Industry and infrastructure: serving the human cause

The world’s population is growing at an astonishing pace; with five billion people added over the last 200 years.

With the exponential growth showing no signs of abating forecasts predict the global population will expand by another three billion by 2050 - we must start preparing today if we are to ensure the responsible management of the planet’s agricultural and mineral resources in the future.

More research and innovative technology is required in order to address how we can conserve natural resources yet cater to the needs of this fast expanding population.

Already, massive investment in industry and infrastructure is creating a paradigm shift in which hundreds of mega-projects are launching in every market segment. These projects are not only economically viable, but becoming increasingly commonplace.

Some examples include a 5 MTPA (million tonnes per annum) integrated steel plant, a 3 MTPA cement plant, a 1 MTPA aluminium plant, a 60-floor apartment block, a 25 million-passenger airport terminal, a 300,000 TPA bulk or liquid cargo ship, a treatment plant to provide drinking water for 2 million people, or an automobile plant producing 300,000 cars a year.

Electrical systems: at the heart of development

The common link between each of these diverse projects is that they require electrical power on an unimaginable scale.

This steep increase of electrical loads needs to be managed in a responsible manner. This means using efficient, eco-friendly, intelligent equipment that provides transparent critical information, while enabling the continuous monitoring of data.

At the same time, the growing use of partnerships with entities dedicated to the sustainable servicing of these large electrical installations will also lead to major changes. First and foremost, companies will be better able to focus their manpower on their core businesses.

At Alstom Grid, we are preparing for the future by revisiting the way we manage energy today. Through our continuous investment in green and smart technologies, we welcome the challenges of the fast-approaching new world order.
The ferrous metals industry not only consumes vast amounts of electricity, but also uses production processes that are reliant on having a dependable power supply. Stepping up to these challenges, Alstom Grid has taken a leading role in providing complete power distribution systems. Starting at the power intake from transmission lines, these systems move power progressively through to the main receiving substations (MRSS) at 420/220/110 kV level, onward to the load block distribution substations (LBDS) at 33/12/6.6 kV level, and up to each electrical load centre of the raw material handling yard, sinter plant, blast furnace, steel smelting shop, rolling and processing plants.

Using sophisticated and full-blown SCADA systems, we assure harmonious and efficient monitoring and operation of all substations from HV down to LV feeders. We also provide real-time information to operators and plant management on the electrical system status. Our integrated iron and steel plant offer includes advanced Static VAR Compensation Systems and furnace transformers, while for ferro alloy plants (nickel, chromium, manganese), our offer includes rectifier stations for the DC arc furnaces. In addition, we use capacitor-based filters across the network and undertake electrical network studies across the HV/MV/LV network.

Demand for quality building materials will surge in the decades to come as the world struggles to keep pace with the fast development of emerging economies and responds to the needs of the booming global population. Materials such as cement, float glass and construction steel are vital for the construction of residential, business and commercial real estate as well as IT and telecom needs. Alstom Grid is well positioned to execute the electrical power distribution of small to large cement plants, from the handling of raw materials, through to lignite mills, raw mills, kilns. For the float glass industry we provide full electrical distribution systems for medium to large capacity plants, from utilities to batch plants, float baths, annealing, cooling baths and special transformers for the furnace.

As for ferrous metal producers, Alstom Grid also provides complete power distribution systems for plants producing non-ferrous metals such as aluminium, copper, zinc, cobalt. Specific to these plants is the electrolysis process used for smelting, which requires huge volumes of DC power to be reliably supplied. Our HV/MV/LV distribution systems for non-ferrous metals begin right at the mining head, leading on to the refining plant before the smelting and rolling mills. Importantly however, for the electrolysis process, we provide complete DC connection substations, including the quality rectifiers and associated rectifier power transformer. The systems also feature remote and local control cubicles and DC busbars with protection, as well as advanced high performance controllers with adaptive algorithms for the high current rectifiers.

In doing all of the above we are helping plants to guarantee their production of both ferrous and non-ferrous metals.
The safety and reliability of electricity supplies at airports is non-negotiable. For this reason, airports have some of the strictest standards for power supply and lighting of any infrastructure in the world.

With the number of commercial departures expected to double globally over the next 20 years, the demands on airport systems will become even greater.

Given the critical importance of a reliable supply, many airports have chosen Alstom Grid to equip their electrical power systems. These include air-side and passenger-side terminal substations at modern airports such as Munich, Berlin, Delhi and Hamburg, with many more to follow.

To guarantee power system reliability and performance sustainability, Alstom Grid offers tailored expert services, including long-term maintenance.

Rail and underground transport is projected to grow by nearly 5% annually until 2020, reducing the carbon footprint by encouraging greater public transportation.

Alstom Grid will play a vital role in the growth of these railway systems, providing both the AC and DC electrical solutions to keep these undergrounds, tramways, freight corridors and high-speed rail services on track.

These solutions cover system engineering, switchyards, quality converter and rectifier transformers, trackside transformers, booster or autotransformers, and SVC and protection. We also provide on-board transformers for rolling stock equipment.

As reliability and performance are key for railways, Alstom Grid supports operators by providing comprehensive services and long-term partnership.

A modern port integrates a sophisticated array of services, including materials handling and storage, logistics management, transport and distribution, as well as ship-related operations.

However, with stringent environmental regulations now coming into force to reduce pollution and noise, passenger cruise terminals and container ports are obliged to reconfigure the electrical systems behind these services. This means switching their electrical connections over from diesel power plants onboard ships to shore-based electrical clean power.

As a promoter of clean and green technology, Alstom Grid is helping ports to respond to this challenge by developing a complete HV shore connection system based on power electronics.

For bulk material seaports, our offer includes the design, engineering, manufacturing, testing, installation and maintenance of the whole electrical system for conveyor systems, jetties, transfer towers, mobile machines and stockyards.

As the global population grows, so does the requirement for drinking water. However, water related projects are emerging as major consumers of electrical power. These include crosscountry water pipelines with booster pumping stations, water grids, city water distribution networks and water desalination plants.

Alstom Grid provides full turnkey electrical connections to city utility companies (for electricity and water) and large desalination plants.

These connections, which use HV/MV substations, boosting substations and data acquisition stations, are equipped with full SCADA systems that enable monitoring and control.
System integrators

With our wide experience of primary and secondary electrical engineering, we can build dependable power systems that have the requisite flexibility for future adaptations and upgrades.

Air-insulated substation
Gas-insulated substation
Static VAR Compensator (SVC)
EAF transformer
Electrolysis converter station
Rectifier transformer

Project managers

Drawing on the experience of our over 450 project managers, we ensure your projects have a fast start-up and make smooth progress.

Challenging modernisation and extension projects

Alstom Grid stands out from the competition as a reliable partner for projects involving partial retrofit or even full-scale revamps.

Contributing towards a smarter future

Tomorrow's electricity network must be smarter if it is to face up to the new challenges for energy efficiency, higher reliability, stability of power systems and integration of distributed energies.

As an electrical expert we are responding to these challenges through continuous innovation in Smart Grid-ready solutions. These solutions create synergies between our key technologies, namely power electronics, automation solutions and control room information technology.