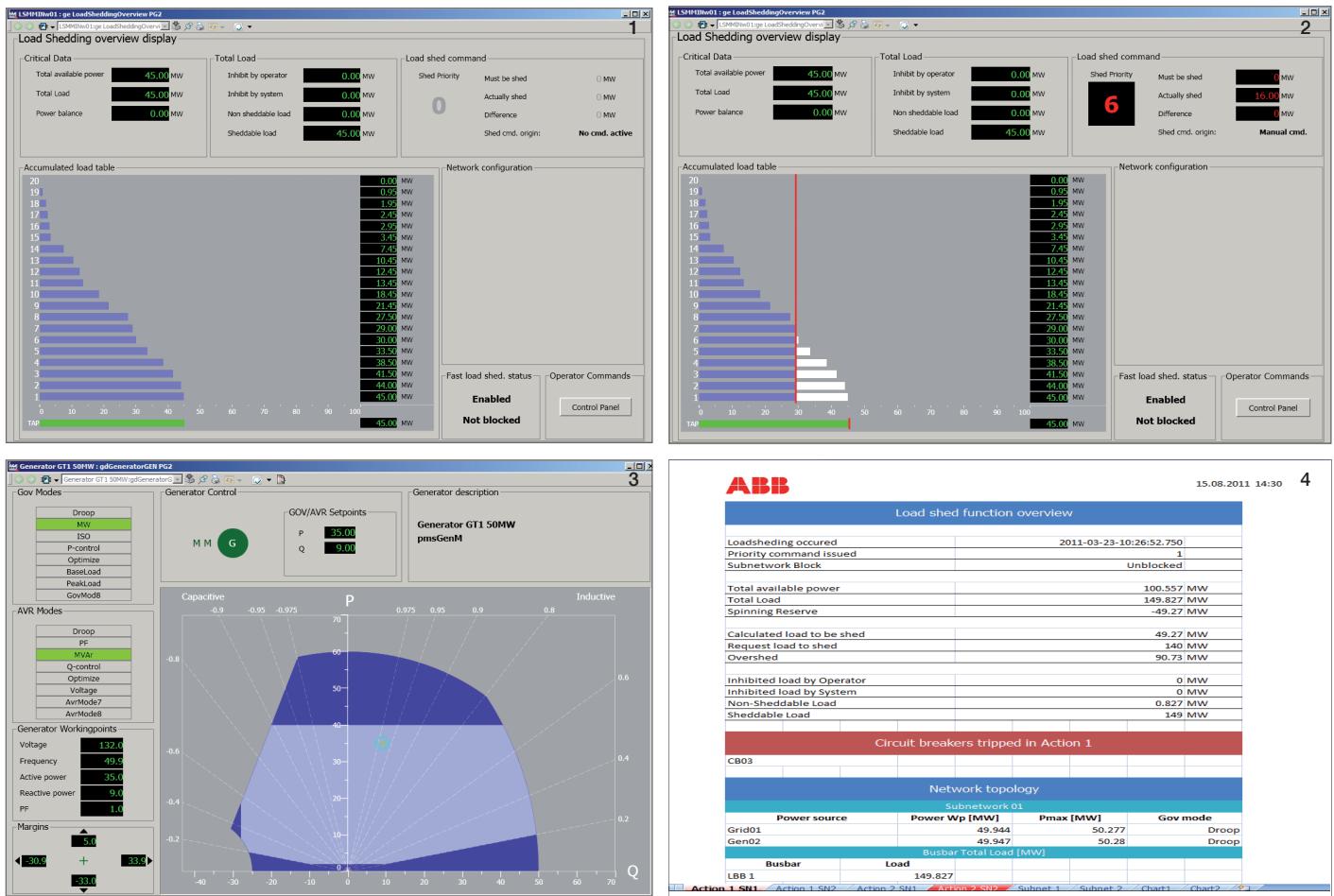
ABB's global expertise

ABB has a long-standing tradition as a supplier of superior automation and power technology products, solutions and services to the oil and gas, petroleum and chemical industries. In the application area of power management system, we have been active since the mid 1980's. Over the past 20 years, we have accumulated a wealth of expertise in this domain and have built up a large installed base at leading oil and gas, petroleum and chemical companies throughout the world. The power management system thus combines our knowledge of automation and power technology with our broad expertise in each industry segment.

For worldwide implementations of the power management system, you can rely on engineering execution centers on every continent across the globe. We're always right there, when and where you need us.

ABB power management system is part of a full suite of automation and IT solutions tailored to the needs of the oil and gas industry and the petrochemical industries. Our solutions cover full-scope applications for:

- offshore oil and gas production
- onshore oil and gas production
- liquefied natural gas
- pipelines
- refining
- bulk and distribution terminals
- petrochemicals
- chemicals



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