



# ABB in primary aluminium

From mine to market



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# Efficiency, availability, productivity and profits

Price fluctuations, intense competition, and demands for improved environmental performance and increased energy efficiency – these are the major challenges aluminium producers face today.

ABB can help you meet these business challenges by providing electrification and automation solutions that improve operating procedures and integrate existing plant equipment. ABB's experience is unmatched and our accomplishments in supplying complete electrification solutions and subsystems to more than 60 aluminium smelters worldwide is unrivaled. Further, with ABB Ability™, ABB's entire portfolio of digital solutions and services can now be combined. ABB Ability is a unified, cross-industry digital capability with devices, systems, solutions, services and a platform that enables more knowledge of the system, more capabilities and improved performance delivered by connectivity of the smelter equipment.

Whether you need a single product or a comprehensive electrification package, look to ABB as your single source.



# From mine to market

## A complete portfolio of solutions

Look no further than ABB. Our portfolio and expertise cover the full value-added chain, from your bauxite mine to the primary aluminium you market. ABB excels at integrating equipment, skills and services into a comprehensive, customized solution that strengthens your entire operation. As one of the key market players in electrical generation, distribution and transformer rectifier systems, ABB can help you leverage process and business information by providing seamless access to power, control and instrumentation data.

### Power conversion and distribution

ABB provides efficient and reliable power distribution solutions for bauxite, alumina and smelter operations as well as the broadest range of high-, medium- and low-voltage equipment for switching and distributing electric power. ABB's high-power rectifier systems (with single unit ratings of up to 113 kA and 1,750 VDC or 100 kA and 2,000 VDC) and our FOCS 20 – 500 kA fiber optic DC measuring system are of the highest efficiency.

ABB's solutions are engineered for safety, flexibility and security to keep operations running day and night. ABB provides emergency power generation, industrial substations, harmonic current compensation equipment, switchgear and transformers.

In smelter power conversion systems, power quality and power plant/smelter interfaces are treated as key efficiency areas. ABB's blackout protection (BPC) prevents potline trips and loss of production, and our Switchsync™ controllers ensure maximum power quality and minimal impact on the feeding power plant and power conversion station during switching events. ABB's captive power plant/smelter interface increases power plant efficiency and reduces operating costs.

By expert positioning of substations and electrical rooms, and innovative power distribution design, ABB's experienced infrastructure engineers maximize the value of the customer's investment and reduce energy costs. Electrical room and substation locations must be selected

carefully as cable lengths and the distance between electrical rooms and electrical consumers contribute directly to operating costs and power losses.

### Power quality

Aluminium smelters require huge amounts of electrical energy. Optimized power conversion systems and well-engineered power utility interfaces are essential for maximum energy efficiencies and power quality. Electrical energy accounts for 30 to 40 percent of aluminium production costs. ABB's knowledge, rigorous engineering practices and simulation software help reduce overall capital investment and aluminium production energy costs without compromising power quality.

### Drive applications

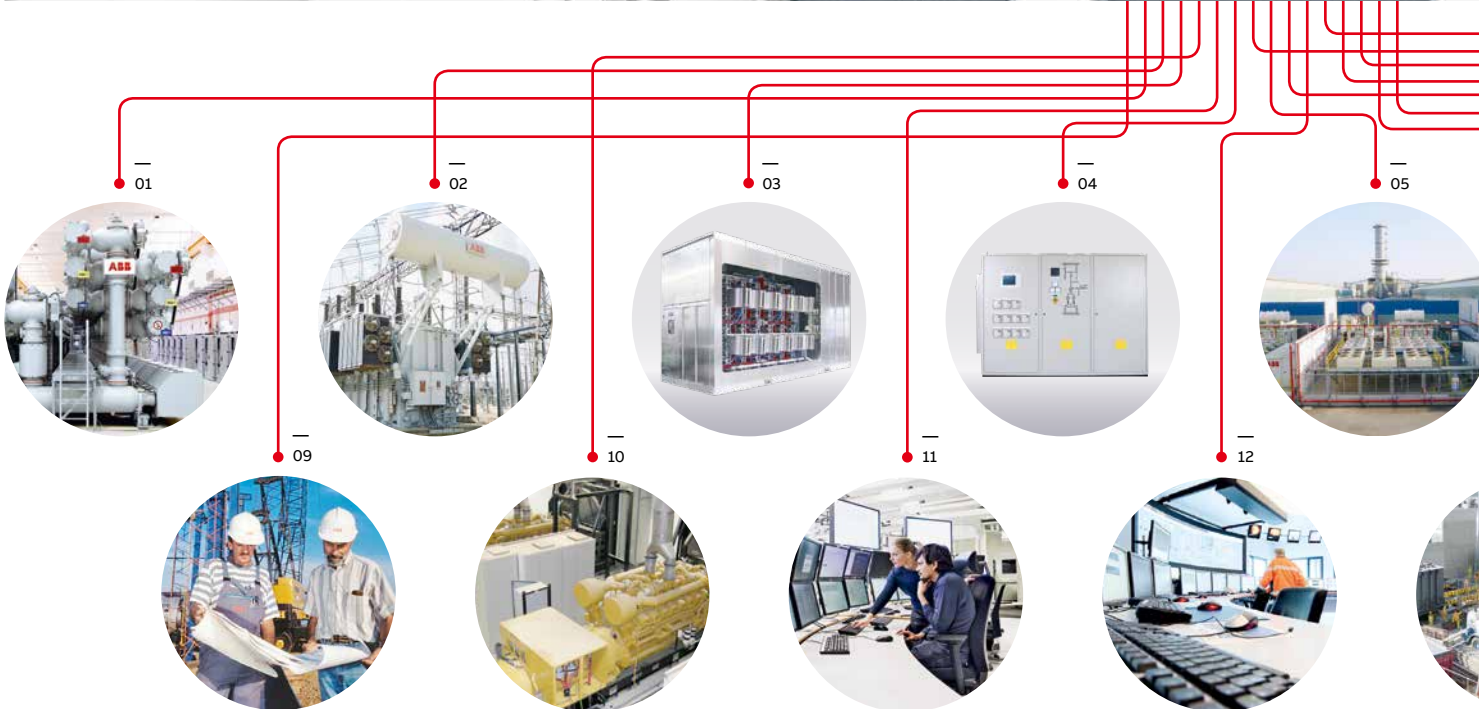
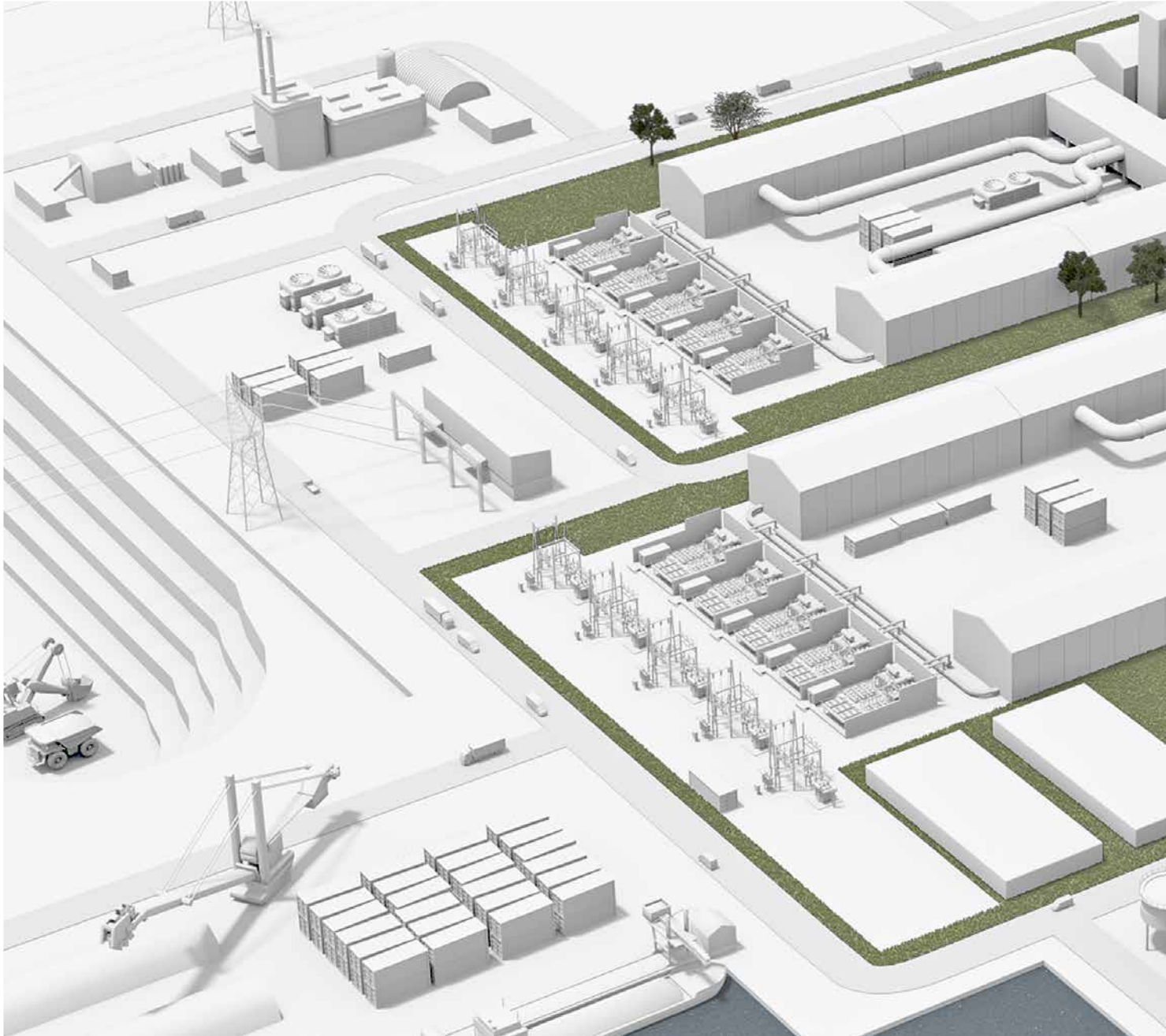
ABB's vast experience in the primary aluminium industry enables us to select the right motor for each drive application, from moving bauxite and producing alumina to feeding the smelting process. As the world's largest producer of industrial motors and variable-speed drives, ABB draws on an extensive knowledge base that meets the needs of the aluminium industry.

### Process control and instrumentation

Aluminium plants need integrated process control systems that provide plant-wide efficiency and maximum productivity. ABB's distributed control solutions provide easy access through a single point of entry to the process, production, quality and business information systems. These can be accessed by authorized users from the most remote location or corporate headquarters.









- 01 HV gas insulated switchgear
- 02 Power transformer
- 03 Rectifier
- 04 Rectifier unit control
- 05 Rectifier substation
- 06 DC busbar collector system
- 07 Fibre optic current sensor (FOCS)
- 08 Power factor and harmonic current compensation system
- 09 Infrastructure: Grounding lightning protection, lighting systems, cabling, communications systems and fire protection
- 10 Emergency power generation and UPS
- 11 Automated integration of process data with business systems for effective management
- 12 Process control systems and advanced application software for plant automation
- 13 Online retrofit and upgrades
- 14 Life cycle services and training
- 15 Site management, installation supervision and commissioning services
- 16 Project management and engineering for complete electrical system integration

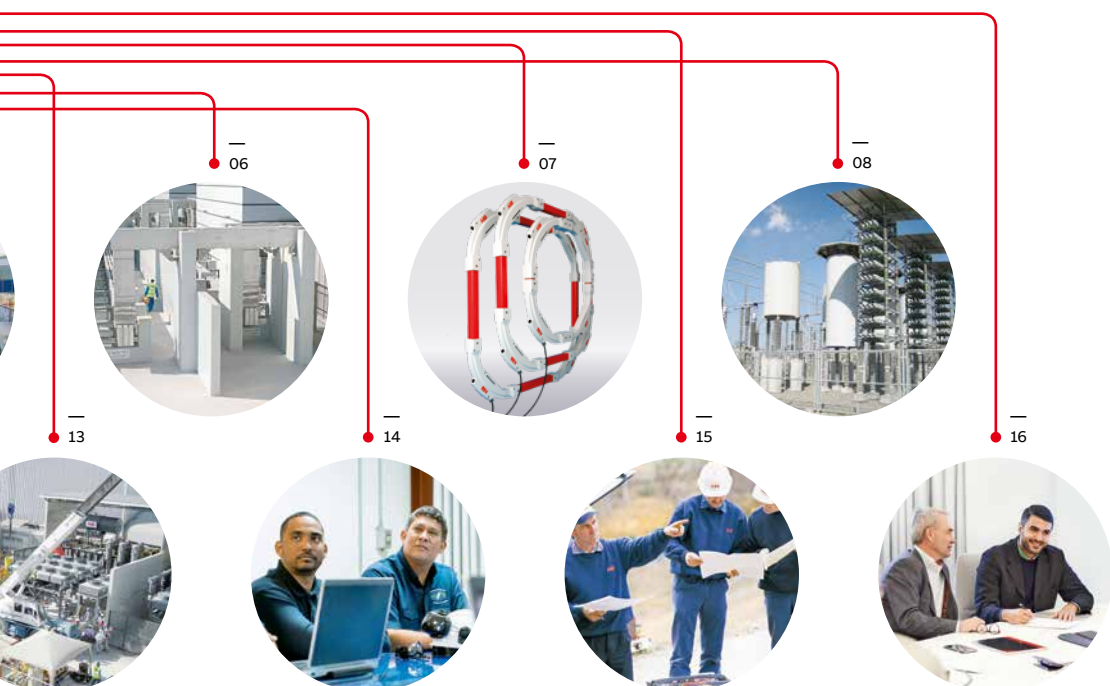


ABB provides tailored distributed control solutions that use real-time data – enabling constant monitoring and analysis of your process for improved asset availability. Process control optimization will be implemented by exploiting the unique features of ABB Ability, which will enable customers to achieve greater uptime (by minimizing downtime via predictive maintenance), higher speed (via automation), better yields (by use of sensors and automation) and enhanced safety and security (by protecting at rest and in motion).

ABB also offers a complete range of instrumentation products for the primary aluminium industry, such as hydrogen analyzers, melt cleanliness analyzers, as well as inclusion identification and quantification analyzers.

#### **Collaborative production management solutions**

Count on ABB to help you meet all your requirements. ABB's offerings include production management solutions that allow you to drill down into your plant data with any chosen key performance indicator (KPI). ABB's award-winning optimization solutions currently enhance more than 400 processes worldwide and are helping customers make effective use of alternative fuels and materials. ABB's connectivity solutions enable you to share and view information between critical business systems.

#### **Electrification and plant engineering**

The efficiency of an industrial plant is not only determined by its critical mechanical and electrical equipment – planning and engineering also play an important role. ABB ensures the selection of the right technologies and products, their correct dimensioning and compliance with environmental requirements. All of this can lead to enormous savings in investment and energy consumption, as well as a significant improvement in plant profitability over its life cycle.

Supplied as an integrated entity, ABB's solutions for plant electrical infrastructure include optimized substation and electrical room layouts, cable engineering, grounding systems, fire detection and protection, air conditioning and ventilation systems, communication systems and much more. ABB's electrification solutions are engineered for safety, flexibility, security and the highest operational availability to keep your plant running day and night.

#### **Services**

ABB has an extensive network of service centers all over the world to support your production assets. ABB's expert field engineers are available day and night to diagnose, repair, upgrade, install or perform on-site maintenance for ABB and

third-party products and systems. Preventive maintenance programs and life cycle support contracts, as well as training programs, help you to reduce maintenance costs, improve operational reliability and increase revenues.

#### **Plant modernization**

Modernizing an existing plant to the latest standards – and the best production and efficiency levels – while maintaining production demands a set of skills and competencies different to those needed for a greenfield plant. The challenges faced by each customer and plant make each revamping project unique in its complexity. Plant modernizations can only be successful when the customer's partner and supplier fully understands the complexity of the primary aluminium production process and has the experience necessary to realize a unique solution within a strictly planned downtime schedule. This is where ABB stands out as the recognized world leader in the field.

#### **Your benefits**

ABB offers extensive global resources and strong local presence. While getting the best technology on the market, you can profit from complete support through the life cycle of your installation – every day of the year.

ABB can help you to achieve production and energy efficiency, and environmental compliance, by ensuring product quality and process efficiency.

#### **ABB's core competencies**

- Excellence in executing turnkey projects – from civil and electrical design to construction, through installation and commissioning to long-term support
- Expertise in modernizing and upgrading critical equipment while maintaining production
- Meeting smelter technology specifications
- Enhancing energy efficiencies and environmental performance
- Providing 24/7 service support to bring you peace of mind
- Expertise in power-quality harmonic filter solutions
- Experience in leading successful negotiations with utilities to secure power quality requirements
- Offering a full range of conditioning, sensing and remote monitoring applications, using the latest automation and control technologies, and linking via ABB Ability to ABB's entire portfolio of digital solutions and services.
- Conducting studies and making recommendations on major substation components
- Conducting studies on transient recovery voltage and dynamic switching studies



## Maximize your energy efficiency and improve your environmental performance

As a business, ABB focuses on developing world-class products, systems and services to lower customers' energy use, reduce their emissions and improve resource efficiency on a long-term basis. ABB takes a life cycle approach to assess environmental impact throughout the phases of a product's life. Environmental impact can occur in all phases of a product's life cycle, from raw material supply to manufacture, transportation, customer use, and final recycling and disposal. ABB has been working for many years to manage environmental impact, both that caused by ABB products and projects as well as in our own facilities.

### Energy efficiency

As aluminium processing is energy intensive, the industry is particularly concerned about the efficient use of energy, for two main reasons:

- There is no energy alternative to electricity in the manufacture of aluminium, and it represents a large part of production costs. The efficiency of aluminium smelters has shown steady improvement since the 1950s and electricity consumption has fallen by more than one-third over that period.

- Energy is "stored" in aluminium products and can be reused. Aluminium products can be turned into recycled aluminium, thereby reclaiming up to 95 percent of the energy used in primary production. The recycling of used aluminium products is, therefore, both energy-efficient and cost-effective.

The aluminium industry is constantly researching new ways to use energy more efficiently. Energy consumption throughout the production process can only be reduced by technological development and upgraded systems equipment.

### Powering your operation to profitability

Your competitive edge depends on the optimal integration of electrical, automation and mechanical systems. The challenge of building new plants or expanding existing capacity requires world-leading competence.

ABB provides that competence, offering extensive global resources, industry-leading technologies and a complete scope of supply that ranges from engineering and commissioning to training and comprehensive long-term local support.





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# Contact us

Please visit our website:  
[www.abb.com/metals](http://www.abb.com/metals)

