



*We are shaping the future*

**ALSTOM**

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## Performance assessed by independent experts

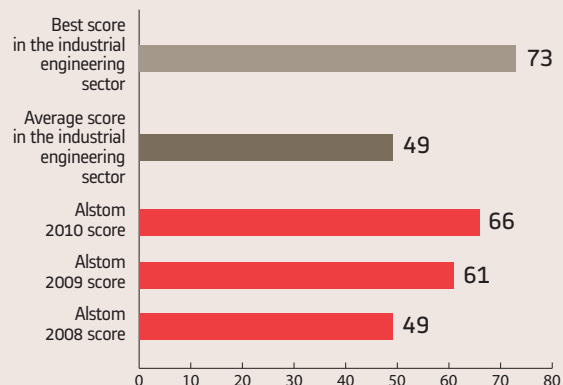
Several ratings agencies, including Sustainable Asset Management (SAM), EIRIS, Vigéo and Oekom, assess the Group's Corporate Social Responsibility performance using various methods and criteria.

The CSR assessment carried out by Swiss ratings agency, SAM, in 2010 showed continual improvement since 2008.

In early 2011, Alstom received the SAM Bronze Class distinction, which places it in the top 15% of best performing companies worldwide (based on the Dow Jones Global Total Stock Market Index) in the industrial engineering sector. Alstom's goal is to reach the top 10%.



### TOTAL SCORE







## LEADING THE WAY IN SUSTAINABLE DEVELOPMENT

If sustainable development means thinking about tomorrow's world today, Alstom is a major contributor. Power generation, power transmission and transport are the primary challenges in building a world that is both cleaner and more prosperous, and we are convinced that we can fight global warming and environmental damage without giving up manufacturing, lighting, heating or travelling.

Alstom is already developing technologies to meet growing power and mass transit needs in the decades to come. Though we are committed to making these technologies efficient, we are also solving the problem of limiting their environmental impact. The equipment, systems and services that we offer to the power generation, power transmission and rail transport markets are ready to meet the world's inextricable demands for economic development, social progress and environmental protection.

This ambition is shared by the 93,500 Alstom employees who work in some one hundred countries around the world, keeping our customers satisfied and – as our motto says – “shaping the future.”

And we bring this same conviction to managing our own operations. We make every effort to minimise our impact on the environment, live by a rigorous code of ethics and stay committed to our stakeholders – customers, employees, shareholders, suppliers and local communities.

This is the side of Alstom that I invite you to explore in our 2010/11 sustainable development report.

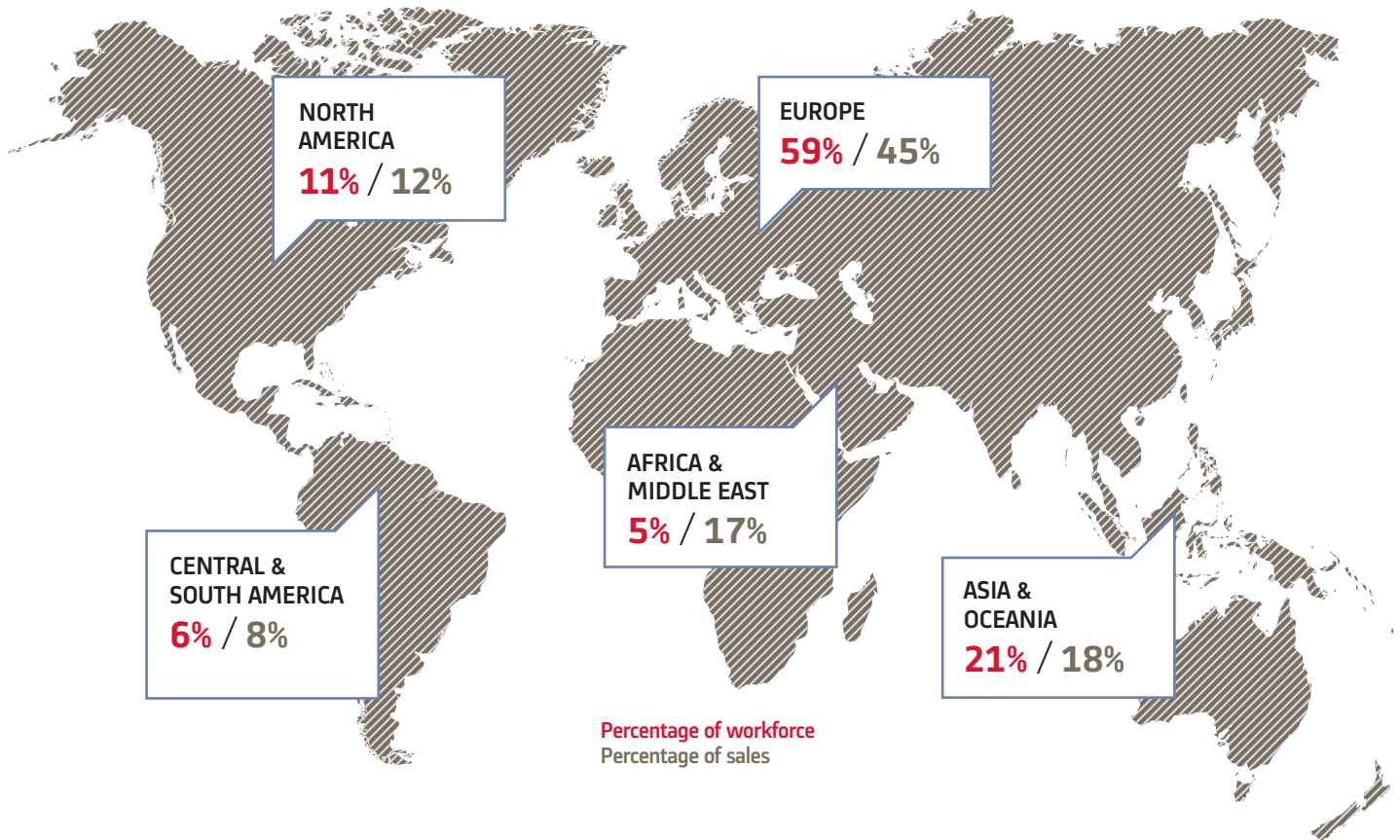
PATRICK KRON  
CHAIRMAN AND CHIEF EXECUTIVE OFFICER

## **THE ALSTOM GROUP IN 2010/11**

In a world of fast-changing technology and pressing environmental concerns, Alstom is a key contributor, with leading positions in the markets for power generation infrastructure, power transmission and rail transport. The Group meets critical needs for energy and mobility, offering innovative technologies that promote social progress, economic development and environmental responsibility. Alstom adheres to a rigorous code of ethics in its relationships with customers, suppliers and employees. Though they work in some one hundred different countries, Alstom's 93,500 employees are united around three shared values: trust, team and action.

# ALSTOM AROUND THE WORLD

## WORKFORCE AND SALES BY REGION



93,500 employees

in around one hundred countries

€20.9 billion

in sales in 2010/11

€700 million

in Research & Development in 2010/11

## A LEADER IN POWER AND RAIL INFRASTRUCTURE

### Promoting "clean" power

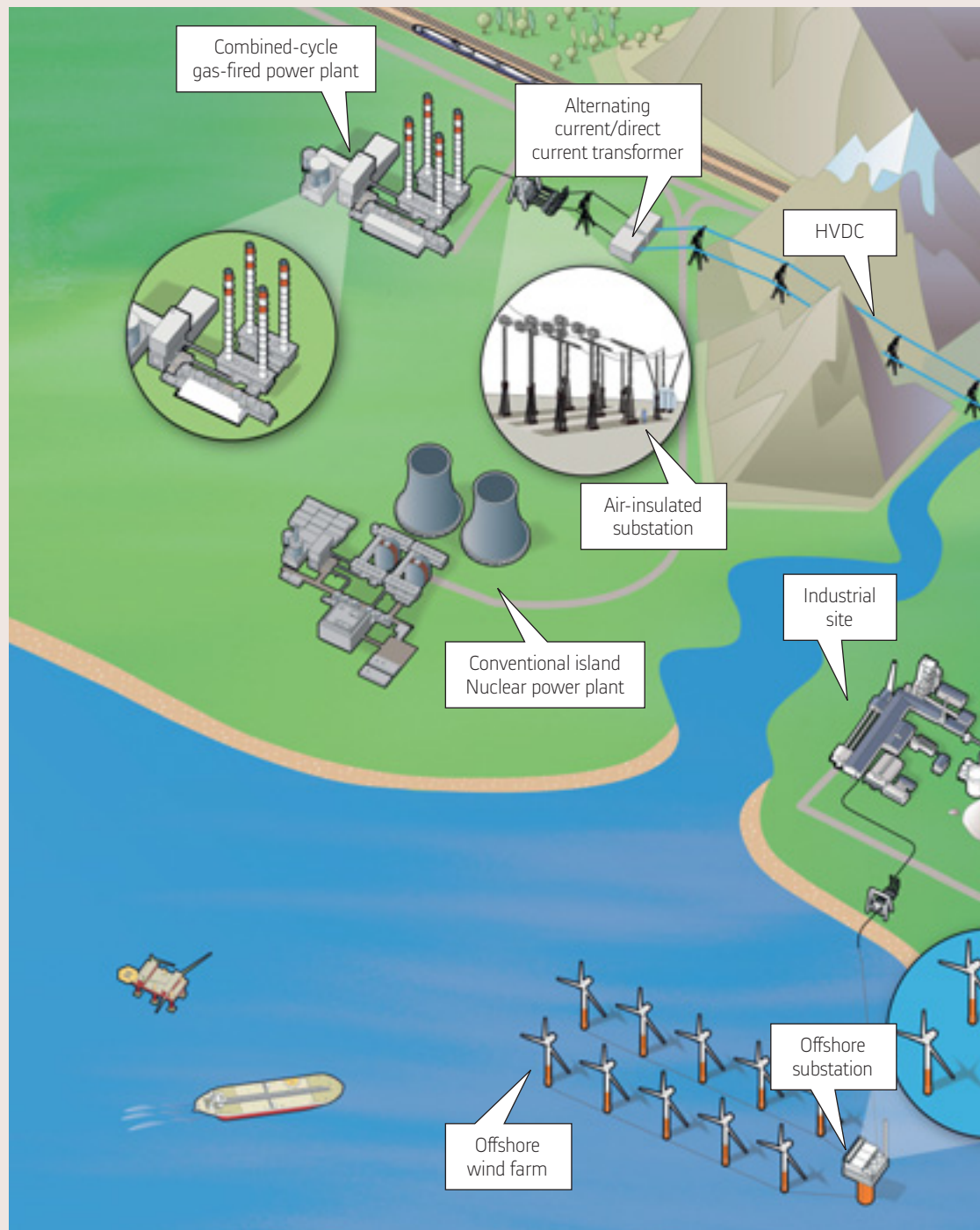
Alstom Power is the world leader in turnkey power plants, power generation services and air quality control systems. A supplier of all types of power generation technology – coal, gas, fuel oil, nuclear, hydropower, wind power, geothermal energy, biomass and solar energy – Power also leads the market for "clean" power and is a pioneer in carbon capture.

### The smart grid expert

Alstom Grid is one of the power transmission market's top three players, offering strategic high and very high voltage technologies and smart grid solutions.

### Versatile rail specialist

Alstom Transport is one of the world's leading suppliers of rail equipment and services, with the broadest offering on the market. A specialist in sustainable mobility, Transport leads the world in the construction of high-speed and very high-speed trains, ranking second for urban transport and regional trains.

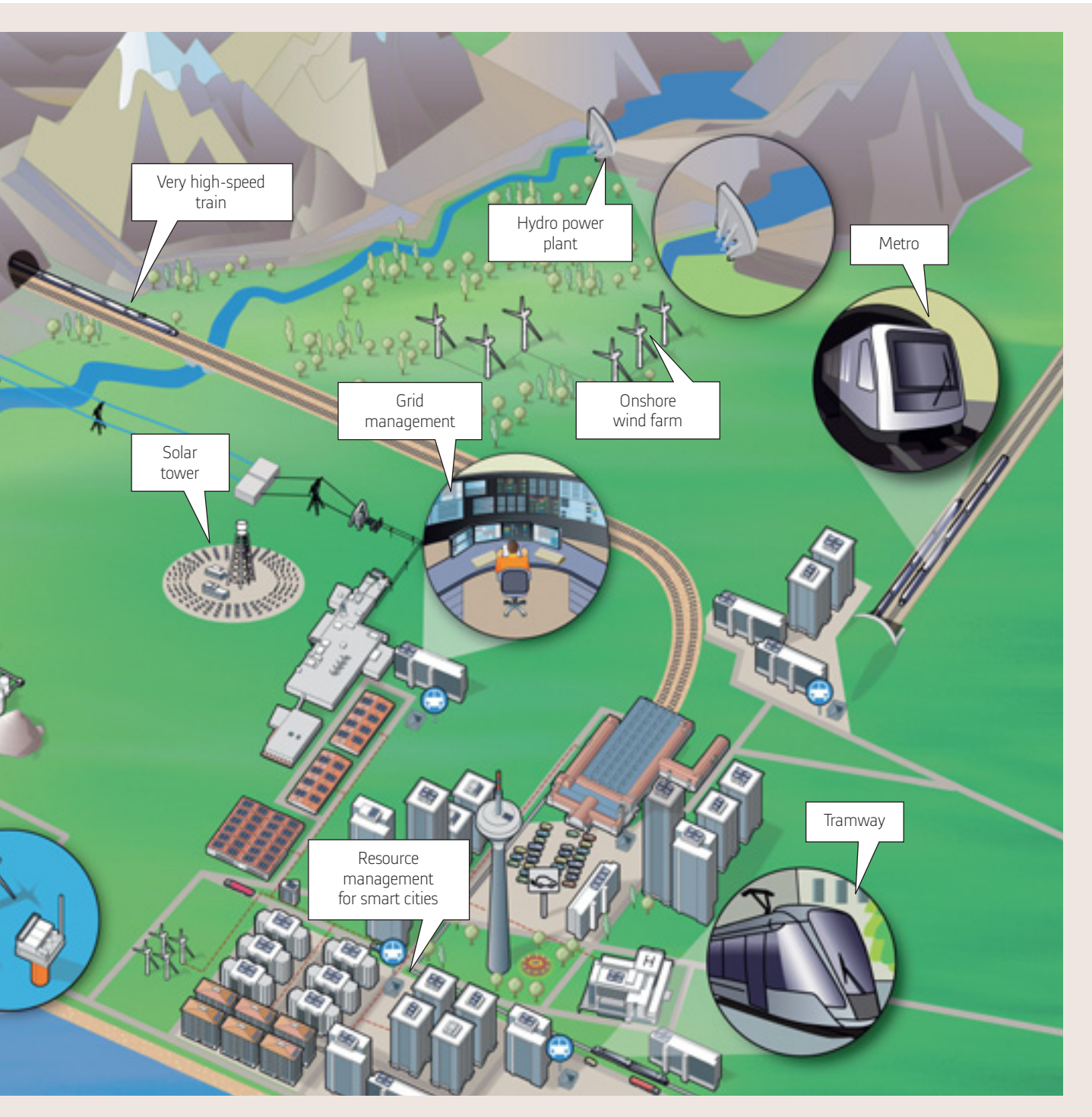


# Challenges

• *One in four light bulbs worldwide is powered by electricity from equipment using Alstom technology.*

• *Grid is the world's number one supplier of gas-insulated substations (GIS), high voltage direct current (HVDC) transmission and other key products and technologies.*

• *One in three tramways and one in four metros worldwide are made by Alstom.*





# MEETING ENVIRONMENTAL CHALLENGES

## Power generation

### CHALLENGES

- **1.5 billion people** had no access to electricity in 2009, with 80% living in rural areas. According to the IEA, world power consumption will rise 2.2% annually from 2008 to 2035.

- **60% of the infrastructures** that will supply the world's power in 2030 have yet to be built.

- **Coal-fired power plants** have an average energy efficiency of 35%.

- **Power generation** (the production of electricity and heat) from fossil fuel combustion is responsible for 40% of CO<sub>2</sub> emissions, 20% of NO<sub>x</sub> emissions (including smog and urban pollution), 70% of SO<sub>2</sub> emissions (the source of acid rain) and 40% of mercury emissions (which cause ground and water pollution).

- **The Kyoto Protocol** requires industrialised countries (other than the US) to reduce greenhouse gas emissions to 5% below 1990 levels by 2012. The European Union has adopted the goal of reducing its greenhouse gas emissions by 20% and producing 20% of its energy from renewables by 2020. China plans to reduce its CO<sub>2</sub> intensity (defined

as CO<sub>2</sub> emissions per unit of GDP) by 40-45% of 2005 levels by 2020.

- **Power should remain affordable** to allow access for the greatest number of people.

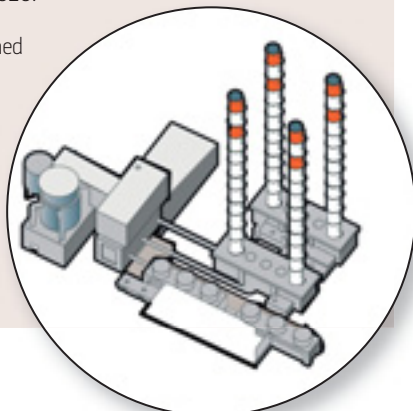
### SOLUTIONS

- **Alstom builds power plants** that use all types of fossil and renewable energies.

- **Modernise power plants** and raise their energy efficiency, massively reducing CO<sub>2</sub> emissions: a 2% increase in energy efficiency cuts CO<sub>2</sub> emissions by 5%.

- **Alstom technologies** reduce emissions of traditional pollutants – particulates, SO<sub>2</sub>, NO<sub>x</sub> and mercury – by more than 90%.

Alstom is developing **CO<sub>2</sub> capture technologies** for power plants that run on fossil fuels. The Group has already launched 15 demonstrator projects.



## Power transmission

### CHALLENGES

- **By 2030**, power generated from renewable sources will quadruple.

- **Integrating intermittent renewable energies** (wind and solar) affects grid stability.

- **16% of generated power** never reaches the consumer: much of it is lost in transmission.

- **In large countries where energy consumption is rising sharply** – India and China, for example – thousands of kilometres can separate power generation units from consumers.

### SOLUTIONS

- **Alstom is a pioneer in developing high voltage and ultra high voltage solutions.**

Ranging up to 1,100 kV, these technologies are the safest and – as measured by reduction in lost joules – the most efficient way to transmit large quantities of power over very long distances.

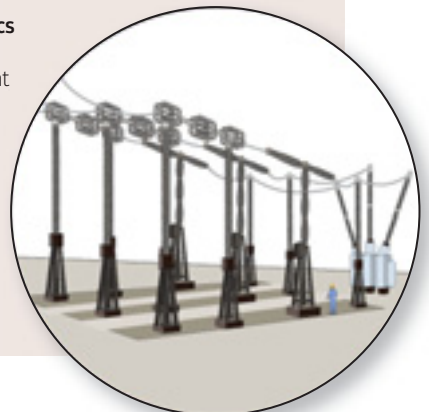
- **Alstom leads Europe in connecting** British and German offshore wind farms to the grid.

- **Alstom's power electronics solutions** (like FACTS, or flexible alternating current transmission systems) make power transmission more reliable and increase grid capacity.

- **Alstom's green solutions** reduce environmental impact: products perform better throughout their lifecycle, with less noise, smaller footprints, lower CO<sub>2</sub> emissions, reduced raw materials consumption, higher energy efficiency and greater recyclability.

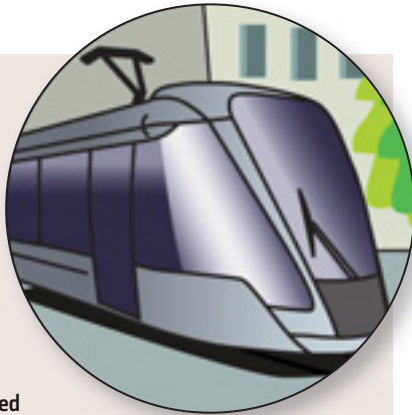
- **Alstom's smart grid solutions** combine protection and control equipment and new power transformer and power electronics technologies with IT solutions for control rooms, enabling operators to monitor, control and optimise grid performance. Power from renewable sources is integrated in complete safety and grids are more efficient.

- **Alstom's maintenance solutions** optimise infrastructures and extend product lifecycles.





## Transport



### CHALLENGES

- **23% of world CO<sub>2</sub> emissions** are generated by transport.
- **0.5% of transport-generated CO<sub>2</sub> emissions are produced by trains.** That is only 0.11% of worldwide emissions.
- **360 cities will have over 1 million residents** by 2015.
- **350 million people will live in megacities** of over 10 million residents by 2015.

### SOLUTIONS

- **Provide clean mass transit solutions:** one tramway can transport as many people as 3 buses or 150 cars, and an AGV train can carry a passenger for 100 km on the equivalent of only 0.4 litre of petrol.
- **Reduce energy consumption:** make cars lighter, improve aerodynamics, recover braking energy and make traction systems and auxiliary equipment more energy-efficient.
- **Provide signalling** systems that optimise rail traffic and meet stringent safety requirements.
- **Practise ecodesign:** analyse the lifecycles of entire systems and subsystems and design equipment to be up to 98% recyclable.
- **Extend equipment lifecycles** with appropriate maintenance.
- **Renovate equipment to improve performance.**
- **Design systems** to reduce noise pollution.
- **Improve safety and comfort,** provide access for passengers with limited mobility and connect rail with other types of transport.

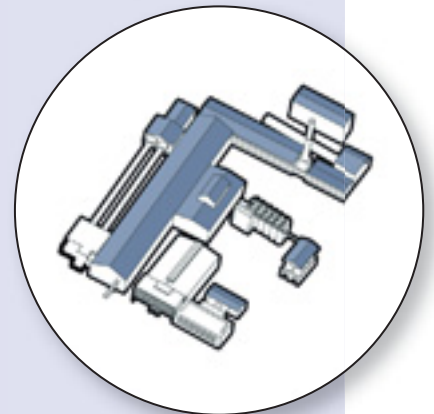
## Alstom production sites

### CHALLENGES

- **Optimise use of resources** (energy, water and raw materials) and reduce environmental footprint by cutting greenhouse gases, air emissions, effluent discharge and waste.
- **Offer employees good pay and working conditions,** social dialogue, development of skills, support during reorganisations, and opportunities to help local communities prosper.
- **Implement a human resources policy** geared around workplace safety (Zero Severe Injury programme), ongoing training, equal opportunity, dialogue and engagement.
- **Practise responsible sourcing:** provide a charter to suppliers and evaluate them based on environmental and social criteria.
- **Promote local development** and education.

### SOLUTIONS

- **Achieve 5 major environmental goals:** in 2012, earn ISO 14001 certification for production sites with over 200 employees; by 2015, cut energy intensity and greenhouse gas emissions by 20%, reduce water consumption by 20% in water-stressed regions, reduce emissions of volatile organic compounds by 10%, and recycle 80% of waste.



## 1.

RESPONSIBLE  
VISION

In power generation, power transmission and rail transport, Alstom delivers solutions that promote sustainable development, combining environmental protection with economic growth and social progress. The Group also minimises the environmental impact of its own industrial activity and promotes economic and social development wherever it does business, ever alert to stakeholder expectations.

1.1.  
**TAKING  
A STAND**

Tomorrow's world will be home to 9 billion people. With cities expected to attract two-thirds of world population, this demographic growth will generate considerable demand for power and mobility.

The IEA<sup>1</sup> expects demand for electricity to grow 2.2% annually from 2008 to 2035.

To meet these growing needs amid dwindling supplies of oil, gas and coal – which currently account for 75% of the world's consumption of energy – and rising concern over CO<sub>2</sub> emissions and other pollutants released by fossil fuel combustion, Alstom is developing solution-oriented technologies that:

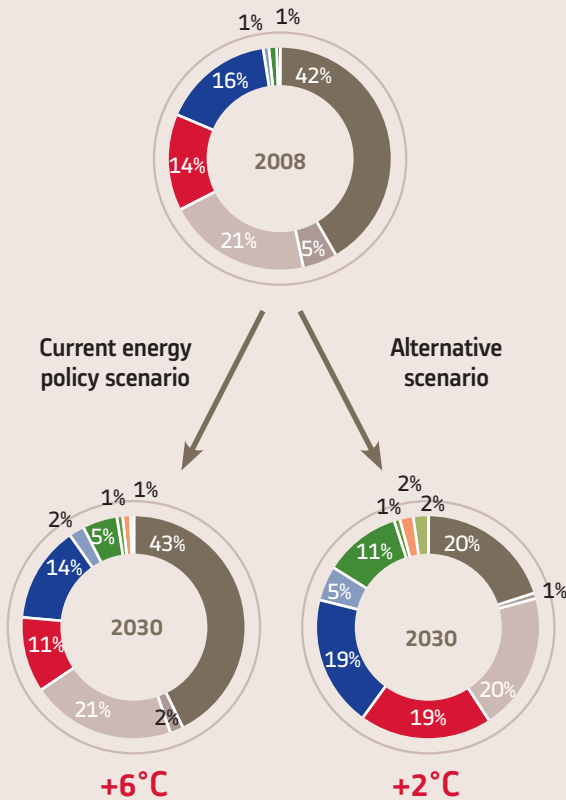
- **optimise energy efficiency and environmental protection** in rail transport and in power generation, transmission and distribution infrastructures,
- **increase the proportion of low-CO<sub>2</sub> energy sources** – renewable energy (hydro, wind, tidal, geothermal, biomass, thermodynamic solar) and nuclear power – without losing sight of realities on the ground or the need to stay competitive,
- **expand smart grids**, with optimum integration of energy from renewable sources,
- **set up facilities to capture and store CO<sub>2</sub>** emitted by fossil fuel-based power plants,
- **offer a broad range of rail transport options** to meet a wide variety of needs and ease the transition from other forms of transport to rail.

<sup>1</sup> International Energy Agency: World Energy Outlook 2010

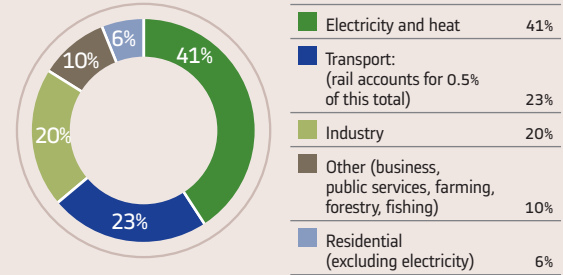
## THE ENERGY MIX AND CLIMATE CHANGE (two IEA scenarios)

To cap temperature increases caused by atmospheric CO<sub>2</sub> resulting from electricity production at 2°C, Alstom offers a multi-stage strategy:

- develop a portfolio of technologies with an expanded role for carbon-free energies,
- boost energy yields for all power plants, regardless of energy source,
- optimise the use of energy produced by managing power transmission effectively,
- capture and store the CO<sub>2</sub> generated by power plants – because reducing carbon output is only the first step.

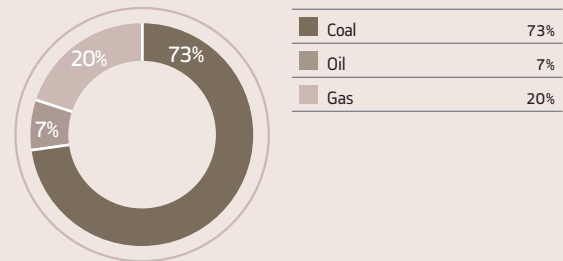


## ANTHROPOGENIC CO<sub>2</sub> EMISSIONS by sector worldwide



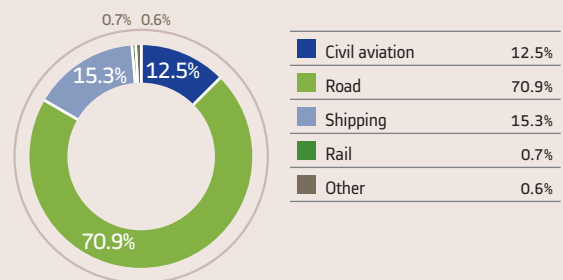
(Source: CO<sub>2</sub> Emissions from fuel combustion 2009 edition, International Energy Agency)

## CO<sub>2</sub> EMISSIONS IN 2008 FROM POWER GENERATION by fuel type



(Source: International Energy Agency 2010)

## GREENHOUSE GAS EMISSIONS BY TYPE OF TRANSPORT in the 27 countries of the EU in 2007



(Source: European Environment Agency 2010)

## Solutions that limit greenhouse gas emissions

- Expand intracity and intercity rail transport to limit CO<sub>2</sub> emissions from road transport,
- Expand very high-speed rail to limit CO<sub>2</sub> emissions from air transport.



## 1.2. CLEAN POWER TODAY!

**Energy producers must deliver enough reliable, affordable power to meet rising demand, even as they make rapid cuts in CO<sub>2</sub> emissions. No power source can meet this challenge alone: success will require harnessing all available energies – fossil fuels, nuclear and renewables.**

Alstom is the only provider that offers solutions for all sources of power generation.

Through its Clean Power Today! strategy, the Group is developing a practical strategy geared around:

- **Expanding low-CO<sub>2</sub> power generation technologies:** renewable energies (hydropower, tidal energy, onshore and offshore wind power, and geothermal, thermodynamic solar and biomass plants) and nuclear power (conventional islands),
- **Making fossil fuel-based power plants more energy-efficient and eco-friendly by:**
  - developing ultra-supercritical coal-fired plants,
  - optimising plant management through control and automation technology,
  - implementing post-combustion solutions – like Alstom's air quality control system – that capture and eliminate up to 99% of SO<sub>2</sub> emissions, 93% of NO<sub>x</sub> and 99.75% of particulates, as well as technologies like KNX™, Filsorption™, and MerCure™, which can eliminate more than 90% of mercury,
- **Capturing and storing CO<sub>2</sub> emitted by fossil fuel-based power plants.**

## The full range of renewable energies

### Hydropower

The world leader in hydroelectric power plants and services, Alstom has installed turbines and generators totalling 400 GW, or 25% of world hydropower capacity, and the Group also leads the market in pump turbines. The only available technology capable of storing and rapidly releasing large quantities of energy, pump turbines are critical to the growth of intermittent renewable energies (wind and solar power). After participating successfully in a Chinese programme, Alstom is now involved in variable-speed pump turbine projects in Limmern and Nant de Drance, Switzerland.

### Tidal energy

Tidal stream turbines generate electricity from tides and ocean currents. Alstom is currently developing the 1 MW Beluga 9 turbine, designed for very powerful currents and sites at least 30 metres deep. Working with its partner, Clean Current Power Systems, Alstom will test the Beluga 9 in Canada's Bay of Fundy beginning in 2012.

### Onshore wind energy

The Group is active in this market through its Wind subsidiary, which has installed 1,850 turbines in some one hundred wind farms, with total capacity reaching 2,200 MW. The new ECO110 turbine, which can operate in extremely cold and hot

climates, will round out Alstom's current offering – the ECO80, at 1.67-2 MW, and the ECO100, at 3 MW.

### Offshore wind energy

A prototype for a large, 6 MW offshore wind turbine will be available by late 2011. Alstom is also partnering with EDF Energies Nouvelles to expand France's offshore wind farms.

### Geothermal energy

Alstom is particularly active in Mexico, where it built the Los Azufres power plant (four 25 MW units) and won a 2010 contract for the Los Humeros plant, which will feature two 25 MW units. Since 1988, the Group has installed a total of 1,000 MW of capacity in Mexico.

### Solar power plants

Now partnered with BrightSource Energy, a specialist in thermal plants using solar towers, Alstom aims to become the world's leading supplier of integrated solutions<sup>1</sup>.

### Biomass power plants

Alstom has worked on biomass for 20 years, with the goal of generating 10% of output from coal/biomass co-firing: recent projects include the Fiddler's Ferry and Drax power plants in the UK. The world's first coal/biomass co-firing unit, the 4,000 MW Drax plant supplies 7% of the UK's electricity, saving 2 million tonnes of CO<sub>2</sub> annually.

<sup>1</sup> In this technique, hundreds of mirrors called "heliostats" reflect sunlight directly onto a boiler at the top of a tower. This produces high-temperature steam, which is then routed to a turbine and a generator to produce electricity.

## CO<sub>2</sub> capture: one step ahead

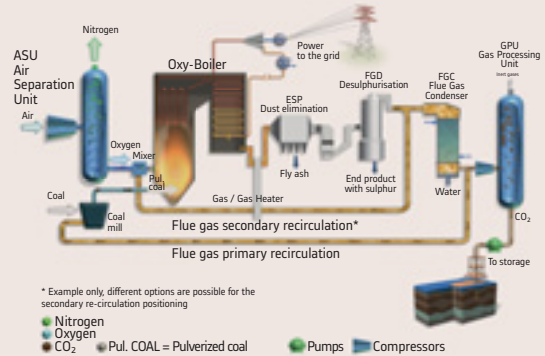
Though renewable energies are on the rise, by 2030 nearly 60% of the world's electricity will still come from coal and gas, which are responsible for 40% of global CO<sub>2</sub> emissions. Alstom has improved the energy efficiency of coal- and gas-fired power plants and diversified power generation sources, and since 2006, the Group has worked with industrial partners in major national and international programmes to develop carbon capture and storage technologies – a critical asset in the battle against greenhouse gases (GHG). According to the IEA, CO<sub>2</sub> capture should reduce GHG emissions by 20% by 2050.

Alstom has focused on two processes that are compatible with current and future coal- and gas-fired power plants: post-combustion, which uses advanced amines or chilled ammonia as

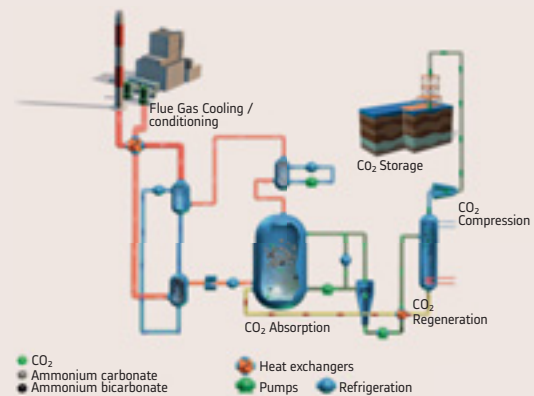
a solvent to extract CO<sub>2</sub>, and oxy-combustion, in which a solid fuel is burned in a mixture of oxygen and CO<sub>2</sub> to produce a concentrated, easily storable stream of CO<sub>2</sub>.

Working with its European and North American partners, Alstom is developing 15 projects to assess these technologies and make them more energy-efficient, eco-friendly and economical. Eight pilot or demonstrator units – including three with storage – are currently operating in Germany, the USA, France and Sweden. The goal is to launch a preliminary demonstrator unit that can capture an amount of CO<sub>2</sub> equivalent to the output of a 200 MW power plant by late 2015.

### OXY PC POWER PLANT



### CHILLED AMMONIA CO<sub>2</sub> CAPTURE



LACQ CO<sub>2</sub> CAPTURE AND STORAGE PILOT SITE RUN JOINTLY WITH TOTAL.



## 1.3. SMART GRID AND SUPER GRID

Today's power grids must simultaneously:

- supply enough safe, reliable electricity to meet rising demand,
- adapt to fluctuations in consumption,
- integrate a growing proportion of electricity from renewable and distributed sources, primarily wind and solar,
- reduce environmental impact,
- become more efficient, more flexible, and more intelligent.

Alstom Grid is a driving force behind these trends.

**Smart grids to integrate distributed, primarily renewable power sources into power networks, enhance energy efficiency and optimise energy production and consumption.**

As a leader in the growth of smart grids, which combine network management with information technology, Alstom Grid develops solutions geared around key power electronics technologies, information technology for control rooms, and automation solutions.

**Super grids to link networks in different countries and on different continents.**

Alstom is promoting development of a high voltage direct current (HVDC) grid, a promising solution for transmitting electricity across long distances, reducing losses, interconnecting asynchronous networks, and integrating far-distant intermittent power sources.

**Optimised power infrastructures.**

With Alstom's solutions, operators can monitor and control network equipment, control rooms and substations on line. Real-time feedback on the physical condition of equipment, variations in voltage and other factors, enables them to optimise maintenance and operating costs.



ALSTOM IS SUPPLYING SUBSTATIONS AND GRID CONNECTIONS FOR WIND FARMS AND HELPING TO BUILD SMARTER GRIDS.







CITADIS TRAMWAY IN DUBLIN, IRELAND.

## 1.4. SUSTAINABLE MOBILITY

Of all forms of motorised travel, rail transport is the most eco-friendly, the least energy-intensive and the most efficient in terms of passenger and freight capacity. In Europe, for example, rail accounts for only 1% of the transport sector's CO<sub>2</sub> emissions, even though it handles 7% of passenger traffic and 10% of freight. In France, AGV trains can carry a passenger 100 km on the equivalent of only 0.4 litre of petrol – 3 times less than a bus, 6 times less than an automobile and 15 times less than a plane. When measured in kWh per seated passenger, the Citadis Dualis tram-train consumes 4 times less energy than a bus and 10 times less than a car. To help move the planet towards more sustainable mobility, Alstom Transport is expanding its product offering and making its products and services more environment-friendly through programmes that:

- **optimise energy consumption** (you can find more information about this on page 16),
- **improve quality of life**
  - wireless solutions to supply power to tramways: Alstom has provided ground-level power supply to the cities of Bordeaux, Angers, Brasilia, Orléans, Reims, Tours and Dubai and battery-operated tramways to Nice,
  - the world's first diesel particulate filter for trains on the Coradia Lint in Frankfurt, reducing soot particulate emissions by 95%,
- **reduce noise**
  - low-noise wheels and absorbent skirts for the AGV and Pendolino trains, the Citadis Dualis tram-train and the Prima locomotive,
  - aero-acoustic modelling and design changes to the front end of TGV train sets: in 30 years, train speed has doubled, while noise has remained constant,
  - less vibration: elastomer base plates under the crossties of the new Paris-London line,
- **make trains accessible for all**
  - tramways with low floors,
  - interior design,
  - information systems to ease mobility for passengers with handicaps.

## 1.5. ACTIVE PARTICIPATION IN INTERNATIONAL BODIES

Reaching sustainable development goals means getting everyone involved. Active in numerous organisations, Alstom stresses the need to:

- leverage the full range of clean technologies,
- enact pro-active public policy to spark innovation and promote implementation of these technologies,
- establish a carbon market with a price on CO<sub>2</sub> emissions,
- experiment with CO<sub>2</sub> capture and storage, backed by government funding,
- encourage solutions that combine different forms of transport, including electric vehicles, trains, and tramways, with the goal of reducing emissions of local pollutants and CO<sub>2</sub>.

A member of the UN's Global Compact since 2008, Alstom joined the 190-member World Business Council for Sustainable Development in 2009 and the Group contributes to the work of the International Emissions Trading Association (IETA), which is establishing an international framework for trading in greenhouse gas emission quotas.

Alstom is also a member of The Climate Group, an independent organisation that works internationally with governments and business to reduce emissions and advance clean technologies, and the Alliance for Clean Technology Innovation which promotes the spread of eco-friendly technologies. The Group has also signed the Charter on Sustainable Development of the International Association of Public Transport (UITP). Finally, in 2010 Alstom joined the Prince of Wales's Corporate Leaders Group on Climate Change and the EU's Corporate Leaders Group on Climate Change: both organisations bring together business leaders from major European and international companies who are committed to fighting climate change.



SCHWARZE PUMPE CO<sub>2</sub> CAPTURE PILOT SITE  
DEVELOPED WITH VATTENFALL.

## Supporting international programmes

### LOW-CARBON TECHNOLOGIES

Alstom is participating in Europe's CO<sub>2</sub> capture and storage demonstrators and in the programme financed by the NER<sup>1</sup> 300 fund, a source of some €4 billion for commercial and industrial deployment of innovative technologies for CO<sub>2</sub> capture and storage, offshore wind power and smart grids. Alstom has submitted proposals along with several partners in Poland, Belgium, Germany, Romania, Spain, France and the UK. The Group is also involved in several programmes run by the International Energy Agency – including the Greenhouse Gas R&D Programme and the Clean Coal Centre – and by the US Department of Energy.

<sup>1</sup> New Entrants Reserve

### SMART GRIDS AND ENERGY STORAGE

Alstom contributes to the EU's TWENTIES programme, which focuses on direct current transmission technologies suitable for wind and solar power. Alstom experts speak at seminars on energy storage, presenting the Group's solutions for combining hydraulic technology (pumped-storage variable-speed turbines) with optimised grid management ("virtual" power generation).

### SMART CITIES

The European Union is supporting development of eco-friendly communities combining renewable energy, smart buildings and clean transport. Alstom and its partners will participate in the smart cities demonstrator programme launched in 2011 by the European Commission.

## 2.

RESPONSIBLE  
INNOVATION  
IN FIVE  
KEY AREAS

At Alstom, innovation doesn't just drive growth – it also promotes sustainable development in five key areas:

- energy efficiency
- ecodesign
- lifetime equipment costs
- smart cities
- strategic partnerships.

2.1.  
**ENERGY  
EFFICIENCY**

Generation, transmission, distribution, consumption: Alstom optimises efficiency along the entire energy chain. With two objectives: enhancing performance and reducing environmental impact.

**2.1.1. More efficient coal and gas-fired power plants means less CO<sub>2</sub> emissions**

Fossil fuels, such as natural gas and above all coal, produce more CO<sub>2</sub> than any other energy source. Yet given the ease with which it can be mined, its low cost and widespread abundance, coal will continue to be a primary source of energy. Improving the energy efficiency of power plants is the key to reducing emissions, since the more efficient a plant is, the less fuel it will consume and the less CO<sub>2</sub> it will emit for a given power output. It is estimated that increasing the efficiency of a coal-fired plant from 30% to 50% will reduce its CO<sub>2</sub> emissions by 40%, while increasing a gas-fired plant's efficiency from 40% to 60% will lower its carbon emissions by 33%.

For existing power plants, which, according to the IEA, will account for 60% of CO<sub>2</sub> emissions in 2030, Alstom proposes a range of renovation solutions that can improve their efficiency by 5% to 10%, increase their capacity, reduce their emissions and extend their life. Control and automation solutions play a big role here (a large coal-fired plant can have up to 120,000 control points) as do simulation tools. For new coal-fired plants, Alstom is developing innovative technologies that will optimise the efficiency of supercritical and ultra-supercritical boilers. One example is the Group's participation in the construction of the RDK 8 supercritical coal-fired plant in Karlsruhe, Germany, which will operate with a steam temperature above 600°C and at a net efficiency of over 46%. Alstom also offers combined-cycle gas turbine (CCGT) solutions that aim for more than 60% efficiency.



## 2.1.2. Developing increasingly energy-efficient transport systems

Major advances in train technology have reduced electricity consumption significantly. For example, a next-generation metro uses 30% less energy than its predecessor.

Alstom saves energy by:

- using composite materials to reduce weight,
- making traction systems more efficient,
- recovering energy lost during braking,
- using electronic power management systems to make trains run more efficiently.

The AGV very high-speed train already offers these features, with lighter metal parts, an outer skin just 2.5 mm thick and composite cross-members that link bogies to bodies.

Alstom offers solutions that recover energy lost during braking, which is often considerable. For example, the power recovered by an AGV during braking can reach 8 MW – the equivalent of eight wind turbines.

Alstom also has solutions for storing braking energy.

For example, the STEEM<sup>1</sup> project, conducted in collaboration with RATP, involves testing supercapacitors on Citadis trams in Paris (France) as a potential source of autonomous power between two stations. The objective is to reduce electricity consumption by 15%.

Braking energy can also be returned to the grid with the reversible Hesop<sup>2</sup> substation, developed by Alstom engineers.

Alstom is also experimenting with hybrid power systems that combine a thermal engine with a battery to reduce the energy consumption of shunting locomotives by 50%. Greater energy efficiency and the modernisation of transport equipment go hand-in-hand. For example, the upgrading of the drive systems of 25 MP82 metro-trains of Mexico City's metro system reduced traction energy consumption by 40%.

## 2.1.3. Increasing electricity yield with smart grids

Electrical grids are getting "smart" to meet the needs of grid operators seeking to reduce environmental impact and to include more renewable energy sources. They also want to decrease energy loss during transmission, increase power generation efficiency and match production capacity as closely as possible to user needs, to avoid having to building plants solely to meet peak demand requirements. These smart grids bring two big improvements to conventional power transmission and distribution. First of all, smart grid technology endows conventional electrical grids with an information and communication system that enables real-time data exchange between power generators and consumers.

Since the latter now also generate electricity themselves, they are tending to become "consum'actors" who manage

## Alstom's role in Smart Grid demonstrator projects

**FENIX** – With its e-terra trading platform and IPO<sup>1</sup> system, Alstom Grid provided advanced systems and a market interface for synchronizing distributed energy resources in a "virtual power plant" (United Kingdom, 2005-2009).

**TWENTIES** – This European Union demonstration project to develop high voltage direct current (HVDC) networks will run until 2014.

**PNW-SGDP<sup>2</sup>** – Smart grid solutions were tested in 60,000 households in five US states. Alstom's energy management solution displays renewable energy resources and pricing information in real time (United States).

### DOE Smart Grid Demonstration Project –

Alstom's contribution to this project, which seeks to efficiently integrate distributed energy resources into the electric grid, is its IDMS<sup>3</sup>, which enhances the reliability and efficiency of the distribution grid by integrating several types of distributed energy sources and monitoring the data sent via the distributed interfaces (the US Department of Energy, North Carolina).

<sup>1</sup> Intra-day plant optimization

<sup>2</sup> Pacific Northwest Smart Grid Demonstration Project

<sup>3</sup> Integrated distribution management system

their power consumption more proactively, responsibly and sustainably.

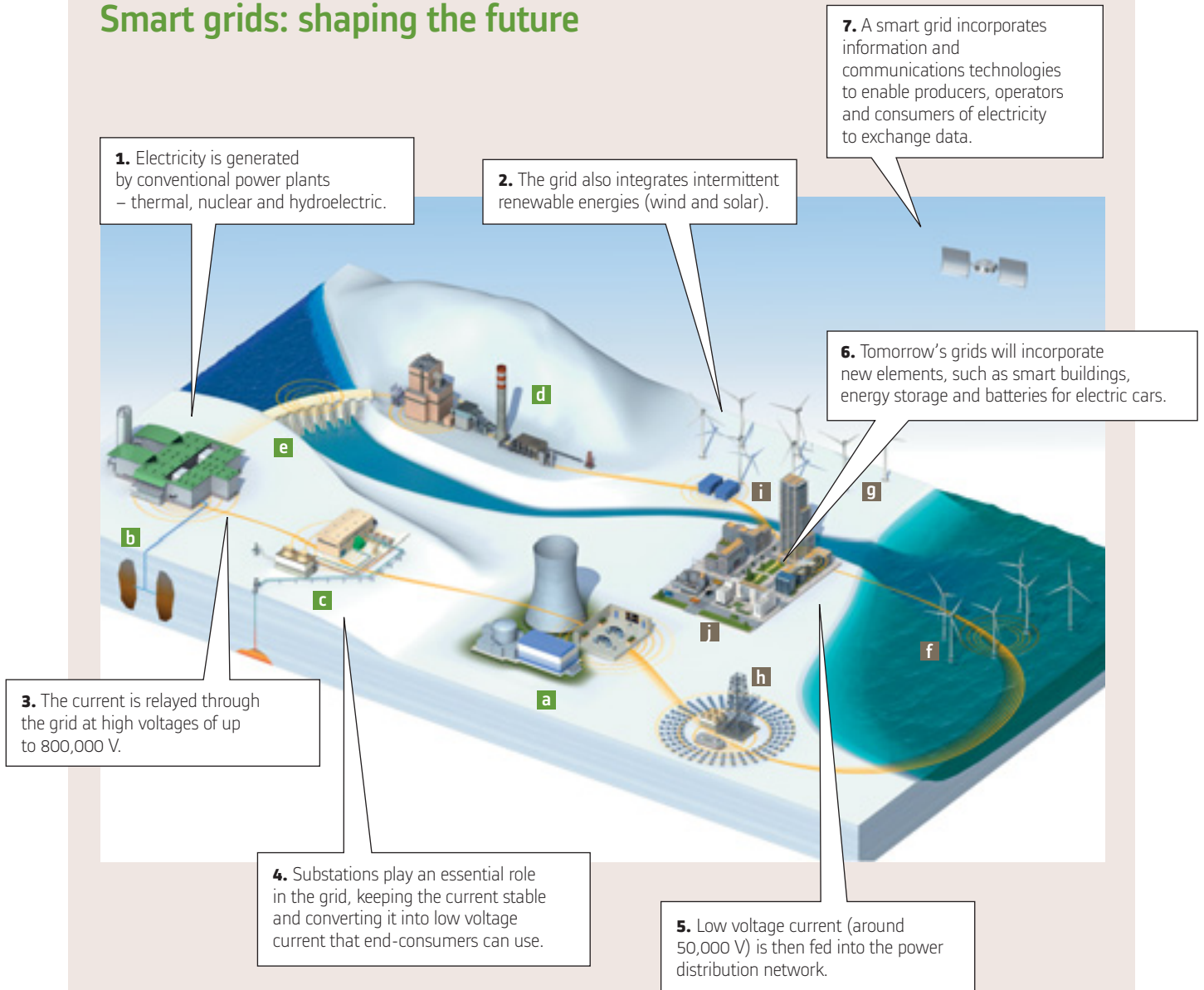
Secondly, they make it possible to include new "distributed" energy sources, such as electric vehicles, positive-energy buildings and power storage systems, while taking into account their specific power consumption and contribution characteristics.

Alstom Grid's integrated approach to smart grids includes solutions based on its key technologies, smart substations and grid control room software.

<sup>1</sup> Maximised energy efficiency tramway system.

<sup>2</sup> Harmonic and energy saving optimiser.

## Smart grids: shaping the future



### CONVENTIONAL POWER PLANTS (centralised power production)

- a** Nuclear power plant
- b** Fossil-fuel power plant with CO<sub>2</sub> capture and storage
- c** Geothermal plant
- d** Coal-fired plant
- e** Hydroelectric dam

### DISTRIBUTED ENERGY RESOURCES

- f** Offshore wind farm
- g** Onshore wind farm
- h** Solar tower
- i** Smart buildings (roof or facade-mounted solar panels, energy storage, etc.)
- j** Electric vehicle batteries

## 2.2. ECODESIGN

To ensure sustainable development, Alstom reduces the environmental impact of its products throughout their life-cycle, from production to recycling. This integrated approach begins during the design phase.

### 2.2.1. Reducing the environmental impact of Alstom Grid products

Ecodesign is an integral part of Alstom Grid product development, from circuit breakers to new metal-clad substations to environment-friendly transformers that use biodegradable esters instead of mineral oil.

A life-cycle analysis covers each stage of the product's life, from production to transport, use, and disposal. When development is complete, Alstom measures the effectiveness of the ecodesign process with SimaPro software, which runs a life-cycle analysis comparing the new product with the previous generation. The product's environmental impact is also assessed using 16 indicators in five key areas: global impacts (climate change and ozone layer depletion), local impacts (acidification, eutrophication and photochemical smog), ecotoxicity and human toxicity (air, water and soil), waste and resource consumption.

### 2.2.2. Developing a universal life-cycle analysis tool

Alstom Power uses a variety of techniques to reduce the carbon footprint of its products from "cradle to grave". The main objective of some of these is to eliminate the use of hazardous materials. For example, Alstom Power is working with silicon suppliers to find a substitute for formaldehyde in the varnish it uses on its hydro-generators. For other products, reducing safety or health hazards begins at the design phase. One example is using elevators instead of ladders in new wind turbines to reduce falling risk for maintenance personnel.

In other cases, such as when analysing a gas turbine's life-cycle, the approach involves reducing their overall impact on climate change over the full product life-cycle (cf. page 21).

To ensure continuous and uniform improvement of all of its products, Alstom Power is currently experimenting with a universal life-cycle analysis tool.

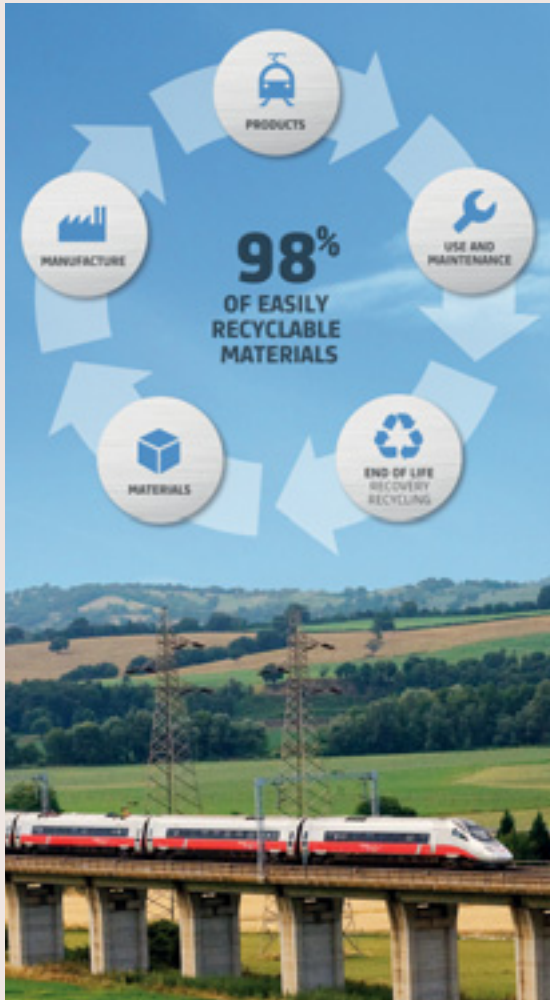


F35, AN ECO-DESIGNED SUBSTATION.

## An eco-designed substation

Alstom Grid used ecodesign principles to develop a compact, gas-insulated metal-enclosed switchgear that would meet three objectives: eliminate the use of such heavy metals as hexavalent chromium, cadmium and lead for surface treatment, eliminate the use of non-recyclable epoxy resins and minimise the leakage of SF<sub>6</sub> (sulphur hexafluoride, a greenhouse gas) throughout the substation's life-cycle.

The result is impressive. Substation size and volume were reduced by 30%, which facilitates transport and reduces costs. Using stainless steel for screws, nuts and metal gaskets eliminated the need for hexavalent chromium and epoxy resins were replaced with recyclable thermoplastic polymers. Lastly, SF<sub>6</sub> emissions were decreased by using less SF<sub>6</sub> initially and reducing leakage by developing special lobe seals and decreasing their length.



## An Ecodesign Centre for Alstom Transport in northern France

Committed to ecodesign since the mid-1990s, Alstom set up an Ecodesign Centre in the northern French city of Valenciennes in 2003. The Group is also involved in several research and industry clusters

with global ambitions, such as I-Trans in northern France, where engineers and researchers are working together to find new solutions to environmental challenges.

### 2.2.3. Rail transport – promoting an eco-friendly life-cycle

To promote sustainable rail transport, Alstom designs its products in accordance with eco-friendly principles to limit and reduce their environmental impact throughout their life-cycle, from production to recycling.

The environmental information and management explorer (EIME) application, developed in collaboration with Ademe<sup>1</sup>, provides a pre-design assessment of the environmental impact of most products in terms of air, water and soil pollution, consumption of raw materials, greenhouse gas emissions, ozone layer destruction and hazardous waste production.

Ecodesign research focuses on:

- easily recyclable materials such as aluminium, steel, copper or biodegradable materials such as oils,
- riveting and screw-bolting during assembly of parts to facilitate end-of-life recycling,
- anthropomorphic data on future generations (height, weight, age),
- gradual elimination of substances that are harmful to the environment, such as hexavalent chromium,
- use of renewable materials such as wood, hemp, wool and other for insulation and soundproofing, and bamboo as an experimental flooring,
- development of thermosetting composite materials with low environmental impact through the Finather project,
- at least 85% recyclability of products for Metropolis metros and Citadis tramways, with 98% for Stockholm's Coradia train.

<sup>1</sup> The French Environment and Energy Management Agency.



## 2.3. FACTORING IN LIFETIME EQUIPMENT COSTS

Alstom equipment – for both the transport and energy sectors – has a lifespan of 30-40 years. The Group looks ahead to its environmental impact and lifetime cost starting from the design phase.

### 2.3.1. Maintenance, the key to train operational availability and performance

Since their profits depend largely on ensuring maximum availability of their rolling stock and infrastructure, railway operators must reason in terms of total cost of ownership and integrated logistics support. The total cost of owning rolling stock can be divided into purchase cost, maintenance cost and operation cost, with each of these generally representing a third of the total cost. Operation cost depends mostly on the price of energy and operating personnel expenses.

#### Designed-in maintenance

In an overall approach that includes not only supplying trains but also overseeing their entire life-cycle (including maintenance, repair, obsolescence management and upgrading), Alstom is committed to reducing their total cost of ownership. This means that maintenance requirements are addressed during the design phase, as are weight reduction and energy consumption. The objective is to facilitate component access and disassembly and simplify maintenance plans to ensure maximum availability and safety for railway operators.

#### Targeted preventive maintenance with TrainTracer

Conditional preventive maintenance, which involves monitoring a train's most critical parameters and only performing maintenance when a predetermined threshold has been reached, keeps servicing downtime to a minimum and thus ensures maximum operating availability and profit. This is why Alstom developed TrainTracer, a powerful preventive maintenance tool that sends maintenance data on each train in commercial service to the maintenance depot in real time. This system detects and analyses anything unusual, directs the train to the depot best equipped to provide the required servicing, schedules servicing when the train is not being used and reduces downtime. This system is currently in operation on the West Coast Main Line between London and Glasgow in the UK.



VIRGIN TRAINS, WHICH OPERATES THE WEST COAST MAIN LINE, HAS BEEN NAMED THE UK'S "BEST RAIL OPERATOR" AND "BEST RAIL COMPANY".

## Signalling – safe and secure networks that make railways more competitive

By ensuring optimum traffic fluidity on rail networks with such features as automatic control of train movements, secure traffic management and frequency optimisation, and through ongoing enhancement of passenger safety, Alstom's Urbalis and Atlas signalling solutions (for urban and intercity lines respectively) make railways more competitive and encourage a modal shift from other means of transport with larger carbon footprints.

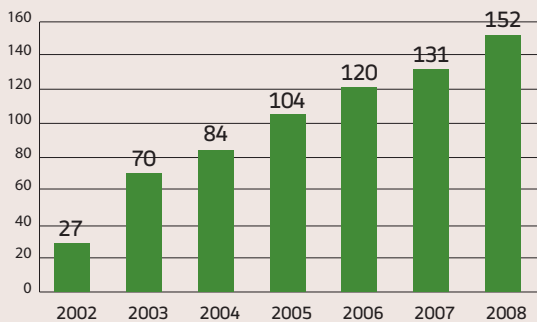
Urbalis is a proven monitoring and control system that can optimise the operating frequency of metro train lines

(and in some cases tram lines) in accordance with traffic requirements. Urbalis strengthens safety and increases passenger throughput per hour and per direction, and provides an effective response to the congestion of transport infrastructure.

Alstom's Atlas signalling solution – a European Rail Traffic Management System (ERTMS) – smoothes border crossings, controls and optimises train speed and safety, improving the flow of passenger and freight traffic and boosting line profitability. Flexible and upgradable, Atlas can be adapted to any network.

## QUANTIFYING THE EFFECTIVENESS OF ALSTOM SOLUTIONS

Projects commissioned from 2002 to 2008: reduction in annual CO<sub>2</sub> emissions (cumulative) in millions of tonnes of CO<sub>2</sub> equivalent



Results were verified by PwC (July 2010)

A study was undertaken to measure reductions in CO<sub>2</sub> emissions associated with commissioning of Power equipment. This resulted in the assessment, in 2010, of 944 projects launched from 2002 to 2008 using a methodology that was verified by PricewaterhouseCoopers.

**This study shows that plant operators reduced their annual CO<sub>2</sub> emissions by 152 million tonnes.**

- Emerging and developed countries accounted for 71% and 29% of these reductions, respectively.

- 53% of these reductions involved fossil fuels and mainly natural gas, while

the remaining 47% involved hydroelectricity, other renewable energy sources and nuclear power.

- The increase in the proportion of low-carbon power generation technologies accounted for 2/3 of the emissions reductions, while greater energy efficiency accounted for the remaining third.

This sort of success encourages global power plant operators to pursue their efforts to reduce CO<sub>2</sub> emissions by 10 billion tonnes a year by 2030.

### 2.3.2. Looking ahead to tighter energy regulation

All over the world environmental regulations are becoming increasingly stringent for power plant operators and are increasing their production costs. Alstom is helping them meet this challenge by developing technologies that emit less local pollutants (such as SO<sub>x</sub>, NO<sub>x</sub>, mercury and particulate emissions) and low-carbon power generation solutions that make existing and new plants more efficient and increase the use of renewable energy sources.

### 2.3.3. Services that improve grid performance and reliability

Alstom Grid offers services that optimise the operation of electrical networks, increase return on investment and extend equipment life. Customer needs include grid design, equipment maintenance and upgrading, emergency assistance, preventive maintenance and training, provided on an ad hoc basis or within the framework of a long-term partnership.

Equipment that is properly maintained throughout its life-cycle and is replaced or upgraded to meet new environmental standards will operate more reliably and more efficiently. Alstom Grid's long-term maintenance contracts ensure that high voltage equipment and entire grid systems are given the attention they need throughout their life-cycle. Alstom Grid's annual inspections and minor and major maintenance operations ensure the reliability of network infrastructure, while the renovation, upgrading and life-cycle extension solutions it provides enhance performance, lower costs and resolve the problem of obsolescence. Alstom Grid has also developed a broad range of advisory services to actively manage the reliability and energy efficiency of grid equipment.

## 2.4. THE SMART CITY, FOR SUSTAINABLE URBAN DEVELOPMENT

Many large cities and towns have begun to think about what they can do to reduce CO<sub>2</sub> emissions and in general, promote sustainable development. One example is the EU's Covenant of Mayors initiative through which over 2,500 cities and towns have committed to reducing their CO<sub>2</sub> emissions by at least 20%.

Smart cities use energy-management, construction, transportation and telecommunications technologies to ensure that tomorrow's cities will be able to reconcile economic needs with sustainable development and a high quality of life. This new approach to urban development will mean providing integrated and low-carbon energy and transport services, managing carbon footprints and using smart grids to optimise local energy consumption and decentralised energy production.

### From consumers to "consum'actors"

Eco-neighbourhoods, the building blocks of tomorrow's smart cities, are based on three principles. The first is protecting the environment through greater energy and environmental efficiency (for example, by using sustainable materials, insulation and decentralised renewable energies), clean transport (such as electric buses and cars), waste management and water treatment. The second principle is making a positive contribution to the city's economic growth.

The third and last is developing a participative culture where eco-neighbourhood inhabitants feel they have a responsible and active role to play and where local government entities can promote transversal projects in energy, transport and other areas and keep people well informed.



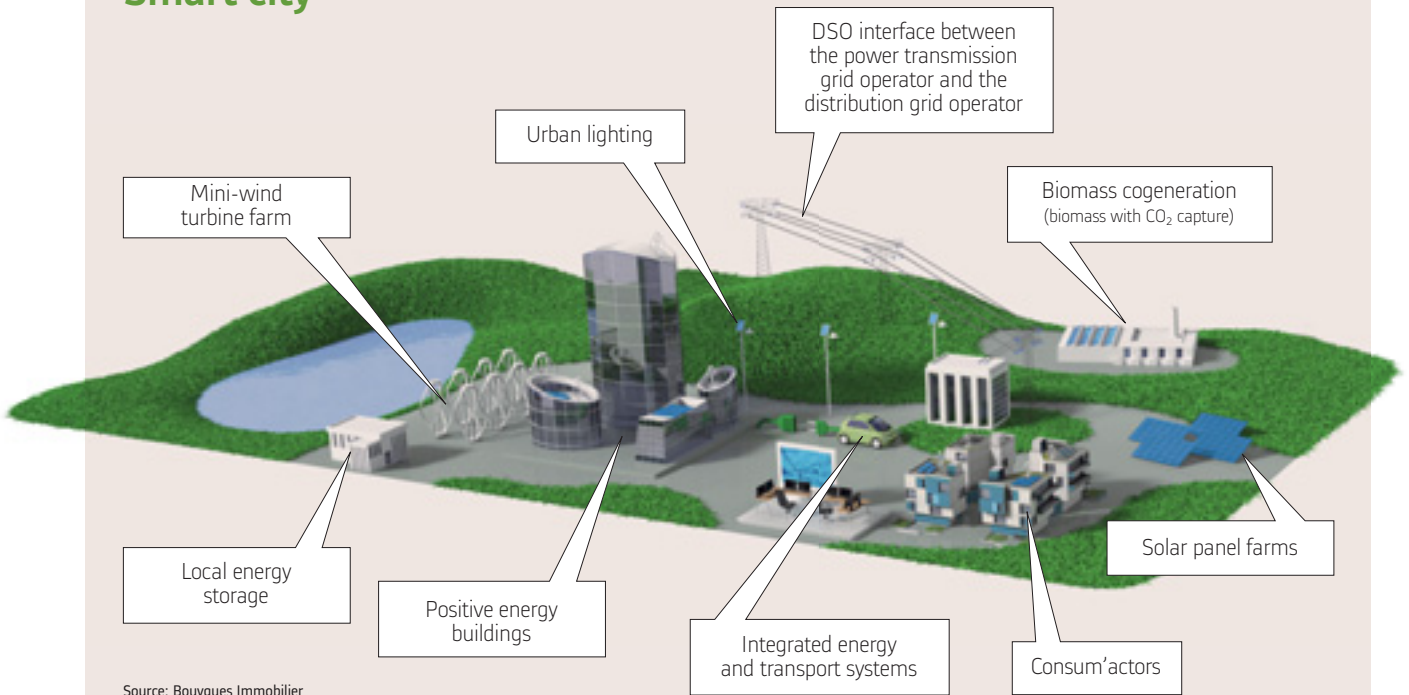
As a founding member of the Econoving<sup>1</sup> international research chair, Alstom is working to develop eco-neighbourhood technologies. Several areas of research and development have been identified, such as electric transport systems and cars and the changing role of energy users. These users will take a more active participation by optimising their energy supply and use in their homes and electric vehicles.

### Energy management and planning services

In 2011, Alstom founded EMBIX to develop energy management and planning services for eco-neighbourhoods. These services range from energy and environmental audits to the optimisation of energy resources and grids. Alstom has solutions for decentralised energy production and integrated power storage and also offers expertise in smart grid and multimodal transport technologies.

<sup>1</sup> Econoving was founded by GDF SUEZ, Italcementi, Saur, SNCF and Alstom together with a group of universities and research institutes including Université Paris-Sud 11, Université de Versailles-Saint-Quentin-en-Yvelines, École Normale Supérieure de Cachan, École Centrale de Paris, École Supérieure d'Électricité (Supélec) and Ademe, the French agency for energy management and the environment.

## Smart city



Source: Bouygues Immobilier



## Building tomorrow's smart cities

EMBIX, a joint venture of Alstom and Bouygues<sup>1</sup>, develops and provides energy management and planning services for eco-neighbourhoods. EMBIX offers a broad range of services, from neighbourhood audits to energy performance optimisation using information systems that employ the latest smart grid technologies. The arrival in the urban environment of solar power, mini-wind turbines, geothermal energy and other renewable energy sources, and of new means of storing energy (such as electric cars), together with the growing trend toward

eco-responsible behaviour, have made the need to optimise energy performance more compelling than ever.

This trend has been strengthened in France and throughout Europe by new energy regulations that aim to increase energy efficiency by 20%, reduce carbon emissions by 20% and ensure that renewable energy sources account for 20% of European energy production, by 2020.

<sup>1</sup> Via its subsidiaries Bouygues Immobilier and ETDE.



## 2.5. INDUSTRIAL PARTNERSHIPS FOR SUSTAINABLE DEVELOPMENT

Alstom is involved in numerous projects with industrial partners to develop and market sustainable solutions. These projects involve renewable energies, energy storage, increasing energy efficiency, smart grids, eco-neighbourhood energy management and innovative transport solutions. Here are some recent examples.

### Developing energy storage systems

Some of the electricity produced by intermittent wind and solar power sources is wasted since any surplus relative to demand cannot be stored until needed. To solve this problem, Chinese battery manufacturer BYD and Alstom have signed a memorandum of understanding to develop solutions capable of storing 1 MW and more.

### Helping innovative start-ups promote renewable energies, energy efficiency and environmental technologies

Alstom, Schneider Electric and Rhodia have joined forces to form Aster II, a venture capital fund. In partnership with two Israeli high-technology companies, Rotem Industries and Gefen Biomed Investments, Alstom has also formed Horizon, a company that supports innovative Israeli start-ups.

### The French government's project to build 6,000 MW of offshore wind farm capacity by 2020

The exclusive agreement signed with EDF Énergies Nouvelles in January 2011 provides for the construction of offshore windfarms developed by EDF Énergies Nouvelles and its partners. They will be equipped with Alstom offshore wind turbines.

### Smart technologies and renewable energies for cities

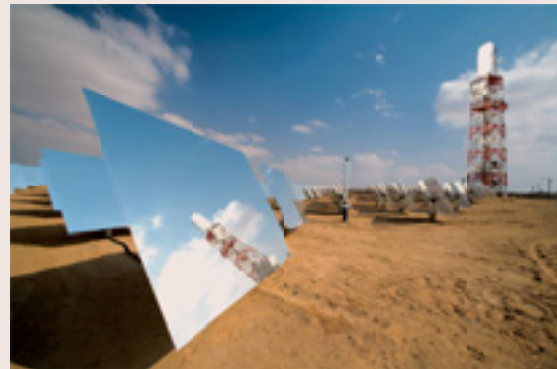
The partnership with Microsoft that began in 2002 to develop solutions for integrating and managing renewable energy sources in smart grids is being expanded in 2011 to include cloud computing<sup>1</sup> solutions for smart cities. This system leverages the use of information technology, reduces the cost of IT infrastructure and offers many advantages for achieving an optimum balance of renewable energies and optimising their management.

<sup>1</sup> In a cloud computing environment, software and data are no longer stored on the user's computer but in a "cloud" composed of remote servers that are interconnected via a very broad bandwidth connection.

### Partnership to develop solar power

In 2010, Alstom entered the solar power market by taking an equity stake in the US company BrightSource Energy, a builder of solar-tower power plants. In 2011, Alstom strengthened this

partnership, which focuses on developing high-efficiency solar power plants. BrightSource Energy is planning to build 14 solar plants in the southwest United States by 2016.



### Developing tomorrow's automated metro system

Alstom and the Paris public transport company, RATP, have joined forces to form Metrolab, a research joint venture that aims to develop innovative and fully automated urban and suburban transport solutions. Supported by the two partners' combined

expertise in transport infrastructure, rolling stock, signalling and passenger information systems, operations and maintenance, Metrolab will develop turnkey systems to be sold under the Optimet brand. A demonstration metro train is to be completed in 2013.



# ENGAGING

## WITH THE COMMUNITY



BRAZIL  
Pescar Foundation



### CANOAS

## JOB TRAINING FOR YOUNG PEOPLE

*"Give a man a fish, and he eats for a day. Teach him to fish, and he eats for a lifetime."* Inspired by this quote from Mao Zedong, the Pescar Foundation and its partners in the business community are developing programmes to educate underprivileged Brazilian teens and help them break into the job market. Each year in Canoas, around fifteen adolescent boys and girls participate in a training programme for various electrical trades, earning a diploma when they complete the course successfully. The programme, which is sponsored by Alstom employees, also includes regular meetings with parents and makes young people aware of civic values and issues related to health, the environment and community life. Since 2004, more than one hundred teens have taken the course: 78 have earned a diploma.



FRANCE  
Employment  
and diversity forum



### LA COURNEUVE

## JOB FAIR FOR DISADVANTAGED YOUTH

In November 2011, Alstom joined 15 other companies in welcoming more than 400 applicants from disadvantaged areas to a job fair at its La Courneuve site outside Paris. Organised in partnership with the French association IMS-Entreprendre pour la Cité, the event was open to students and

recent graduates with a minimum of a two-year degree, regardless of experience level.

Throughout the day, the young people met with recruiters, gave their CVs to company representatives and received advice from coaching teams in private sessions.

# 3.

## GROUPWIDE ENGAGEMENT

Alstom's social responsibility policy, rules on ethical conduct, actions to reduce its environmental footprint, relations with its stakeholders and involvement in local communities are all aspects of the Group's commitment to sustainable development.

## 3.1. ETHICS, THE FOUNDATION OF OUR GOVERNANCE

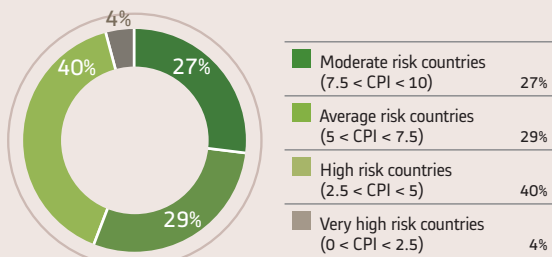
Alstom is listed on the Paris stock exchange and as such manages its activities transparently, following the principles of good governance laid down in the AFEP-MEDEF code. Staff are expected to abide by the principles of integrity, social responsibility and sustainable development. The Group's commitments shape its strategy, procedures and working methods.

### 3.1.1. Rules on ethical conduct shared by everyone

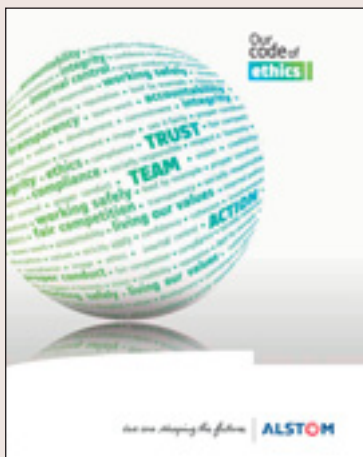
Alstom's staff embrace the three values of trust, team and action, ensuring Group cohesion and bolstering its image. The Group's growth also depends on a culture of integrity and ethical standards that must be adhered to by every employee. To support its ethical culture, the Group implemented the Integrity Programme, which is based on rules of conduct and ethical principles that apply to everyone and to all company procedures. A copy of the Code of Ethics, available in 21 languages and updated in 2010, is distributed to all employees. An e-learning module compulsory for all managers was deployed in 2010 and completed by 32,000 of the 35,000 managers targeted. New guidelines on relations with consultants and conflict of interest management were issued in 2010 and 2011 to answer employees' questions.

All employees are free to trigger a confidential alert if they suspect a violation of the rules on securities, accounting, competition or corruption prevention. In the United States, such violations may be reported anonymously via a hotline. Convinced that corruption in international transactions can only be eliminated through concerted action by all players, the Group is a member of the United Nations Global Compact Working Group on Principle 10 and of Brazil's Ethos Institute, where it is a signatory of the anti-corruption pact. Alstom sponsors the chair of business law and ethics at Cergy-Pontoise University in France and is also a member of the Institute of Business Ethics in the United Kingdom, the Ethics & Compliance Officer Association in the United States and the European Business Ethics Network.

## BREAKDOWN OF GROUP SALES by level of exposure to corruption risk in 2010



(CPI: Corruption Perceptions Index of Transparency International)



THE CODE OF ETHICS WAS DISTRIBUTED TO ALSTOM'S 93,500 EMPLOYEES.

## INDEPENDENT DIRECTORS on the Board and its committees on 1 January 2011

Board of Directors	9/14
Audit Committee	4/6
Nominations and Remuneration Committee	3/5
Ethics, Compliance and Sustainability Committee	3/3

To ensure the effectiveness of its procedures, Alstom had the rules governing its relations with consultants and sales agents certified and will expand certification to include other areas.

### 3.1.2. Commitment to respect for human rights

As a member of the United Nations Global Compact, the Group abides by the Universal Declaration of Human Rights and ILO conventions<sup>1</sup>. Respect for human rights is one of the criteria examined by the Risk Committee when evaluating projects. It is also imposed on our suppliers and subcontractors by a charter. An investigation is carried out yearly to verify that no child exploitation, forced labour, infringement of freedom of association or any form of discrimination has occurred.

### 3.1.3. Board of Directors: principles of good governance

The Board of Directors conducted its annual examination of the independence of its 14 Directors. It found that nine Directors were independent according to the definition given by the AFEP-MEDEF code. The Directors are American, British, French, German and Indian, and three of them are women.

It also makes public the criteria on which the remuneration of the Chairman and Chief Executive Officer and the leading senior executives is based, the number of share purchase options awarded and their unit value, as well as the Directors' remuneration.

<sup>1</sup> International Labour Organisation



## Sustainable development: management strengthened

The policy on corporate social responsibility and sustainability is the responsibility of the Group's Director of Strategy and Business Development. It is deployed through several major Group programmes and through Sector programmes specific to their activities.

### ENVIRONMENTAL POLICY: MANAGEMENT AND MONITORING

**A team of 350 managers** (excluding Alstom Grid), coordinated by the Group's Environment, Health and Safety (EHS) Department.

**A management system** in the Group's 198 EHS units, based on the EHS Roadmap, which covers the environmental management system, and occupational health, safety and risk prevention.

**Self-evaluations** based on the EHS Roadmap and checked by 85 internal inspectors and external auditors. A total of 40% of the 136 evaluations in 2010 were submitted to independent auditors.

At 31 March 2011, 143 EHS units had conducted self-evaluations.

**Monthly reporting on 34 indicators**, defined on the basis of the Global Reporting Initiative and covering over 90% of the employees in permanent operations. PricewaterhouseCoopers verified 31 environmental indicators, as well as the ISO 14001 certification processes and EHS audits.

**AlstomTrack**, created in 2010 to plan the quality audits and self-evaluations, consolidate the results and manage incident follow-up.

### SOCIAL POLICY: MANAGEMENT AND MONITORING

**A team of 750 managers** coordinated by the Group Human Resources Department.

**The "It's all about people" policy and human resources procedures**, with mandatory application, published in a brochure.

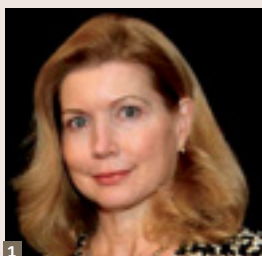
**A common information system (SIRH)**, currently being deployed at Alstom Grid.

**A management system for preventing workplace accidents**, based on the EHS Roadmap.

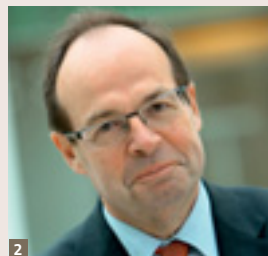
**A dashboard** with indicators from the information and survey system in the 22 countries where the Group employed more than 500 people in 2010 (excluding Alstom Grid) and which represented 92% of its workforce.

### COMMUNITIES POLICY: MANAGEMENT AND MONITORING

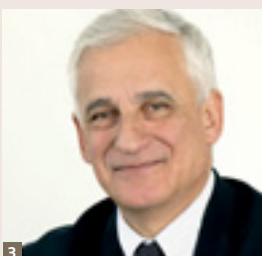
**A network of 50 Presidents**, covering 179 countries, who represent the Group and develop relations with local institutions, organisations and communities.



1



2



3

**1 KATRINA LANDIS**  
Chief Executive Officer  
and Group Vice President  
of BP Alternative Energy

**2 JEAN-MARTIN FOLZ**  
Board Director, Chairman  
of the Ethics, Compliance and  
Sustainability Committee

**3 PASCAL COLOMBANI**  
Senior Advisor to A.T. Kearney

### AN ETHICS COMMITTEE

**In September 2010, the Board of Directors created an Ethics, Compliance and Sustainability Committee composed of three independent Directors.**

The Committee studies and assesses the Group's policies and procedures with respect to ethics, social responsibility and sustainable development, and presents its opinion to the Board of Directors.

## Grid, listening to its customers

**Intimacy and responsiveness are at the heart of Alstom Grid's relationship with its customers.** The response rate to the regular surveys of customer satisfaction, in itself an indicator of the degree of customer intimacy, is closely monitored. Alstom Grid also introduced the Strategic Key Account Management programme

for its major customers and conducted 360 in-depth interviews with 35 key accounts in 2010. Expectations regarding prices, quality, delivery time, service and customer relations are examined with a view to fine-tuning strategy, developing specific products and services and developing tailored action plans.



CUSTOMER INTIMACY: A PRINCIPLE FOR ACTION.

## Interaction, an instrument for technical innovation

**Alstom Power forms working groups** made up of its experts and customers to discuss specific products and technologies. One example is the annual Alstom Turbine Generator Symposium in the United States, which is attended by about 100 customers. The discussions and exchanges, especially

concerning the technical improvements expected, prove extremely valuable. Meetings with more advanced technical content, such as product presentations and seminars, are also held, facilitating dialogue between customers and trade associations in Asia, Europe and North America.

# 3.2.

## CLOSE CUSTOMER RELATIONSHIPS BASED ON TRUST

**The Group stays close to all its customers. To gain a better understanding of their needs and anticipate their expectations, it deploys specific procedures that complement the direct contacts.**

### 3.2.1. In-depth interviews for better service

Alstom uses regular in-depth interviews to analyse the needs of its customers and markets, as well as its customers' views on the products and services it offers. The information is incorporated into the Transport Sector's Customer Needs Review, which drives strategy and the development of products and services. Once projects are completed, Alstom conducts customer satisfaction surveys.

Besides the yearly in-depth interviews with their key accounts, the Grid and Power Sectors hold user workshops to help guide their innovation and R&D programmes.

### 3.2.2. Customer satisfaction surveys fostering continuous improvement

Alstom Grid conducts yearly satisfaction surveys with 20,000 customers in every country where it operates. The answers are analysed case by case and entered into the customer complaint system so that corrective action can be launched when necessary.

Since 2005, Alstom Power has been conducting in-depth satisfaction surveys with its customers every three years. It also makes use of more targeted actions; for example, in 2010/11, it made a detailed analysis of the strategy of 620 customers, pinpointing their needs and environmental requirements. It also trained 2,500 managers in a customer relations management programme that incorporates the need to take customer satisfaction into account.

## 3.3. RESPONSIBLE SOURCING POLICY

Purchases of materials, components and services represent approximately 60% of Group sales. Alstom seeks to enlist its suppliers and subcontractors as partners in its growth by following a responsible sourcing policy. The policy was introduced in 2007 and has been deployed at Alstom Grid since September 2010.

### 3.3.1. A charter signed by 4,500 suppliers

Suppliers and subcontractors must comply with Alstom's Responsible Sourcing Charter and abide by the principles in the Universal Declaration of Human Rights, particularly in relation to child labour, the environment and health and safety. They must also adhere to the Group's Code of Ethics. To increase supplier compliance with these principles, Alstom has incorporated the charter into its general purchasing conditions. At 31 March 2011, 4,500 suppliers had signed the charter.

### 3.3.2. Environmental, social and ethical assessment criteria

In 2009, the Group introduced a system for assessing its key suppliers and subcontractors on environmental, social and ethical criteria, as well as on the suppliers' requirements of their own suppliers. These criteria are also incorporated in the selection procedure. Close to 850 suppliers were assessed in 2010/11. In addition, pre-qualification and advanced audits are carried out by Alstom's teams or by specialist companies.

### 3.3.3. Support for suppliers

Remedial action is required when suppliers do not meet the Group's standards. Alstom helps them improve, with advice, assessment following remedial actions and access to training in sustainable development on the Group's website.



## Additional training for the Group's buyers

**1,500 employees** took e-training on sustainable development and responsible sourcing. **300 employees** followed the dedicated training course for principal buyers and quality controllers through online tools or

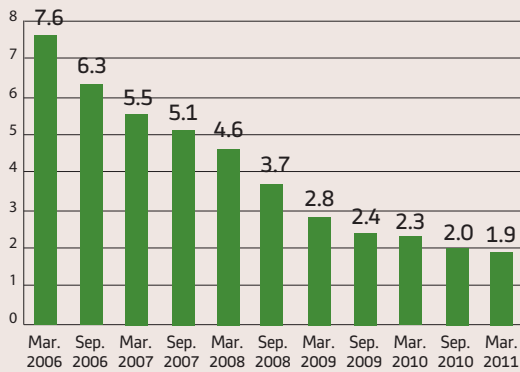
face to face, as in China and India, where 70 people were trained. **Purpose of the course:** understand the Group's priorities, learn how to use assessment results, and assist suppliers with their improvement plans.

### SOURCING: 2008-2010 indicators

	2008	2009	2010 Excluding Grid
Estimated amount of purchases (in millions of euros)	11,000	11,800	10,700
Number of charters signed	580	1,500	4,500
Number of assessments made	92	492	800
Percentage of assessments on purchased volume	5%	24%	34%
Number of employees completing e-training	1,400	1,500	NA
Number of employees completing specific training	0	89	290

## SAFETY: March 2006-2011 indicators

Target: accident frequency below 1 by 2015.



## INSURANCE: 2008-2010 indicators

Target: for all employees, at least one year's basic salary paid in the event of accidental death.

	2008	2009	2010
Percentage of employees covered by accidental death insurance	97%	97%	98%
Percentage of employees with insurance coverage paying out at least one year's basic salary	72%	78%	88%

## Recognition for safety records

**In India**, Hindalco awarded its Safety prize to the Alstom team that installed two fume treatment systems at the Mahan Aluminium Smelter site with no time lost due to safety problems.

**In the UK**, E.ON UK awarded five prizes between June and August 2010 to Alstom Power's Service team at the Enfield power station.

In Edgware, Alstom Transport took second prize in the 2010 Tube Lines Projects Safety Awards for the high level of safety at the depot.

**In the United Arab Emirates**, Emal gave Alstom an award for performance at its facility, where more than 50 languages were spoken: 5.2 million hours of work with no incidents involving lost time.

# 3.4. EMPLOYEES FOCUSED ON COMMON VALUES AND CHALLENGES

To heighten its employees' commitment, Alstom pays particular attention to their working conditions, the development of their skills and recognition of their performance. It makes diversity an asset and a performance lever and encourages dialogue with employees at both local and European levels.

### 3.4.1. Occupational safety

Due to the risk of serious accidents in its production and construction activities, Alstom makes workplace accident prevention an absolute priority and involves all its staff, starting with senior managers.

The Group's Executive Committee analyses the health and safety performance indicators once a month. Training courses, dispensed by Alstom University and the Sectors, have been stepped up and, to further increase employees' awareness, safety criteria were incorporated into the profit-sharing agreements. For example, in France and India, the workplace accident rate counts for 35% in the assignment of collective bonuses.

Safety criteria are also considered in service provider selection and the inspection of safety measures during assignments by subcontractors has been increased.

The Zero Serious Accidents Programme, overseen by senior management, helped bring the rate of workplace accidents down from 4.6 in March 2008 to 1.9 in March 2011.

The programme has four objectives: develop the Group's safety culture, update the self-assessment criteria, improve incident analysis in order to prevent accidents and manage subcontractors' specific risks. The target is accident frequency below 1 by the end of 2015.



# ENGAGING

## IN THE COMMUNITY



FRANCE  
"Elles Bougent",  
a non-profit organisation



### VALENCIENNES, ORNANS, LA ROCHELLE

# ATTRACTING WOMEN TO CAREERS IN INDUSTRY

In many countries, the Group works with non-profit organisations to attract women to careers in industry. In France, it is a member of "Elles Bougent" (which means "they're on the move"), an organisation seeking to create engineering careers for women in such fields as aeronautics, rail transport and energy. "Elles Bougent" organises roundtables and site visits to highlight the career possibilities in industry, with women mentors, many of whom work for the Group, participating.

In April 2011, during Industry Week, about forty female secondary school students visited Alstom Transport's facility in Valenciennes, in northern France. Accompanied there by female employees of Alstom, they had their first glimpse of exciting jobs that are still mainly occupied by men through a presentation of the Group and its activities, round tables with specialists who went into greater detail about certain jobs, and a visit to the plant producing the Citadis Dualis tram-trains, double-decker regional trains like the MI 09, and Paris and Amsterdam metro cars. Two similar events were held in Ornans and La Rochelle.

## CAREER MANAGEMENT: 2008-2010 indicators

	2008	2009	2010
Number of annual performance interviews	23,000	39,000	42,000
Number of employees managed by People Reviews	15,000	30,000	33,000
Internal promotion rate of senior managers	60%	70%	79%

## TRAINING: 2008-2010 indicators

	2008	2009	2010
Percentage of employees who received training	NA	67%	69%
Average number of hours of training	NA	21	20
Number of employees trained at Alstom University	5,600	6,300	8,649

## 108 videos on the Alstom University Tube platform

Launched in 2010, Alstom University Tube offers an opportunity for sharing knowledge and expertise, as well as tips on using Group tools, such as presentation software,

and tricks of the trade. The new platform has proved very popular, with 108 videos made by Alstom employees posted via the Group's intranet sites.

## Universities: partnerships for excellence

The Group has ties with universities in over 35 countries in the form of bursaries, internships, and training and R&D projects. These actions raise Alstom's profile and enable it to identify future employees, establish partnerships (including R&D partnerships) and contribute to national training efforts. Examples include:

**China:** Ecole Centrale de Pékin, Huazhong University of Science and Technology in Wuhan.

**Morocco:** École Hassania des Travaux Publics, École Nationale Supérieure d'Enseignement Technique, École Mohammadia Ingénieurs.

**Turkey:** Sabanci University.

**Russia:** Bauman Moscow State Technical University (with the Grenoble INP).

**India:** College of Engineering, Punjab Engineering College, National Institute of Technology in Surathkal, Maharaja Sayajirao University.

**Canada:** Institute of Electrical Power Engineering.

**France:** support for the chair of business law and ethics at Cergy-Pontoise University, as well as the Econoving chair created by the École Normale Supérieure de Cachan, the École Centrale de Paris, Supélec, Paris XI Orsay and Versailles Saint-Quentin Universities, ADEME<sup>1</sup> and major companies, such as the SNCF (French railways).

<sup>1</sup> French Environment and Energy Management Agency

### 3.4.2. Improve health and well-being at the workplace

There are several specific programmes.

**In France,** the hot line to psychologists helped 49 employees in 2010. It is coordinated by the medical teams.

**In Germany,** employees in Mannheim can take 10 yoga sessions and consult a nutritionist.

**In Switzerland,** Alstom participated in a survey measuring the impact of companies' health policies. The survey found a direct link between management involvement, employee well-being and economic performance.

**In Brazil,** employees in Taubaté can find out about the condition of their health through the Quality of Life Programme.

**In India,** a comprehensive programme covering checkups and access to health care has been put in place.

### 3.4.3. Enriching careers

Alstom is a high-tech company that manages complex, long-term projects. The calibre of its employees, their skills and their commitment are key to its competitiveness. To give them the best opportunities for personal and professional development, the Group has a dynamic career management policy and has stepped up training.

The **People Reviews**, which match the entities' needs with the skills available in the Group, are becoming more common, as are the **42,000 annual performance interviews**, in which objectives are defined and professional development plans set up.

**Internal mobility** is also encouraged: 79% of the 1,200 senior managers (60% in 2008) have been promoted internally.

Specific programmes focusing on development of managerial skills and internal mobility are deployed at local level. In 2009 and 2010, 252 managers in Poland took part in Power Lider, a two-week course partially funded by the European Union. Another of these programmes, Goal, launched by Alstom Transport, benefited 32 managers in Asia and will soon be expanded to South America.

In 2010, nearly seven in 10 employees took **training courses**. Over 10% of these were held in the Sectors' specialised centres or at Alstom University, which is in Paris but also has campuses in India, China, Switzerland, Brazil and the United States. The ISO 9001-certified University offers a foundation of 80 courses covering all the Group's activities, such as the Projects and Contracts Management Programme. Accredited by the Project Management Institute, the 20-module programme is taken by close to 2,000 people a year. The University offers a wide variety of learning options: classes, correspondence courses, seminars, workshops and e-learning.

## Alstom University in 2010

764 training sessions

66 e-learning programmes available

### 3.4.4. Alstom Collaborative Way: a networked company

Through blogs, wikis, forums, web conferences, information-sharing and online tutorials, the Alstom Collaborative Way Programme encourages the development of communities for sharing knowledge and best practices using new information technologies. The goal is to increase collaboration between the Group's entities, fuel innovation and improve the integration of new recruits. Alstom University's Community Networks department supports this programme worldwide.

### 3.4.5. Diversity, an asset

With 93,500 employees in around one hundred countries, Alstom attaches considerable importance to diversity which it considers an asset for performance, innovation and attractivity. It ensures respect for diversity and equal opportunity in three areas in which vigilance is particularly important: gender equality, origins (ethnic, national and cultural) and employment for disabled people.

With men far outnumbering women in the Group, it encourages the recruitment of women, who represent 16% of its workforce, 16.5% of its managers and 11% of its 1,200 senior managers (6% in 2008).

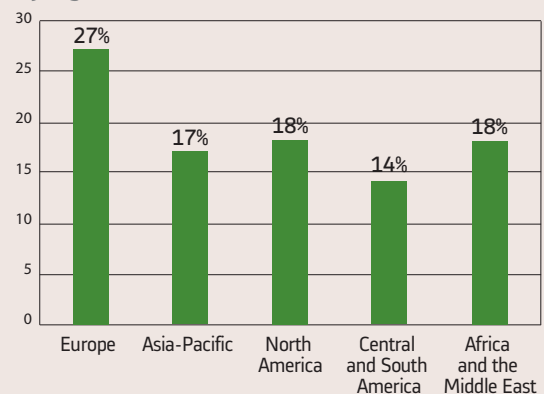
Three women are Country Presidents, for Mexico, Nigeria and Jordan. The Group is involved in various initiatives to attract young women engineers to industry and to improve work-life balance. In France, for example, Alstom works with the NGO Elles Bougent, and in Switzerland, the internal WAVE<sup>1</sup> network helps broaden the career possibilities of women working for the Group. Specific actions help to promote diversity in nationalities and cultures within the Group and to encourage social and professional advancement. That is the purpose of the Promotion Cadre training programme in France and the literacy project for Alstom employees in Argentina. Alstom also helps access to employment for the disadvantaged.

<sup>1</sup> Women Adding Value to Engineering



SPECIFIC PROGRAMMES FOR INCREASING DIVERSITY.

### REPRESENTATION OF WOMEN AT ALSTOM by region in 2010



The proportion of women in the workforce varies by country: 25% in Sweden and 11% in the United Kingdom, 24% in China and 5% in India, 18% in the United States and 10% in Mexico.

### EMPLOYMENT OF DISABLED PEOPLE: 2008-2010 indicators

% of the workforce	2008	2009	2010
Germany	5.5%	5.4%	5.4%
Brazil	4.8%	4.7%	5%
France	3.4%	3.2%	3.4%
Italy	2.4%	2.3%	2.7%
Spain	0.3%*	0.4%	0.3%

The Group's Code of Ethics prohibits discrimination based on health or disability, and the company complies with local laws on encouraging the recruitment and retention of disabled people. In France, the Alstom Power Sector Service business signed its first agreement on recruiting people with disabilities: their representation rose from 2.8% in 2009 to 3.5% in 2010.





19,000 NEW EMPLOYEES JOINED ALSTOM IN 2010.

## Alstom Grid: successful integration

### The year's standout event

was the successful integration of 19,000 Alstom Grid employees in 70 countries. The integration process mobilised considerable resources to ensure that new staff members remained motivated and to encourage corporate loyalty and a feeling of belonging to the Group. Highlights included the organisation of a worldwide Welcome Day in June when information packs were handed out. The process of communicating with managers was developed in stages: an introductory

seminar was followed by a monthly newsletter, regular teleconferences, creation of a specific portal and training sessions. An initial poll of 500 managers was conducted in September 2010, with an 85% response rate. The results show that managers feel very positive about the integration process, with 90% expressing their commitment to Alstom Grid's success and Alstom's corporate values. The poll results were also of use in drawing up the integration plan and finalising organisation.

### PERMANENT STAFF TURNOVER RATES BY REGION: 2008-2010 indicators

As % of workforce	2008	2009	2010
Europe + Africa/Middle East	2.46%	1.65%	2.55%
Asia/Pacific	7.20%	5.83%	6.37%
Americas	3.80%	2.39%	3.05%
<b>Total</b>	<b>3.47%</b>	<b>2.41%</b>	<b>3.42%</b>

Staff turnover rates are an indicator of employee satisfaction. They also reflect the general employment situation in the areas of the world where Alstom operates. This indicator is monitored extremely carefully.

As Grid was only integrated during the year, its data are not included in the table above.

### 3.4.6. Rewarded, loyal and motivated staff

Regular information, a fair remuneration policy and an employee share ownership scheme all help to ensure that Alstom's staff are motivated and feel they are valued members of the company.

They receive information about key developments concerning the Group and its Sectors at least once a week. Alstom Power has been developing *Cafezinhos*, meetings between managers and their teams that are used to explain goals, share views and exchange ideas on improvements. The contribution made by the workforce is also celebrated through events such as the **Alstom Innovation Awards**, which attracted entries from 640 members of the company in 2010, representing 23 countries and a total of 187 innovations. Entries are judged in terms of "Is it new?" and "Does it work?"

Managers' **remuneration** includes a variable element related to individual targets and Group and Sector performance. As of 31 March 2011, this involved 23,000 managers. In addition, a **profit-share scheme** operates in nine countries<sup>1</sup> where 55% of staff work. Alstom also encourages **employee share ownership**: as of 31 March 2011, current and former staff owned 1.3% of the Group's capital, either directly or via an investment fund.

Employee satisfaction is measured through **regular opinion polls**, with the results used to draw up plans to improve working conditions. Based on the results of its 2009 poll, Alstom Power Hydro unveiled a variety of action plans for different regions, such as setting up suggestion boxes in China and lunchtime lecture cycles in North America. These local action plans are monitored by senior management. In 2010, over 30,000 Alstom Power staff with an internal email address were sent a questionnaire: 70% answered. The overall responses were positive, revealing people's real attachment to Alstom and suggesting ways to streamline decision-making and simplify procedures; the results formed the basis of a three-year action plan. Early 2011 saw 62% of Alstom Transport's 24,600-strong workforce replying to a survey, the results of which highlighted their high degree of satisfaction at work. This was thanks in large measure to the autonomy they enjoy, their pride in being part of the company and their desire to contribute to its results. Areas for improvement included a simpler and more responsive way of working, a clearer organisational structure and better communication about strategy.

<sup>1</sup> France, Brazil, USA, Chile, UK, Italy, China, Mexico and Poland.



### 3.4.7. Dynamic dialogue with employees

Alstom supports inclusive dialogue with employees whether at the local or European levels and it is a key component of industrial restructuring. A wide range of agreements covering wages, working hours, benefit plans, restructuring and profit-sharing have been signed with employee representatives at the local level.

At the European level, senior management very regularly consults with the employees' European Works Forum. Discussions in 2010 focused to a large extent on the integration of Alstom Grid and reorganising and restructuring the Power and Transport sectors.

A number of innovative agreements were concluded. For instance, in March 2010 a Temporary Dialogue and Oversight Board was created to monitor the integration of Areva T&D activities. This was set up by Alstom, Areva and Schneider Electric, in partnership with their respective European works councils and in line with a protocol established by the European Metalworkers' Federation (EMF). The board helped to ensure that management and employee representatives from the three companies were able to consult and share information prior to the nomination of representatives to the company representative bodies; it met four times in 2010.

In July 2010, Alstom, Schneider Electric and the EMF signed a new agreement covering the integration of Areva T&D workers at Alstom and Schneider Electric. The agreement restates the two companies' commitment, unless prevented by exceptional circumstances, to offer a job to all Areva T&D workers in line with their skills and qualifications and located in their area.

In February 2011, Alstom and the EMF signed a further agreement in anticipation of changes and developments in 30 European countries. The agreement picked up on best practices from different countries, such as strategic workforce planning in France, temporary working hour cuts in Germany and geographical mobility in Italy. The agreement aims to safeguard jobs, support job transfers, develop skills and organise dialogue with employees within the Group at the European, national and local levels.

## Our goal: leave no one to face employment difficulties alone

Alstom puts in place redundancy schemes to limit the social impact of its restructuring plans in the Power Sector (4,000 jobs) and Transport Sector (1,380 jobs). Arrangements in place in Brazil, Italy, the Czech Republic, Hungary, Switzerland, the UK and Canada are designed to ensure that no one is left to face employment difficulties alone. Case-by-case solutions are always sought: internal reassignment, short-time working, training, business start-up aid or external reassignment.

**In Brazil**, at an Alstom Transport site in Lapa employing 780 people, 60 staff chose to take voluntary redundancy and another 165 were switched to short-time working as well as being given training to keep their skills up to date for when business picks up.

**In the Czech Republic**, a workshop in Brno was shut down in late 2010 after agreement with the social partners. In total, 225 of the 375-strong workforce were reassigned externally, with a leaving bonus, two were trained for new qualifications, 33 retired and four were reassigned internally.

**In Hungary**, following negotiations at the local and European levels, internal and external solutions were sought for 190 staff from the Budapest factory closed due to the downturn in boilermaking activities.

**In Switzerland**, an agreement was reached covering the loss of 700 jobs in Baden.

**In Italy**, internal reassignments with geographical mobility were offered to 147 employees in Colleferro, following a drop in renovation business.

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**71% of Alstom staff are covered by a national collective bargaining agreement or a company-wide agreement.**

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**The European Works Forum in 2010:**

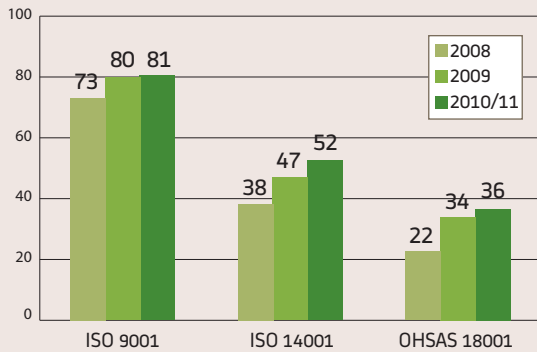
**10 select committee meetings**

**6 plenary sessions**

**11 Alstom Power and Alstom Transport working group meetings**

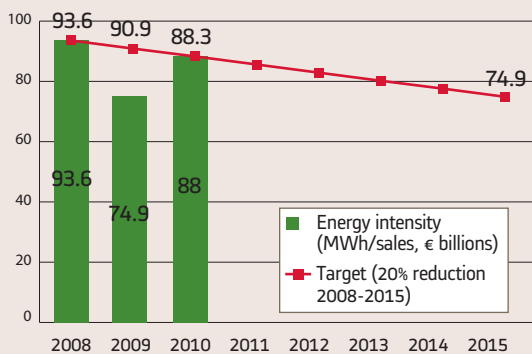
## CERTIFICATIONS

(% of certified units, all types)  
2008-2010 indicators



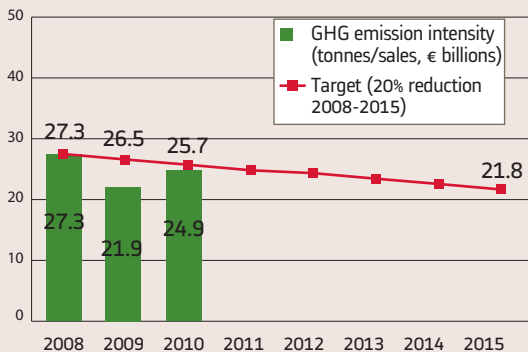
## ENERGY INTENSITY

(MWh/sales, € billions)



## GREENHOUSE GAS EMISSION INTENSITY

(tonnes/sales, € billions)



## TOTAL ENERGY CONSUMPTION (GWh):

2008-2010 indicators

2008	2009	2010
1,712	1,483	1,605

◆ Indicators verified by PricewaterhouseCoopers.

# 3.5.

## ENVIRONMENT: PLAYING A RESPONSIBLE AND DETERMINED ROLE

In 2008 and 2009, Alstom set itself five targets for cutting the environmental impact of its activities. The results achieved are in line with these targets, with the exception of volatile organic compound emissions. Grid will be included in the Group's targets for financial year 2011/12.

### 3.5.1. ISO 14001 certification in 2012 for all manufacturing sites employing over 200 people

In late 2010, 160 of the Group's 198 manufacturing sites held ISO 9001 certification (quality), 103 were ISO 14001 certified (environment) and 71 were OHSAS 18001 certified (health and safety). Some 65% of Alstom Grid sites were ISO 14001 certified (including 85% of manufacturing sites employing over 200 people), with 64% meeting the OHSAS 18001 standard.

In addition to the ISO and OHSAS certifications, a number of German sites also hold EMAS environmental certification<sup>1</sup>. In 2011 in the UK, the three Sectors achieved CEMARS certification, primarily for the efficiency of their greenhouse gas emission reduction strategy.

In the Netherlands, Alstom is the first rolling stock manufacturer to reach Level 3 on the ProRail CO<sub>2</sub> Performance Ladder. ProRail is a major force in the railway sector that encourages all its stakeholders to strive to cut their energy consumption.

### 3.5.2. Target of 20% cut in energy intensity and GHG emissions<sup>2</sup> over the period 2008 to 2015

During 2010, energy intensity (energy consumed in relation to sales) and greenhouse gas emission intensity (volume emitted in relation to sales) fell by 6% and 9% respectively in comparison with 2008. On the other hand, an upturn in activity at the Birr test centre combined with a very cold European winter led to an 8% increase in energy consumed and a 4% increase in greenhouse emissions in comparison with 2009. However, the amount of coal used, a fuel that emits large amounts of CO<sub>2</sub>, fell by 65%, and electricity consumption fell by 6%.

<sup>1</sup> European Union Eco-Management and Audit Scheme.

<sup>2</sup> Greenhouse gas emissions: includes CO<sub>2</sub> (carbon dioxide), SF<sub>6</sub> (sulphur hexafluoride), PFCs (perfluorocarbons) and HFCs (hydrofluorocarbons), which are very high for Alstom Grid.

Alstom's manufacturing sites use gas for heating and air conditioning, and electricity for industrial processes and lighting. Although it is a major fuel consumer, the Birr turbine test centre in Switzerland also feeds electricity it generates back into the grid.

Energy audits have been carried out at Alstom's manufacturing sites and action plans are now in place to optimise equipment, compressed air networks and energy management systems, to better organise working hours so as to cut heating requirements and to equip all factories and offices with low-energy lighting. A booklet detailing a range of energy-saving best practices has been produced. Alstom publishes its emissions data through the Carbon Disclosure Project, a business survey conducted by a group of investors.

### 3.5.3. Target of 20% cut in water consumption in water-stressed regions over the period 2010 to 2015

A total of 19 manufacturing sites are located in regions suffering from water stress as defined by the World Resources Institute. In 2009, Alstom set itself the target of cutting the amount of water consumed by these sites by 20% by 2015. Action plans put in place by the sites, relocation to new factories that need less water to operate and a fall in activity levels meant that the target was met and exceeded as early as 2010, with a 39% fall in the amount of water consumed, from 1,583 million m<sup>3</sup> in 2009 to 969,000 m<sup>3</sup>. The target will therefore be revised. Every one of Alstom's manufacturing sites, particularly the 20 sites that account for over 75% of the Group's total water consumption, are moving in the same direction; actions include restricting watering of open spaces, eliminating leaks, recycling, rainwater harvesting and alterations to industrial processes. During 2010, Alstom cut its overall water consumption by 18%.

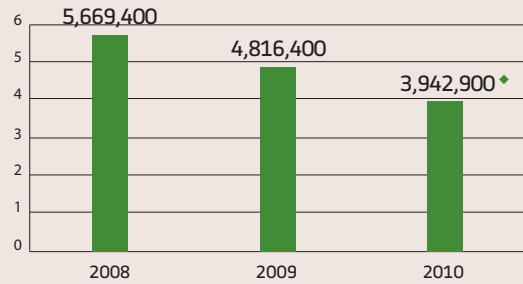
### 3.5.4. Target of 10% cut in VOC emissions over the period 2010 to 2015

A number of measures have been taken to achieve a 10% cut in volatile organic compound (VOC) emissions by 2015. Alstom Transport, for example, now uses water-soluble paints, cutting its VOC emissions by two-thirds and reducing exposure to solvents by its staff. In addition, in 2010, six sites in the UK switched from solvent-based cleaning products to the use of water-based solutions for equipment maintenance. Waste from the cleaning process was also reduced by fitting filtration systems. However, an upturn in activity at Alstom Power Hydro prevented the Group from meeting its target for 2010.

### 3.5.5. Target of 80% of all waste to be recycled by 2015

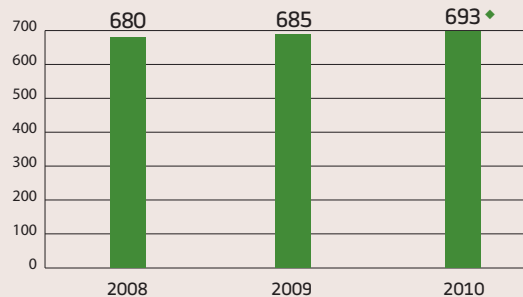
Alstom continues to improve its waste recycling performance. Figures for 2011 will be published once the reporting system has been finalised; they are in line with our targets.

## WATER CONSUMPTION IN PERMANENT FACILITIES (m<sup>3</sup>): 2008-2010 indicators



♦ Indicators verified by PricewaterhouseCoopers.

## VOC\* EMISSIONS IN PERMANENT FACILITIES (tonnes): 2008-2010 indicators



♦ Indicators verified by PricewaterhouseCoopers.  
\* Volatile Organic Compounds.

The high level of activity at the Chinese, Spanish and Portuguese Hydro sites led to a slight increase in VOC emissions during 2010.

## Eliminating asbestos

In 2006, an internal directive banned the use of asbestos within the Group. The ban also applies to sourcing. Wherever possible, Alstom is ridding all its buildings of asbestos, wherever they are in the world, including countries where its use is not forbidden by law.

In order to ensure that asbestos is eliminated from all sourcing channels, a subsidiary has devised a training module on asbestos in the supply chain. All buyers have received this training, which is also available to supply chain quality auditors who carry out supplier inspections.



THE CHATTANOOGA MANUFACTURING SITE IN THE UNITED STATES.

## Buildings with a smaller ecological footprint

Minimal energy consumption was a key design feature of Alstom sites opened in 2010.

**In the United States**, the Chattanooga site was designed to meet LEED<sup>1</sup> Gold standards: buildings are made from recycled steel and the road from concrete waste, the design includes insulation, natural lighting in workshops and offices, heat recovery, rainwater irrigation, parking areas for bicycles and low-carbon vehicles, and the site is accessible via public transport.

The Alstom Transport site in Delaware, which meets LEED Silver standard, puts the emphasis on reduced energy consumption and CO<sub>2</sub> emissions, the use of recycled materials, and recycling water and waste.

**In China, the Tianjin facility** is targeting a zero carbon footprint. The heating, air conditioning, lighting, ventilation and stack gas treatment systems generate 70% less CO<sub>2</sub> emissions than the old factory. Water and wastewater is recycled and rainwater

harvested. The oil used in production is biodegradable and each machine is equipped with an electricity meter.

**In France, the HQE<sup>2</sup> office** building opened in Massy, just south of Paris, is equipped with solar panels and wind turbines.

A project to make more use of low-carbon energies, increase energy storage capacity and optimise electricity consumption is under way. It will also provide parking spaces to charge electric cars and use Alstom technology to manage energy flows.

**In Sweden, the new Oslo office** has been certified by three different environmental standards: GreenBuilding, P-Mark and Miljöklassat Hus. Its façade is designed to optimise natural lighting without increasing heat in the offices. Heating is provided in part by the station under the building and cooling water comes from a nearby lake. Employees are encouraged to use bicycles or public transport.

### 3.5.6. Complying with the European REACH directive

Alstom does not directly import or manufacture in excess of 1 tonne of substances of very high concern (SVHC) at its European sites, and does not supply products containing over 0.1% of SVHC. Alstom uses only authorised importers, reminds its suppliers of the directive's requirements and asks them to disclose any SVHC content, identifies high-risk products using in-house experts, uses replacement products where possible and regularly updates its chemical risk management procedures.

### 3.5.7. Employees committed to environmental issues

Alstom runs a wide range of initiatives to raise staff awareness of environmental conservation issues. They include providing information, creating incentives to encourage energy savings, sorting and recycling, and promoting clean transport.

Its intranet site provides access to environmental information concerning the industry, demography and natural resources. For example, a dedicated climate issues blog was used to keep staff in touch with negotiations at the 2010 Cancun conference. A collection of good environmental practices has also been published in cooperation with two NGOs, Global Village Beijing and the Nature Conservancy. In the UK, employees took part in the Environment Week organised by managers and centring on energy savings: they came up with two hundred suggestions for improvements, the three best receiving an award.

In the French city of Villeurbanne, near Lyon, Alstom Grid's Energy Treasure Hunt, carried out with the help of its employees, identified 200 sources of waste, from compressed air leaks to unnecessary lighting. The result was a decrease of up to 60% in the amount of electricity used by one workshop. In Hungary, the staff awareness-raising programme requires recycled paper to be used in offices and sets annual targets for reductions in waste and in water and energy consumption.

The Group also encourages staff to use low-impact transport locally. In Sweden, where a project to reduce CO<sub>2</sub> emissions from transport and travel is already under way, 70% of cars rented by Alstom TSSE in 2010 were EcoCars running on 85% ethanol, a saving of 95 tonnes of CO<sub>2</sub> emissions.

Car-pooling is encouraged in Canada, and in the United States, Alstom's programme for alternatives to the private car for individual transport at its Seattle site has been awarded by the City of Redmond.

Environmental criteria have also been included in profit-sharing schemes. The scheme operated at Alstom's French headquarters includes paper consumption, and the Alstom Grid scheme applies different criteria according to the site, including reductions in SF<sub>6</sub> emissions and in the consumption of water, gas, electricity and paper.

<sup>1</sup> Leadership in Energy and Environmental Design: an internationally recognised environmental certification system.

<sup>2</sup> High Quality Environmental standard.



## 3.6. SUPPORTING LOCAL COMMUNITY DEVELOPMENT

In every country where it operates, Alstom works together with local communities and collaborates with local partners on sustainable development projects. These projects focus on tomorrow's technologies, training, job creation and environmental conservation.

### 3.6.1. Supporting innovative companies

Alstom puts in place partnerships with start-ups that offer new materials, components, technologies or solutions likely to apply to its own products and markets.

It also provides targeted funding for innovating companies operating mainly in the energy, renewables and sustainable mobility sectors. Alongside the French national institute for energy research (INRE<sup>1</sup>), the national atomic and alternative energy commission (CEA), GDF Suez, CDC Enterprises and the RATP, it invests in Emertec 4, a venture capital fund that supports 12 start-ups. It has also committed €30 million until 2020 in Aster II, an international fund jointly managed with Schneider Electric and Rhodia that invests in energy and chemical start-ups.

In 2011, it teamed up with Rotem Industries and Gefen Biomed Investments, high technology specialists, to create Horizon, a venture capital firm that finances innovative companies working on renewable energy and energy efficiency.

### 3.6.2. Partnering industry clusters in France

Alstom's engineers work with other companies and academics on projects at seven of the 71 national industry clusters: embedded systems (System@tic), future transport (I-Trans), microtechnology, new energies (Tenerrdis), nuclear hubs, renewable energies and power electronics.

<sup>1</sup> National Institute for Energy Research.

## Prize-winning innovation

In Germany, Alstom Transport organises the annual Alstom Innovation Preis for young scientists developing innovative ideas

on the train of the future. In November 2010, three prizes worth €6,000, €3,000 and €1,500 were awarded to the winners.

## Local training and recruitment

In La Courneuve, France, Alstom Power has renewed its partnership with the Plaine Commune joint district authority and helped to set up its Agenda 21.

Alstom Power undertakes to recruit or provide work placements for local residents, develop partnerships with educational establishments and use local firms as subcontractors.



THE LA COURNEUVE SITE IS INVOLVED IN LOCAL RECRUITMENT AND TRAINING CAMPAIGNS.

## The Alstom Foundation

Throughout the world, Alstom and its employees work with local partners on initiatives to improve living conditions for the communities located near its manufacturing and construction sites.

The Alstom Foundation also funds environmental conservation actions. The Foundation was established in late 2007, and has since supported 43 projects, including 19 in 2010, focused on four key areas.

**Economic development:** irrigation system at a farming cooperative in Burkina Faso, trout farming in Ethiopia, support for ecotourism in Guatemala, supply of small-scale wind turbines to salt farmers in India, clean energy solutions in South Africa, waste collection in Egypt and bamboo plantations in Indonesia.

**Community projects:** well construction in Afghanistan, drinking water access for 5,000 people in Congo, installation of solar panels

for a Haitian clinic and reconstruction of multimedia classrooms in Chile after the earthquake.

**Education and raising awareness of environmental issues:**

promotion of green technologies in Mexico, waste management and tree planting in Romania, and a radio campaign on mangrove protection in the Philippines.

**Nature conservation:** well construction and tree planting in Mali's Dogon lands, migratory bird protection in Mexico, reforestation of Brazil's Atlantic forest and fruit tree planting in China. The Foundation also provides support during catastrophes, including in Japan and Hungary in 2011.

[www.foundation.alstom.com](http://www.foundation.alstom.com)



### 3.6.3. Supporting local economic and social development: training actions

Alstom supports local community development through training programmes and funding for investments by its suppliers.

As joint partners in the Amazonian mechanical and metallurgic industry company (IMMA), in 2010 Alstom and Bardella built and opened a hydroelectric equipment facility in the Brazilian city of Porto Velho, located in a region without heavy industry. As part of the Guaporé project, 900 young people from the agricultural sector received training and 350 of them were then hired.

The factory also supports local development by signing contracts with regional suppliers. In Brazil, Alstom Grid and Alstom Power are partners in the Escola Formare Alstom programme, run in Taubaté by Brazilian organisation, IOCHPE. In 2010, 34 young people from disadvantaged backgrounds received a year's training with help from Alstom staff.

In South Africa, the Group finances training initiatives exploring energy issues. The programme is training 650 workers and technicians, such as welders and boilermakers, and 176 engineers, including project managers and quality and financial controllers.

Alstom also supports the engineering faculty at Wits University and has funded grants for 55 engineers studying mechanical, electrical and civil engineering.

### 3.6.4. Support for educational charities

Alstom works with grassroots organisations to develop a wide range of social initiatives, mainly focused on education and the integration of people in difficulty. Alstom spends over a million euros on these programmes, which include support for a primary school and secondary school in Durgapur and Shahabad in India, work to combat illiteracy in the US school system, donations to schools in Poland, and promotion of scientific education in South Africa's Lephahale district and environmental education in the Western Cape area.









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The ALSTOM logo is positioned at the bottom center of the page. It consists of the word 'ALSTOM' in a bold, blue, sans-serif font. The letter 'O' is replaced by a red circle with a white horizontal line through its center, resembling a stylized eye or a train wheel.