



*We are shaping the future*

**ALSTOM**





CO<sub>2</sub>

40% of CO<sub>2</sub> emissions come from power generation.  
25% come from transport.

## Solutions exist... today!

**GLOBAL CHALLENGE** If current trends continue, emissions of CO<sub>2</sub> and other greenhouse gases could have an increasing impact on the Earth's climate. Alstom's three activities offer technology solutions that can sharply limit these emissions – today.

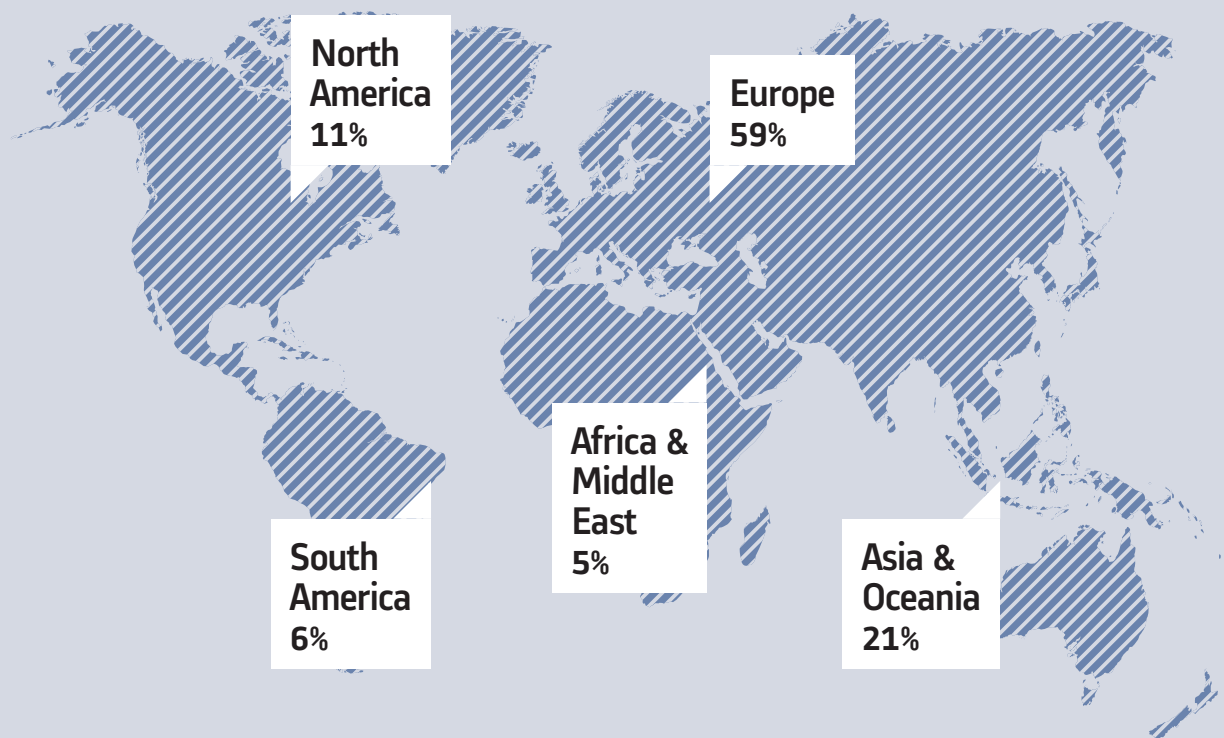
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## **THE ALSTOM GROUP IN 2010/11**

In 2010/11, Alstom overcame challenging conditions to meet its operational goals, with orders rebounding sharply in the second half. The turnaround resulted from numerous successes in the developing world, as demand shifted from industrialised to emerging countries and Alstom made the most of the trend. Trimming capacity as needed, the Group pursued its growth strategy in the BRIC countries, forging strategic relationships with local partners. Alstom is also working toward the future, investing heavily in Research & Development to maintain its technology edge.

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### Workforce by region at 31 March 2011



# 93,500 employees

in around a hundred different countries

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# €20.9 billion

in sales for 2010/11

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# €700 million

in Research & Development in 2010/11

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## POWER

Promoting “clean” power

### 56% of Group sales

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.

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



## GRID

The smart grid expert

### 17% of Group sales\*

In June 2010 Alstom created Grid, the Group’s third sector and one of the power transmission market’s top three players. Alstom Grid offers critical high and very high voltage technologies and smart grid solutions.

\*Figures for Grid are consolidated for the period June 2010 to March 2011.

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.



## TRANSPORT

Versatile rail specialist

### 27% of Group sales

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 construction of high- and very high-speed trains, ranking second in urban transport and regional trains.

One in three tramways and one in four metros worldwide were made by Alstom.

**Overview**

Profile _____	1
Interview with the Chairman _____	3
Governance _____	6
Key figures _____	8
Alstom and its shareholders _____	10

**Highlights**

2010/11: The year in review _____	12
-----------------------------------	----

**Strategy**

Power _____	24
Grid _____	28
Transport _____	38

**Human values**

Sustainable development data _____	56
Financial results _____	69
	70

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. And 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.





60%

of orders booked in emerging countries.

## Alstom enters a new phase of development

**FAR-SIGHTED AND RESPONSIVE** With orders picking up again after a slowdown, the future looks brighter for Alstom. And the Group was ready for new market trends thanks to strategic changes in its geographic positioning and portfolio of products and services. Always alert to new opportunities, Alstom never stops adapting.

## **“WE ARE ADAPTING RAPIDLY TO THE POST-CRISIS WORLD.”**



**“I hope that the turnaround in our orders points to the end of the crisis, but we are entering a new world. The geography of our markets is shifting, and demand for systems, equipment and services is changing with it.”**

PATRICK KRON,  
ALSTOM CHAIRMAN AND CEO

### **How would you sum up financial year 2010/11?**

First, we have done a very good job under tough conditions, with an operating performance at the higher end of our expectations, and I would like to thank all our employees for contributing to that result. Secondly, I want to point out that the outlook has improved, with orders rebounding in the second half after three very weak half-years in a row. And the big contracts that disappeared in 2009/10 and the first part of 2010/11 are starting to come back.

### **Is it fair to say that the crisis is over for Alstom?**

The economy is growing again, but the growth is very uneven: strong in China, India and Brazil, but much more modest in the US and Europe. We are in a two-tier world. I hope that the turnaround in our orders points to the end of the crisis, but we are entering a new world. The geography of our markets is shifting and demand for systems, equipment and services is changing with it. We have to adapt. We have begun to do that successfully, and we need to go on adapting with determination.

### **What is this new environment like, and how exactly is Alstom adapting to it?**

Point one: demand has shifted massively from developed countries to emerging countries. In 2009/10, emerging markets accounted for 35% of our orders. In 2010/11, that figure was almost 60%.

That alone is proof of our responsiveness and of our ability to get out and look for business wherever it presents itself. But we could not have made such a large-scale move in such a short time if we had not been prepared. We already had a solid foundation, built by a strategy that we implemented for many years and are still implementing: we have created new manufacturing capacity in Russia, India and China, and we have forged new relationships

with local partners in these countries. These partnerships are critical to our future growth in these markets, which are considerable but are not easy to break into.

At the same time, we have had to adapt in areas where demand was lacklustre – Power’s thermal business line in Europe and the United States, for example, and some of Transport’s European sites.

### **What about the products and services Alstom offers?**

That is point two: our customers’ needs are changing. In power generation, carbon-free technologies are growing steadily, even though coal and gas are still dominant. In power transmission, the focus is on very high voltage, energy efficiency and smart grids. In transport, there are sizable needs for high-tech equipment – especially high-speed and signalling equipment – but in the emerging countries we are seeing demand for simpler, less expensive equipment tailored to local needs.

We are staying as close to these trends as possible by continuing to make major R&D investments. In 2010/11, we spent €700 million, primarily to develop offshore and onshore wind power and solar thermal power, to continue updating our turbine range, to develop carbon capture, very high voltage power transmission technologies and smart grids, and to design rolling stock tailored to demand in emerging markets.

We are also working to keep our range of services at the highest possible level, since that line of business is essential to the Group.

### **Where does the company stand after two lean years?**

First, let’s remember that during those years Alstom successfully completed a major acquisition: our new Grid Sector is an important asset for the Group. During the last financial year, Grid brought in €3-4 billion in orders and revenue. That is a considerable contribution.



**“Alstom is in a strong position to make the most of the market rebound. Our strategy is clear, and we have the tools to implement it: our solid financial position and ownership structure, our expertise and technology, our manufacturing base, and our geographic presence.”**

Secondly, Alstom is on a sound financial footing: thanks to the turnaround in orders, our free cash flow was back in positive territory in the second half of the year. Net debt is reasonable. And our balance sheet is solid.

Finally, we have worked hard to control costs and become more competitive. We have also launched a major effort to become more flexible and responsive and to get even closer to our customers.

In short, Alstom is in a strong position to make the most of the market rebound. Our strategy is clear, and we have the tools to implement it: our solid financial position and ownership structure, our expertise and technology, our manufacturing base and our geographic presence.

**You have confirmed that your margin target for financial year 2011/12 is 7-8%. What are your priorities for reaching it?**

We will focus on maintaining the encouraging sales performance we saw in the last few months of financial year 2010/11, emphasising the quality of our products more than ever, ensuring that projects are well executed, and rigorously controlling costs. ●



# 24h

**Power and transport:  
the access imperative.**

For hundreds of millions of people around the world, Alstom is a part of life – every minute of every day.

**URBANISATION** By 2030, cities will be home to 60% of the world's population. These urbanites will need clean, affordable energy and efficient public transport – two essential ingredients for social progress. Alstom is positioning itself as a key contributor, able to meet these challenges without sacrificing the environment.







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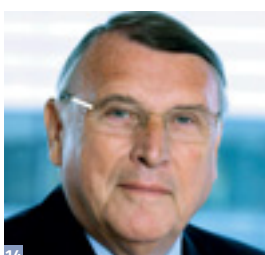
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## BOARD OF DIRECTORS (at 31 March 2011)

Alstom has been listed on the Paris stock exchange since 1998. The Group has taken active steps to achieve its highly demanding goals for transparent corporate governance based on the APEP-MEDEF corporate governance code for listed companies. This means that Alstom applies strict corporate governance rules, particularly with respect to the independence of Board Directors and the missions of specialised committees. For more information on the Group's corporate governance, please visit the Alstom website at [www.alstom.com](http://www.alstom.com). A robust and broad internal control system encompasses all Group Sectors and functions. By enabling quicker, more reliable and more competitive operations, a sound internal control system guarantees, as far as is possible, that laws and regulations are complied with at all times, information and data including financial information are reliable, and that operations are completed in an optimal manner. The Board of Directors is expected to propose the renewal of the terms of office of Patrick Kron, Candace Beinecke, Jean-Martin Folz, James William Leng, Klaus Mangold and Alan Thomson at the upcoming Annual General Meeting on 28 June 2011.

**1 Olivier Bouygues**  
Deputy Chief Executive Officer, Bouygues

**2 Candace Beinecke**  
Chair, Hughes Hubbard & Reed LLP

**3 Jean-Paul Bechat**  
Managing Director, ARSCO

**4 Alan Thomson**  
Chairman, Hays plc

**5 Georges Chodron De Courcel**  
Deputy Chief Executive Officer,  
BNP Paribas

**6 Lalita Gupte**  
Chair, ICICI Venture Funds

**7 Katrina Landis**  
CEO and Group Vice President  
of BP Alternative Energy

**8 Jean-Martin Folz**  
Director

**9 Patrick Kron**  
Chairman & CEO

**10 James William Leng**  
Chairman, AEA Investors Europe

**11 Philippe Marien**  
Representative, Bouygues SA

**12 Pascal Colombani**  
Senior Advisor, A.T. Kearney

**13 Gerard Hauser**  
Company Director

**14 Klaus Mangold**  
Supervisory Board Chairman,  
Rothschild GmbH (Frankfurt)



## EXECUTIVE COMMITTEE (at 31 March 2011)

- 1 Patrick Kron**  
Chairman & CEO
- 2 Henri Poupart-Lafarge**  
Executive Vice-President,  
President of Grid Sector
- 3 Nicolas Tissot**  
Chief Financial Officer
- 4 Patrick Dubert**  
Chief Human Resources Officer
- 5 Philippe Joubert**  
Executive Vice-President,  
President of Power Sector
- 6 Philippe Mellier\***  
Executive Vice-President,  
President of Transport Sector

### Responsibilities:

**Defining strategy and general policies**, setting corresponding operational objectives, notably budgets and financial targets, in addition to allocating financial resources.

**Upholding relations with the Board of Directors** as well as with the external environment and Alstom's partners (shareholders, financial community and the public).

**Undertaking any action needed to implement the strategy** that cannot be efficiently transferred to the Sectors.

**Enhancing the value of human resources** particularly improving the management of career development and succession planning across the Group, general employee relations, global compensation and benefit-related guidelines and policies.

\*Philippe Mellier will leave Alstom on 1 July 2011.

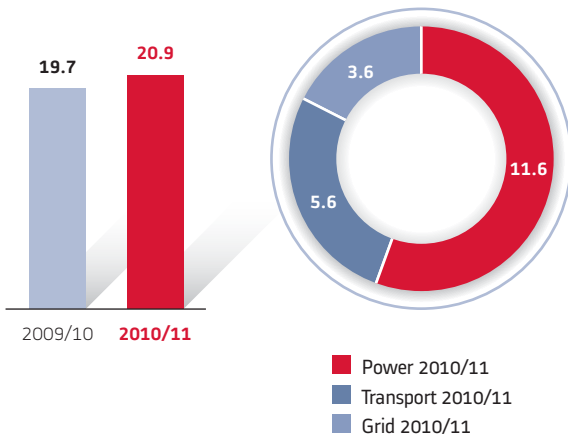


## Orders are up

### SALES +5%

In billions of euros.

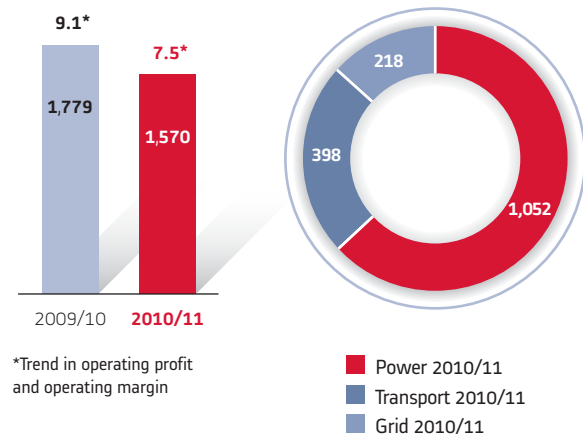
Power sales were down 16% owing to low order intake in previous periods. Transport sales fell slightly, while Grid posted better-than-expected sales for its first ten months.



### OPERATING PROFIT -12%

In millions of euros.

After setting a record in 2009/10, operating profit was down, in line with forecasts. The operating margin was 7.5%.

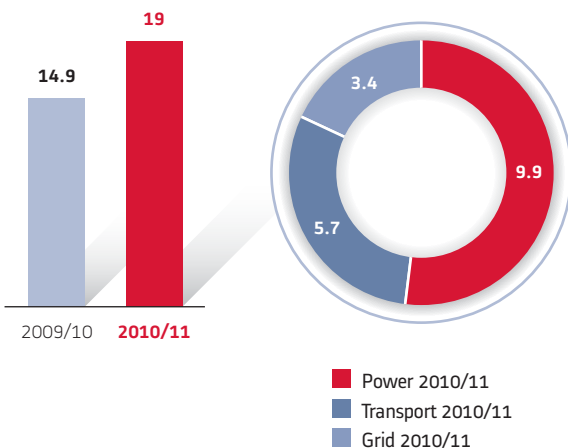


\*Trend in operating profit and operating margin

### ORDER INTAKE +28%

In billions of euros.

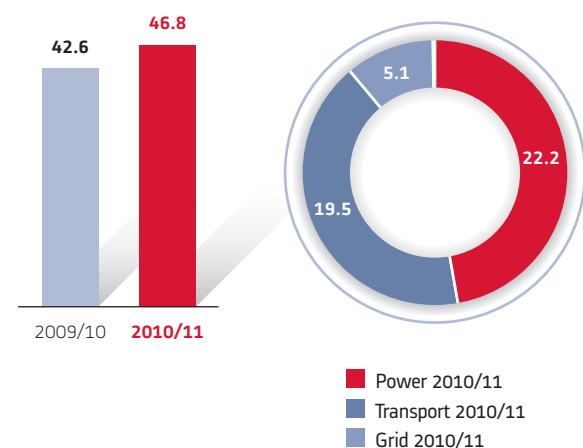
Orders rebounded significantly in the second half of the financial year owing to numerous successes in emerging countries.



### ORDER BACKLOG +6%

In billions of euros.

At 31 March 2011, the order backlog represented 26 months of sales.

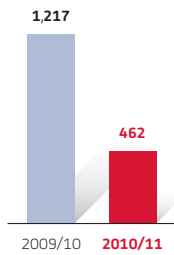


## Alstom reaffirms its operating margin target of **7-8%** for 2011/12

### NET PROFIT – 62%

In millions of euros.

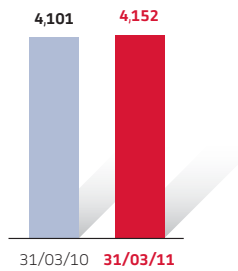
The net profit for the year includes a negative impact specifically for the acquisition of Grid and for significant restructuring costs tied to workforce adjustment plans in Europe and North America.



### SHAREHOLDERS' EQUITY

In millions of euros.

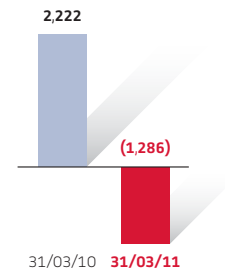
Shareholders' equity was largely unchanged after the impact of changes in retirement funds and payment of the 2009/10 dividend.



### NET CASH

In millions of euros.

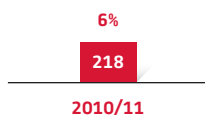
The net debt position reflects financing of the Group's acquisition of Grid (€2,351 million), negative free cash flow and payment of the dividend.



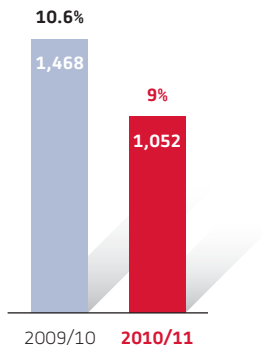
### OPERATING PROFIT AND MARGIN PER SECTOR

In millions of euros.

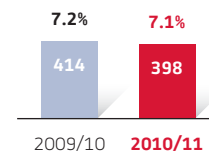
#### GRID



#### POWER – 28%



#### TRANSPORT – 4%

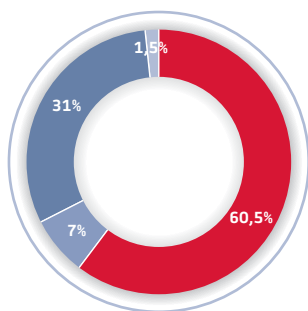


## A CONSTANT DIALOGUE WITH SHAREHOLDERS

### SHARE OWNERSHIP

at 31 March 2011

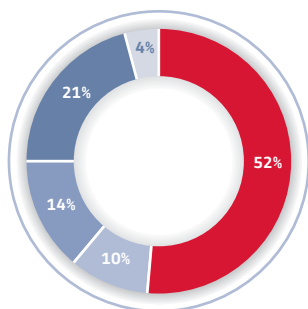
The Group's share capital is held by approximately 260,000 shareholders as of 31 March 2011 (source: Euroclear France).



- Institutional investors
- Individual shareholders
- Bouygues
- Employees

### CAPITAL STRUCTURE BY REGION

at 31 March 2011



- France
- United Kingdom & Ireland
- Rest of Europe
- Americas
- Asia & Middle East

The role of the Investor Relations team is to provide the entire financial community – individual shareholders, institutional investors and financial analysts – with complete, regularly updated information on the Group's strategy and its implementation.

### Active communication policy for individual shareholders

Besides the Annual General Meeting, Alstom is developing opportunities to meet and communicate with its individual shareholders. During financial year 2010/11, the Group took part in information meetings in Strasbourg and Tours in France, organised in association with FFCI (the French Investment Club Federation) and CLIFF (the French Association for Investor Relations). In 2011, the Group will meet with its shareholders in Nice and Lille. Alstom also participates in the annual Actionaria exhibition in Paris, which welcomes over 30,000 visitors every year.

During the 2010 exhibition, shareholders had the chance to meet the Chairman and Chief Executive Officer of the Group, as well as the Investor Relations team and members of the Communications department. The Group also organises site visits in France to give individual shareholders better insight into the way the business works. In 2010/11, one group of shareholders toured the TGV assembly plant in La Rochelle, and another went to Belfort, Alstom's original site, to visit a workshop for nuclear turbines and generators. A third group toured a facility for hydro turbines in Grenoble.

In addition to its periodical financial publications, Alstom offers its shareholders a range of information tools, including the shareholders' letter which is published twice a year in conjunction with the main financial dates of the Group. All documents can be obtained upon request. The Investors section on Alstom's website also provides shareholders with all the financial documentation, as well as debt information and a calendar of financial events ([www.alstom.com](http://www.alstom.com), Investors section).

### Relations with institutional investors and financial analysts

Roadshows are organised several times a year in major American and European financial centres (United Kingdom, France, Switzerland, Germany, Italy...). Information meetings (presentations on Sectors, strategy, etc.), as well as individual meetings with investors and analysts take place throughout the year. Each year, the Group organises an analysts' and investors' day to present its strategy and activities. This year's event, dedicated to the new Grid Sector, was held at a manufacturing plant for gas-insulated substations in Aix-les-Bains, France. The Group also participates in theme-based conferences organised by brokerage firms in France, the UK and the USA. In 2010/11, the topics for these conferences included power generation equipment and the rail market.

### Stock market news

On 31 March 2011, the share price stood at €42.57 and the stock market capitalisation of the Group was €12.3 billion.



## THE ALSTOM SHARE at 31 March 2011

**Listed on:**  
NYSE Euronext

**ISIN code:** FR0010220475

**Ticker symbol:** ALO

**Par value:** €7

**Number of shares:**  
294,419,304

**Market capitalisation:**  
€12,284,645,459.00

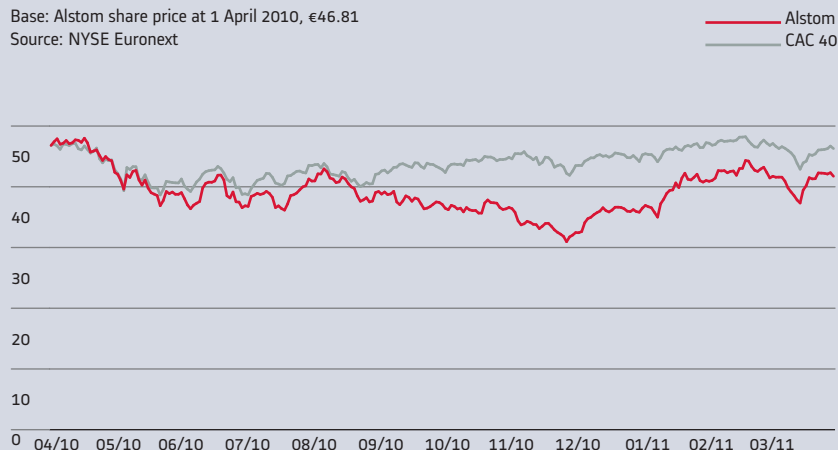
**Main indexes:**

- CAC 40
- SBF 120
- Euronext 100
- DJ Euro Stoxx 50

### Share price performance (in €)

April 2010/April 2011

Base: Alstom share price at 1 April 2010, €46.81  
Source: NYSE Euronext



#### Investor Relations contacts

Emmanuelle Châtelain – Vice President  
Juliette Langlais – deputy  
Emmanuelle Douëzy – manager

#### Alstom

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**Toll free number for France: 0800 50 90 51,**  
From Monday to Friday, 9am to 7pm CET.  
From outside France, you can contact the team  
by dialling +33 1 45 30 85 75 (calls will be charged  
at your local operator's standard international rate).

#### Dividend

For financial year 2009/10, Alstom paid a dividend of €1.24 per share on 29 June 2010.

The dividend proposed at the Annual General Meeting on 28 June 2011 amounts to €0.62 per share. This represents a distribution rate of 40% of the Group's net profit, compared to 30% for the prior year. The payment date has been fixed for 5 July 2011.

#### Keeping investors informed [www.alstom.com](http://www.alstom.com)

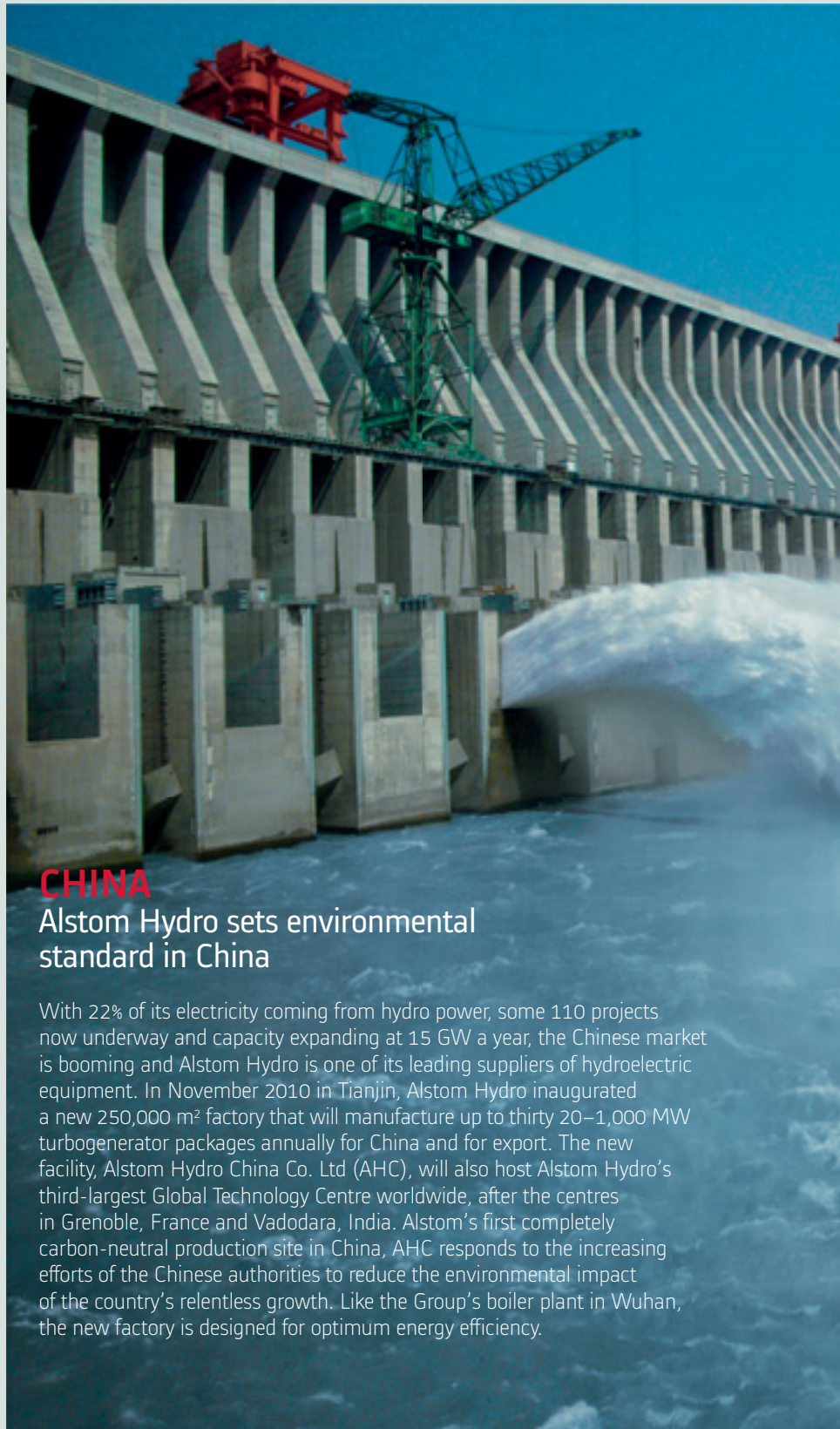
The Investors section of the Alstom website has been specially designed to provide shareholders with easy access to all the Group's financial communications: share price quotes, downloadable historical data for the past five years, financial results, presentations, Activity Reports, shareholders' letters, dates of important meetings, frequently asked questions, as well as a service that dispatches press releases by e-mail. Printed copies of the Activity Report for 2010/11 can be obtained in French and English by sending a request to the Investor Relations department. ●





# THE YEAR IN REVIEW 2010/11

Activity Report



## CHINA

### Alstom Hydro sets environmental standard in China

With 22% of its electricity coming from hydro power, some 110 projects now underway and capacity expanding at 15 GW a year, the Chinese market is booming and Alstom Hydro is one of its leading suppliers of hydroelectric equipment. In November 2010 in Tianjin, Alstom Hydro inaugurated a new 250,000 m<sup>2</sup> factory that will manufacture up to thirty 20–1,000 MW turbogenerator packages annually for China and for export. The new facility, Alstom Hydro China Co. Ltd (AHC), will also host Alstom Hydro's third-largest Global Technology Centre worldwide, after the centres in Grenoble, France and Vadodara, India. Alstom's first completely carbon-neutral production site in China, AHC responds to the increasing efforts of the Chinese authorities to reduce the environmental impact of the country's relentless growth. Like the Group's boiler plant in Wuhan, the new factory is designed for optimum energy efficiency.

Key events for 2010/11 reflect a resilient, flexible strategy designed to keep pace with fast-changing global markets.



ALSTOM IS A LEADING PLAYER IN THE CHINESE HYDRO SECTOR, WITH PROJECTS INCLUDING THE THREE GORGES DAM.

## Strategic rail agreements

**Alstom Transport and two Chinese companies**, CNR Corporation Ltd. and Shanghai Electric Group Co., signed a strategic partnership agreement in October 2010. The goal: to find new areas of cooperation in key rail transport markets, to expand China's network and to identify joint export markets. Now present in China for over 50 years, Alstom Transport relies on five joint ventures, three manufacturing partnerships and eight design offices to supply metros, locomotives and passenger trains.

### In brief...

**Yunnan:** Alstom Power will supply three 600 MW turbine generator units to the new Guanyinyan hydropower station in Yunnan province. Alstom has already installed half of the 43 GW of capacity ordered previously.

**Beijing:** Having provided equipment for Line 15 of Beijing's metro, Alstom will now supply Line 7 with Optonix traction systems (specially designed by Alstom for the Chinese market) and

cutting-edge Urbalis signalling technology.

**Shanghai:** The Shanghai metro, one of the world's largest, also returned to Alstom and the Urbalis CBTC system for the second phase of Line 13. Alstom supplied 1,000 of the 2,400 cars now in service, including Metropolis train sets delivered in July 2010, in time for the World Expo opening ceremony.



## ASIA

### Power: competitive expertise

Three major contracts in Asia underscore Alstom Power's expertise in integrated power plants and maintenance. In **Singapore**, Power won two orders to equip and maintain two combined-cycle plants with capacities of 400 and 800 MW

generated by GT24 gas turbines. In **Taiwan**, Ever-Power IPP Ltd. signed an extension of Power's contract for full operation and maintenance of the 980 MW Hai Fu combined-cycle plant. Built in 1996, the Hai Fu plant features four GT24 turbines.



## CHINA

### Alstom Grid installs tomorrow's grid

**HVDC:** between November 2010 and February 2011 – less than three months – poles 1 and 2 of the Ningdong-Shandong HVDC (high voltage direct current) connection began commercial operations. Run by the state-owned enterprise SGCC, the 1,335 km, 660 kV line links coal-fired plants in north central China with the city of Tsingdao on the east coast. It is also the first very high voltage line to incorporate Alstom's new thyristor valves, the most powerful in the world.

In March 2011, Alstom Grid inaugurated its new China Technology Centre in Shanghai. The new facility will research, develop and test ultra high voltage transmission and smart grid technologies.

### In brief...

**Thailand:** In September, the Bang Bo power plant completed 221 days of continuous operation, setting a new world record for GT24/GT26 turbines.

**China:** Measuring 10 metres in diameter and 2.53 metres high and weighing 110 tonnes, this ring gate for the Ahai

hydroelectric power station is the world's largest – and with its self-closing hydro system designed by Alstom R&D teams in France, it is also the most innovative.

**Vietnam:** This 1,000 tonne rotor (nearly 16 metres in diameter), was installed last August in the 2,400 MW Son La hydroelectric

power station in northwest Vietnam. Delivered by Alstom Hydro's Tianjin plant in China, the rotor is the world's largest, and Son La is Southeast Asia's biggest hydroelectric power station.

**Singapore:** Having built the automatic Circle Line metro and its 40 Metropolis train sets, Alstom delivered a new 11 km section

in April 2010, five months ahead of schedule. When full service begins in October 2011, the Circle Line will be the world's longest fully automatic metro line, with 33 km of in-tunnel track.





## INDIA Urgent demand for electricity

**Power:** GVK Industries returned to Alstom Power for the design and construction of the Jegurupadu III combined-cycle plant in Andhra Pradesh, expected to be among the most efficient in the country.

**Grid:** Alstom Grid leads the 765 kV market and is setting the benchmark for ultra high voltage technology, with 12 of the 25 765 kVac substations in India, completed or currently under construction. Last year, Alstom also successfully installed an ultra high voltage 765 kV transformer for Lanco Infratech, the first to be developed locally in India.

### //////////////////////////////////// In brief...

**4 Gujarat state** has inaugurated India's first combined-cycle plant with GT26 technology. Alstom marked the

dedication of the 370 MW plant by donating €18,000 to the Kanya Kelawani project, which finances education for girls in Gujarat.

## First Alstom metro in India

**5 Transport:** After supplying signalling systems for the Delhi and Bangalore metros, Alstom has now been selected to provide rolling stock for the metro in Chennai (formerly Madras). The 42 train sets – a total of 168 stainless steel cars – will feature air conditioning and a regenerative braking system. After the first units are manufactured by the Alstom plant

in Valenciennes, France, an Indian production site will complete the order, with deliveries between 2012 and 2015. The contract also includes an option for 16 additional units. With the Indian government set to invest some €40 billion to modernise the country's rail infrastructure, the Chennai order is a promising breakthrough for Transport in this enormous market.



## FOCUS: RUSSIA

Step by step, Alstom has forged closer relationships in the energy and transport sectors in Russia and the CIS countries – a strategy that is now generating major contracts and cooperation agreements that will modernise infrastructures in the world’s largest country.



**1 Under a strategic alliance with Alstom holding a 25% stake in its partner’s share capital,** Alstom and Transmashholding (TMH) have signed two very large contracts to deliver a total of 495 electric locomotives:



1

200 for Russian Railways (RZD) and 295 for Kazakh Railways (KTZ). Two 50-50 joint ventures have been created to fulfil the RZD order: one of the companies will develop a new version of Alstom’s EP20 – a 7,200 kW, dual-voltage, triple-bogie passenger locomotive – and the other will develop new-generation Alstom traction systems. Both are located on TMH’s production site in Novocherkassk, near Rostov-on-Don **2**.

For the Kazakhstan contract, Alstom and TMH have set up a joint venture with KTZ. The order consists of two parts: 200 Prima II freight locomotives, among the most powerful in the world; and 95 Prima II

passenger locomotives, which will allow Kazakhstan’s rail traffic to reach 200 km/h. The locomotives will be manufactured in a new factory currently under construction near Astana, the Kazakh capital. Alstom’s site in Belfort, France will deliver the first 70 units of both models. More than 200 people will be working on the project in Europe. These three types of locomotives are all designed to operate in temperatures as low as –50°C and to run on the 1,530 mm track gauge that is used in Russia and as well as in the other CIS countries.





## In brief...

**4 On 12 December, Alstom's Allegro train** – a “polar” version of the Pendolino – began running between Helsinki and Saint Petersburg, slashing travel time by two hours to

3 hours 30 minutes. Once Russian infrastructure work is complete, the trip will be reduced to just three hours. Adapted for Russia's track gauge, the Allegro can also tolerate extreme cold.



## Opening the Russian power market

Following Transport, Power and Grid signed a number of agreements with Russian companies last November:

**Nuclear:** agreements with Rosatom, Russia's federal agency for nuclear power, and Alstom-Atomenergomash (AAEM), a joint venture set up in 2007. Under the agreements, Alstom will help broaden Russia's nuclear programme and modernise its power plants, producing Arabelle steam turbines, the most powerful in the world, in local plants and working with its partners to design conventional islands.

**Hydropower:** cooperation agreement with RusHydro JSC, Russia's biggest hydropower producer, to rebuild, modernise and maintain power plants. Early projects will include the Kubansky cascade power plant in southern Russia and the new turbine pump power station in Zelenchuk. Russia plans to increase hydropower production 60% by 2020 and to double it by 2030.

**5 Thermal power:** memorandum of understanding with Inter Rao UES OJC, a leading Russian power supplier, to set up two joint ventures to provide control systems, site security systems and other products and services. Under a separate cooperation

agreement with state-owned corporation Rostekhnologii, the Group will also supply coal-fired power plants featuring Alstom's market-leading steam plant technology.

**6 Power transmission:** cooperation agreement between Alstom Grid and Russian grid operator FGC UES on research to make Russian facilities more efficient, more reliable and more secure. Locally manufactured Alstom equipment will enable HVDC (high voltage direct current) transmission across very long distances.



## LATIN AMERICA BRAZIL

**Anniversary:** On 30 November 2010, Alstom celebrated 55 years in Brazil. With over 5,000 employees in seven locations, Alstom Brazil has supplied 35% of the country's hydropower equipment and 50% of its power generation capacity, as well as half the metros now operating in South America. Grid is also the leading supplier of high voltage power transmission technology. Recent projects include the world's longest 600 kV, high voltage direct current power transmission line – totalling 2,375 km – for the Rio Madeira interconnection **2**.

**Hydro:** As the leader of a consortium that includes Germany's Voith and Austria's Andritz, Alstom will equip power plants at the Belo

Monte dam in northern Brazil, supplying seven of fourteen 611 MW Francis turbogenerator packages and switchgear for all 14 packages. Alstom's share of the contract totals some €500 million. At 11.2 GW, Belo Monte will be the world's third largest hydropower plant, after the 18.2 GW facility at Three Gorges and the 12.6 GW Itaipu power station, both of which contain Alstom equipment manufactured in Brazil.

**1 Wind:** In March 2011, Alstom laid the first stone of a new wind turbine assembly site in the Carnacari industrial park in Bahia state. Production is scheduled to begin at the end of the year. The first order consists of five 1.67 MW ECO 86 turbines for the three wind farms in the Brotas complex.



### In brief...

**2 Santo Domingo:**

Having equipped Line 1 of the Dominican metro, Alstom has been chosen to supply 15 new three-car Metropolis train sets for Line 2. The contract also includes maintenance and an option for six additional train sets.

**Panama:** Alstom was awarded a turnkey contract for engineering, integration and commissioning of the electro-mechanical works for Panama's first metro. Under the agreement, the Group will also supply 57 Metropolis cars, substations and the train control system.

**Chile:** With Alstom equipment accounting for 33% of Chile's hydropower market, Power has now been chosen to supply the country's Angostura plant with two 136 MW Francis turbogenerator packages, one 45 MW Francis turbine and related equipment. All the equipment will be manufactured at Alstom's Taubate factory in Brazil.

**Mexico:** Alstom will retrofit two 300 MW steam turbines at the Manzanillo power plant, extending their lives by 25 years and enabling the plant to convert from fuel oil to combined-cycle gas-fired operations.





## NORTH AMERICA UNITED STATES

**High voltage:** Alstom Grid's HVDC converter technology has been chosen for the Tres Amigas SuperStation in New Mexico, a pioneering power transmission hub that will link America's three primary transmission grids: Eastern, Western and Texas. Using its cutting-edge voltage source converter (VSC) technology, Grid will design a system to manage the interconnection of various sources of renewable energy: wind, solar and geothermal energy.

**Investment:** in March 2011, Alstom Grid further enhanced its solid US presence by inaugurating an ultramodern factory in Charleroi, Pennsylvania. The new plant will manufacture disconnectors tailored to the American market.

**Suburban:** Thanks to its expertise in overhauling US rail infrastructure, Alstom Transport has won a contract to modernise the 120 train sets that link Philadelphia to nearby suburbs in southern New Jersey.

**Certification:** Alstom Transport's new site in Delaware, on the US East Coast, earned LEED Silver certification for its environment-friendly design, construction and operations.

**Smart grids:** Alstom is participating in a smart grid demonstration project designed to efficiently integrate distributed energy resources – including renewables, power storage and electric vehicles – into the grid. Funded by the US Department of Energy, the project was launched in November 2010

in Charlotte, North Carolina. Grid is contributing its integrated distribution management system (IDMS), which enables integration and real-time monitoring of the project's numerous resources.

**Solar:** Alstom entered the solar power market in May 2010 by taking a stake in BrightSource Energy, a specialist in thermal plants powered by solar towers. Now Alstom has joined its new partner in signing an agreement to supply solar power plants in the Mediterranean basin and Africa.

**Acquisition:** Alstom Grid has acquired the US company Utility Integration Solutions (UISOL), one of the world's leading specialists in integrating utility systems and managing demand for electricity.

**Smart grids:** The PNW-SGDP demonstration project is testing new combinations of intelligent solutions in households and on the power grid for five US states – Washington, Oregon, Idaho, Montana and Wyoming. Alstom Grid is contributing its control system, which provides imaging of renewable energy sources and real-time rate information.

## CANADA

**Metro:** Bombardier and Alstom will supply the Montreal metro with 468 cars to replace its MR-63 fleet, made by the same two providers and in service since 1966. The trains will be built at Bombardier and Alstom facilities in Quebec. The first prototype will be ready in mid-2013, with deliveries planned from 2014 to 2018.



## AFRICA AND THE MIDDLE EAST



1

**Abu Dhabi:** Abu Dhabi Oil Refining Company has awarded Alstom Grid a contract to provide a reliable energy supply system for the Takreer refinery. Grid also won a turnkey contract from Transco, a subsidiary of the Abu Dhabi Water & Electricity Authority, to supply a gas-insulated substation that will provide power to the rapidly growing Northern Emirates region.

**1 Saudi Arabia:** In April 2010, seven months ahead of schedule, Alstom Power delivered the first of three steam turbine groups for Phase III of the Shoaiba oil-fired power plant on the Red Sea coast. The Group's factory in Belfort, France built the units from components manufactured in Elblag (Poland), Bexbach (Germany) and Birr (Switzerland). Once Phase III is complete, the Shoaiba station will have a total of fourteen 397 MW units.

**2 Morocco:** On 10 December, Morocco became the first African country to join the world of high-speed rail, awarding Alstom a contract for 14 TGV Duplex train sets. Beginning in late 2015, the new trains will run between Tangier and Casablanca, reducing travel time from 4 hours 45 minutes to 2 hours 15 minutes, and raising the line's capacity from 4 million to 10 million passengers annually.

**Alstom Grid** has won a contract to provide Egypt with a new energy management system, reinforcing its leading position in the Middle East, where the company manages more than 70% of regional electricity transmission. Alstom Grid technologies



THIS HYDROELECTRIC POWER PLANT IN BUJAGALI, UGANDA, IS A MAJOR PROJECT FOR ALSTOM POWER IN AFRICA.



2





also manage over 70% of electricity transmission on the African continent, including the national grids of Burkina Faso, Ethiopia, Ivory Coast, Senegal, South Africa, Tanzania and Tunisia.

**Nigeria:** Alstom has been chosen to supply the Port Harcourt power plant with a GT13E2 gas turbine/160 MW generator package. The equipment will be manufactured at the Group's sites in Birr (Switzerland), Wroclaw (Poland) and Mannheim (Germany).

**Tanzania:** Alstom Grid won a contract to supply 24 new substations and to retrofit and expand existing substations as part of an upgrade to Tanzania's power grid. Grid will also provide a connection between the mainland and the island of Zanzibar.

## AUSTRALIA

**New South Wales:** Australian operator, RailCorp, has awarded Alstom a series of contracts to upgrade the safety system for Sydney's CityRail network. Though tailored specifically to CityRail's requirements, the automatic train protection (ATP) speed control system is based on Level 1 of the European Train Control System (ETCS), which has a well-established track record in Europe. In all, Alstom will supply systems for 160 trains: the first 50 will begin running in 2013. The agreement also includes creation of a pilot line for ETCS Level 2, allowing the Australian network to move towards high-speed trains.



## EUROPE

**1 Carbon capture:** EDF has tasked Alstom and its US partner, Dow Chemical, with constructing a demonstration unit to study advanced amine-based carbon capture technology at Unit 4 of its coal-fired power plant in Le Havre, France.

**Regional trains:** Under the third and fourth options of the major contract with the French regions, Alstom Transport received an order from three additional regions for 24 more trains. 166 train sets have been ordered since 2009, and total volume could reach 1,000 trains, bringing the contract's value to more than €7 billion.

**Nuclear:** In December 2010, Alstom Power won contracts from EDF to retrofit and maintain French nuclear plants. The order is part of an EDF campaign to renovate existing facilities.

**Connecting offshore wind power:** In Germany, Alstom Grid is supplying an offshore grid connection for an 80 wind turbine farm situated in the Baltic Sea, 30 km off the coast. Their innovative self-installing floating substation platform dramatically cuts installation costs, avoiding the need for expensive offshore cranes.



## INNOVATION

### World's largest wind turbine blade

**2 Record:** A record-breaking blade will be designed and built by LM Wind Power, the leading blade supplier, specifically for Alstom's new-generation 6 MW offshore wind turbine. LM Wind Power's latest GloBlade® design delivers an additional 4-5% of annual energy production compared to standard designs. Two prototypes will be installed in 2011 and 2012.





3

**Germany:** Deutsche Bahn chose Alstom to equip 121 of its high-speed train sets with Atlas, Transport's European Rail Traffic Management System (ERTMS) solution. These trains are in service in Germany, Austria and Switzerland. The contract, signed in January 2011, follows a 2008 agreement covering 17 trains running between Frankfurt and Brussels.

**Spain:** In March 2011, Gas Natural Fenosa, a leading multinational in gas and electricity, awarded Alstom Power a 20-year contract to operate and maintain its gas-fired combined-cycle power plant in Cartagena, Spain. The 400 MW plant was originally built and commissioned by Alstom in 2006. In July 2010, Alstom signed similar contracts with Gas Natural Fenosa for two other combined-cycle plants near Barcelona and Cadiz. Alstom holds 20% of Spain's market for power generation equipment, with 5 GW of installed capacity. Services account for around one third of Power's business.

**Romania:** In January 2011, Alstom's chilled ammonia process was selected for a carbon capture demonstration unit at the coal-fired Turceni power plant. The Alstom technology will capture CO<sub>2</sub> from one of the plant's units and transport it via pipeline to a storage site. Alstom is conducting the feasibility study for the project, which was launched by the Romanian government.

**United Kingdom:** One of the Virgin high-speed trains serving the West Coast Main Line has a special new look. To recognise Alstom for the high-quality maintenance that has made the line a success, the train displays the Alstom logo at the front and back. The "Alstom Pendolino" was unveiled during a ceremony on 16 September 2010.

**Sweden:** Stockholmståg, which operates commuter trains serving the Swedish capital, has awarded Alstom a five-year contract for maintenance of 87 Alstom Coradia Nordic trains and 52 additional trains made by the Swedish manufacturer, Asea.

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**In brief...**

**Turkey:** In 2010, Alstom Grid's Gebze site produced the world's largest electric arc furnace transformer for the Iskenderun iron and steel works.

The order strengthens Grid's dominant position as a manufacturer of special transformers for a wide range of industrial applications.



4





n<sup>o</sup> 1

worldwide

Shanghai Electric and Alstom  
are creating the world's  
number one supplier of boilers  
for coal-fired plants.

Meeting complex needs  
in a changing world

**A WORLD OF NETWORKS** A broader approach to partnerships –  
with customers, suppliers and research institutes, among others –  
is strengthening Alstom's commercial positioning and scope for innovation.



# A NEW WORLD

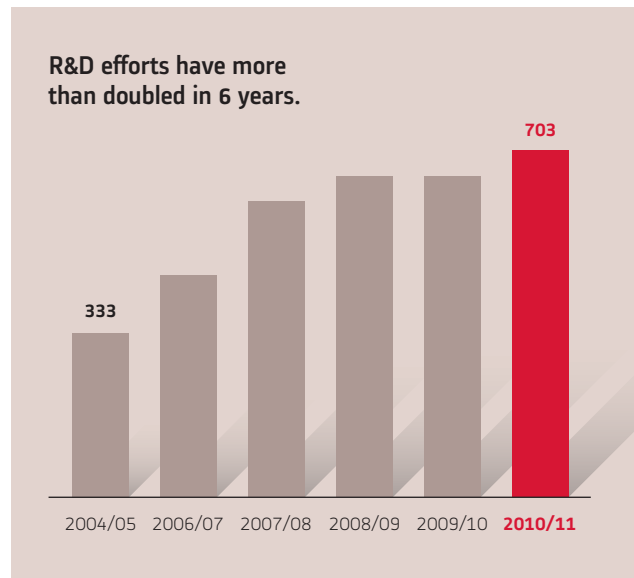
As global markets recover unevenly from the crisis, they are changing dramatically. Demand has changed. Intent on maximising their investments over the long term, customers increasingly prefer clean, energy-efficient solutions that meet local needs and minimise environmental impact. Competition has changed. New contenders, primarily from Asia, have broadened the field and turned up the competitive pressure. To meet the challenges of this new world, the Group is sharpening its strategy to become more agile, more responsive and more competitive.

# COMPREHENSIVE, INNOVATIVE SOLUTIONS FOR SPECIFIC NEEDS

1

## Investing steadily in R&D

to maintain its strategic edge over competitors, Alstom is generating a broader range of solutions. These include offering products and services tailored to local needs, like the Alstom metros supplied to India, Brazil and Panama; developing eco-friendly products and systems such as wind energy, carbon capture, and tidal power; and implementing intelligent, high-tech solutions like rail signalling systems, smart grids, and HVDC technologies.



2

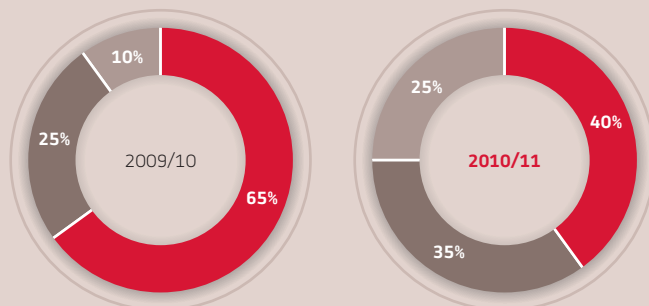
## A STRONGER PRESENCE IN FAST-GROWING COUNTRIES

To stay close to customers in high-growth regions, Alstom is continuing to open new industrial sites and R&D centres, expand its teams and encourage reliance on local expertise. Staying close to customers strengthens the company’s positioning and branding in the key markets of today and tomorrow.

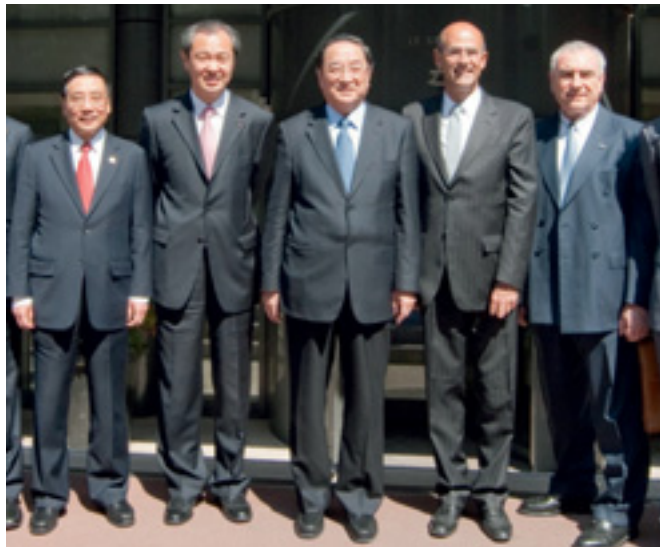
### New orders by destination

In 2010/11, emerging countries accounted for **60%** of new orders, up from **35%** in 2009/10.

- Developed countries
  - BRICs\*
  - Other emerging countries
- \*Brazil, Russia, India, China



## MORE PARTNERS, BROADER RELATIONSHIPS

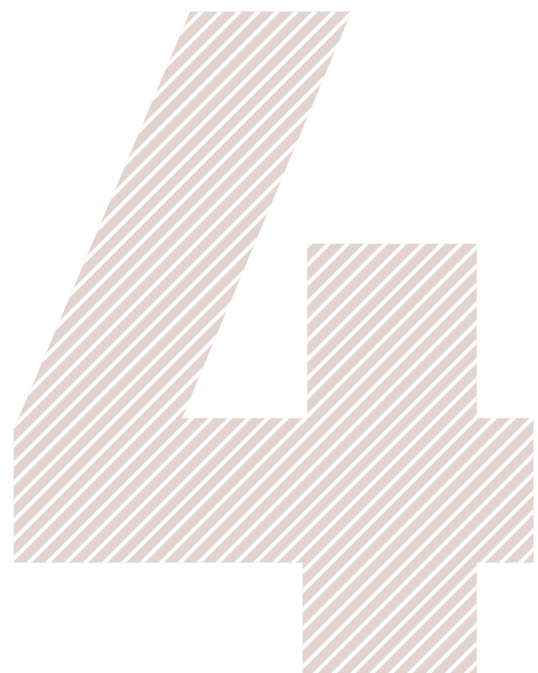


ON 20 APRIL 2011, ALSTOM AND SHANGHAI ELECTRIC ANNOUNCED THE CREATION OF A JOINT BOILER-MAKING COMPANY.

**A vital asset in accessing markets and expanding Alstom's presence,** partnerships have long been a key aspect of the Group's strategy. Alstom has recently signed agreements with leading corporations, including Russian rail group, TMH, Brazilian hydroelectric supplier, Bardella, Indian steam turbine producer, BFL, and Chinese boiler manufacturer, Shanghai Electric Company.

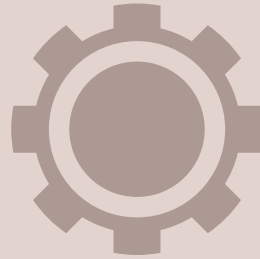
## A CONSTANT QUEST FOR COMPETITIVE EDGE

**Quality is Alstom's watchword,** from design and manufacturing to services and project execution. The company maintains its high-level effort by focusing on operational priorities: gradually streamlining organisational structures and decision-making processes, reducing production costs, and maintaining effective controls are all part of the Group's quest for excellence.





# POWER



Demand for power-generating equipment hinges on a number of complex, interconnected factors. These include not

just economic growth, environmental concerns and aging power plants, but also volatile fuel prices, security of supply, and the economic efficiency of producing electricity. To meet the world's substantial demand for abundant, clean, reliable power, energy strategy is moving increasingly towards optimised production and a broad range of fossil and renewable sources. The power industry is entering a new era, and Alstom is ready to meet its changing needs.



AT THE LING AO NUCLEAR  
POWER PLANT (CHINA)

## EMERGING COUNTRIES GENERATE NEARLY 55% OF ORDERS

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**47,000** employees  
worldwide.

**€9.9** billion in orders,  
a rise of 5%.

**9%** operating margin.

In the wake of the economic and financial crisis, the global power market has still not returned to 2008-2009 levels and its geographic distribution has changed significantly.

The dominant influence is a sustained return to growth in rapidly developing countries, primarily in Asia, and their substantial demand for power generation equipment. Trends vary by region: while Asian demand focuses on power from coal, gas and other fossil fuels, Latin America is moving toward hydro and other renewable energies.

In the mature countries, markets have yet to recover: growth is weak, power consumption remains below pre-crisis levels and investment in new thermal power plants is still sluggish. In October 2010, Alstom Power responded by announcing a plan to adjust operations that produce new equipment for coal and gas-fired plants. The Sector expects to eliminate 4,000 positions in Europe –

primarily in Switzerland and Germany – and in the United States before March 2012.

As power plants age in mature markets in Europe and the United States, however, increasing environmental concerns and tighter regulation are combining to generate sustained demand for equipment updates that should exceed pre-crisis levels. Against this backdrop of uneven recovery, the key development for Power was a strong turnaround in orders, which reached €6.2 billion for the second half of the year, nearly double the €3.6 billion booked in the first half. Overall, the Sector posted sales of €11.6 billion – down 16% from 2009/10 levels – owing to the lacklustre orders for the earlier period. Power's €1,052 billion operating profit and 9% margin are in line with forecasts. ●

WITH TWO ALSTOM GT26 GAS TURBINES, THE EMSLAND COMBINED-CYCLE PLANT IN GERMANY HAS TOTAL CAPACITY OF 876 MW.



## A FULL RANGE OF SOLUTIONS



### MORE THAN 100 GT24/GT26 TURBINES SOLD

**Launched in 1995 and completely updated since,** Alstom's high-power GT24/GT26 gas turbines have reached a milestone: over 100 units have been sold worldwide, some twenty of them in the past four years. Together, they supply around 44 GW of electricity and have logged a combined 650,000 hours of service. The GT24 turbine is designed for the 60 Hz market, and the GT26 for the 50 Hz market.

Alstom Power offers a range of power generation solutions for every energy source, from coal, gas and other fossil fuels to nuclear power and renewables – hydropower, wind, geothermal, biomass, solar and soon, tidal energy. Equipment includes turnkey power plants, turbines, generators, boilers and emission control systems, and services range from facility updates to maintenance to operational support.

#### **Alstom gas-fired plants generate over 150 GW of power worldwide**

Alstom Power has extensive experience with both single- and combined-cycle gas-fired power plants. Designed for a wide range of applications, including cogeneration, urban heating and desalinisation, Alstom turbines and other key components are also used in heavy industry applications such as aluminium and steel production. With its extensive portfolio of model power plants, Alstom can quickly identify customer needs and supply reliable, clean, customised solutions that are effective and respond to requirements for increasing flexibility

of operation – all to short deadlines. In addition, Alstom can convert power plants from single- to combined-cycle. Power's gas turbines range from the 113 MW GT11 N2 to the 296 MW GT26. In combined-cycle configurations, they are paired with STF steam turbines ranging from 100 to 400 MW. In the generator market, Alstom Power maintains its lead with a powerful, reliable range of products that deliver exceptional yield and unparalleled simplicity of use and maintenance: these include the 340 MW air-cooled Topair turbogenerator, the world's largest and most advanced, and the hydrogen-cooled Topgas, which ranges from 300 to 450 MW. Alstom also has unprecedented experience in heat-recovery steam generators: Power has supplied more than 600 units with capacities above 50 MW for use with gas turbines in combined-cycle power plants.

#### **30% of boilers worldwide**

With abundant reserves well distributed around the globe, coal is still the most widely used fuel for power generation. Alstom's mastery in this market





## ARABELLE IN CHINA

**Unit 3 of China's Ling Ao II power plant**, which began commercial operation in September 2010, features a 1,080 MW Arabelle steam turbine, giving the plant significantly better performance than Ling Ao I. Yield now exceeds originally guaranteed levels.

is unchallenged: worldwide, some 30% of boilers now installed or under construction use Alstom technology to generate more than 800 GW of power. These supercritical and ultra-supercritical boilers, which burn all types of coal, fuel oil, gas and biomass, offer both high yield and the lowest emissions of nitrogen oxides, sulphur dioxide, particulates and greenhouse gases. Recent highlights include the 1,000 MW Manjung turnkey project, ordered in March 2011 by Malaysian operator, TNB Janamanjung Sdn Bhd, which will be the first coal-fired supercritical power plant in Southeast Asia. A new boiler factory in Wuhan, China, which began operations in 2010, and a strategic partnership signed in April 2011 with Shanghai Electric will help to consolidate Alstom's worldwide leadership in this market segment. At the same time, more than 20% of the world's turbines were installed by Alstom: Power's STF turbines, ranging from 15 to 1,200 MW, deliver a combined total of 500 GW of power from around a hundred turnkey power plants – steam, combined-cycle and cogeneration – plus other facilities that run on renewable energies. Around 17% of that total comes from a fleet of approximately one thousand small steam turbines with capacities below 100 MW, used with renewable

energies and for a variety of other applications.

For coal-fired plants, Alstom's turbogenerators deliver capacities ranging from 40 to 1,400 MW: the largest include the hydrogen-cooled Gigatop 2-pole for maximum reliability.

Power's Plant Integrator concept offers customers an extensive range of integrated, custom solutions, from engineering to building and commissioning power facilities. And its new steam power plants are now designed for carbon capture, reducing their impact on the environment.

### Renovating nuclear power plants

In addition to being the world's leading supplier of conventional islands for all types of nuclear power plants, Alstom Power has substantial expertise in renovating and maintaining nuclear plants, a business line which accounts for half of Power's sales in nuclear power generation and which has become even more important since the accident in Fukushima, Japan. In the area of new equipment, Alstom's Arabelle is recognised as the most powerful, most advanced half-speed turbine on the market. Arabelle features welded rotors and an output range of 900-1,800 MW, and outclasses



## 15 PILOT PROJECTS UNDERWAY

**Because power generation alone accounts for 40% of carbon dioxide and other greenhouse gas emissions**, making energy technologies cleaner is a major challenge. Carbon capture, under study for several years, now seems to be a viable solution. In its quest to lead the industry in this technology, Alstom Power is currently validating several processes in some fifteen pilot projects across the United States and Europe, including some with geological storage. Processes

being tested include post-combustion capture, which uses amine or ammonia scrubbing to extract CO<sub>2</sub> from flue gases, and oxy-combustion, which produces a concentrated stream of CO<sub>2</sub> that is easier to store. Applicable to both new and existing plants, these solutions offer some of the best available energy yields at installation and maintenance costs that customers can accept. Large-scale industrial application of these technologies should begin by 2015.



## CURRENT EVENT

**In 2010, Alstom unveiled the model for a 1 MW tidal energy turbine** that will extract energy from tidal currents. Leveraging the accumulated experience of Clean Current, its Canadian partner, Alstom is now working on a commercial-scale demonstrator unit. Testing will begin in 2013 in the Bay of Fundy in Nova Scotia, Canada. The potential of the worldwide tidal energy market is estimated at 50-100 GW, with Europe accounting for 10% of the total.

competitors with unrivalled efficiency, reliability, resistance to stress corrosion cracking and longevity. It is also designed for easy access, reducing maintenance time and thereby cutting operating costs. The 4-pole Gigatop generator, designed to complement the Arabelle turbine, has a range of 900-1,800 MW and is the largest generator on the market today. Like Arabelle, Gigatop sets the standard for reliability and efficiency.

In addition to turbine-generator packages, Alstom Power also supplies auxiliary equipment, including heat exchangers, pumps and 3-10 MW diesel backup generators that account for 40% of installed capacity worldwide.

### Cutting-edge services for thermal power plants

With its sizeable installed base (Alstom equipment generates a quarter of the world's power), service is a significant part of Power's business. Supported by substantial R&D investments, the Sector maintains and updates all types of power plants regardless of manufacturer, optimising performance and competitiveness throughout the life of the plant. Alstom's Plant Integrator concept is particularly effective in modernising installed equipment, from upgrades of individual components to comprehensive solutions that overhaul and extend the life of entire power plants.

With the installed base aging, environmental standards becoming more rigorous and fuel prices continuing to rise, demand for this type of service should increase, becoming a major growth driver for Power, not just in Europe and the United States, but increasingly in Asia and the Middle East as well.

### Renewable energies

Hydropower is the world's leading source of renewable energy, accounting for more than 15% of total power generation.

### 25% of world hydropower capacity

As a leader in the industry, Alstom Hydro offers the broadest range of primary and auxiliary equipment, services and control systems for all types and sizes of hydropower stations. From giant plants like Three Gorges in China and Rio Madeira in Brazil to the smallest. From run-of-river installations to turbine pump plants. And from individual pieces of equipment to comprehensive turnkey solutions.

Alstom's range of hydro turbines (Francis, Kaplan, Pelton, bulb and pump) offers capacities up to 900 MW and its generators can produce up to 1,000 MVA, depending on the type of application. Alstom hydropower stations are extremely reliable and deliver very high yields, converting over 90% of the water's energy into electricity. For industrial and agricultural applications requiring capacities of 5-30 MW, Alstom has developed a range of turnkey solutions geared around standardised electromechanical equipment.

Finally, Alstom's expertise in designing and manufacturing hydromechanical equipment goes beyond power plants to include water courses and irrigation systems as well.

### 120 Alstom wind farms worldwide

In its quest to play a significant role in wind power, Alstom entered the market in 2007 by acquiring Spanish wind specialist, Ecotècnia. Today, Alstom Wind designs, assembles, installs and commissions a broad range of onshore and offshore wind turbines. All are based on Alstom's Pure Torque concept, which transfers wind deflection loads directly to the turbine tower, enhancing performance and protecting the generator which is exposed to torque only. To date, Alstom Wind has installed or is installing over 2,700 MW of capacity at 120 wind farms in Spain, France, UK, Portugal, Morocco, Italy, Brazil, USA, Turkey, Japan and India.



ONE OF THE TEAMS AT ALSTOM SIZHOU, A COMPANY SPECIALISING IN SERVICE IN CHINA.

Alstom has the world's largest service network, with over **15,000** employees at **200** sites in **60** countries and **25** centres of technical expertise.

Onshore products, ranging from 1.67 to 3 MW, are divided into two groups: ECO 80 platforms (with rotor diameters of 74-86 m) and ECO 100 platforms (with rotor diameters of 100 to 110 m). The first 3 MW ECO 110 unit (with a diameter of 110 m) was installed in 2009. Alstom has also staked out a position in the offshore segment: a new 6 MW turbine with an innovative electromechanical design will go into mass production in 2014. This new product will allow Alstom and EDF Energies Nouvelles (EDF-EN) to respond jointly to France's recent invitation to tender for 3 GW of offshore capacity. Alstom has also forged partnerships with Emerge, Iberola and Zefir for future development in the promising offshore segment and is expanding its manufacturing capacity outside Europe, with projects underway in Brazil and the United States.

**Thermal Renewables: geothermal and solar energy**

Alstom Power has created a new Thermal Renewables unit, reflecting its expanding portfolio of products and technologies in the renewable energy segment. In geothermal energy, Power has made a comeback, winning contracts in Mexico and, to date, the Sector's geothermal business has installed total capacity of 350 MW worldwide. Alstom can deliver customised configurations tailored to the 50 and 60 Hz markets for installations ranging from 20 to 60 MW and beyond, as well as turnkey power plant solutions from construction to commissioning. Power's robust direct-drive turbines are specially designed for the most challenging wet steam compositions. Alstom entered the solar market in the late 1980s, supplying steam turbines to solar-power plants,



## PHILIPPE JOUBERT President, Alstom Power

### What was most memorable for Power this year?

"It was a year of contrasts. We put the equivalent of 26,000 MW on line – a record for Alstom – and at the same time, we were adjusting production capacity for thermal equipment in Europe and the United States and fighting to take advantage of new opportunities in emerging countries. "We restructured our business by fuel type to increase our flexibility and strengthen our position as plant integration experts. We also made some significant changes in Asia, designating Singapore as a decision-making centre for most of the businesses in the region. We stepped up our manufacturing presence in that part of the world by investing in facilities like our new plants in Mundra, India and Tianjin, China. Finally, we enhanced our 'carbonless' offering in solar and offshore wind power."

### How would you assess Power's overall performance?

"We had a tough beginning with a challenging market, but in the second half we managed to reverse the trend and began growing again. In Singapore, for example, we took 100% of the market for gas-fired power plants. Even though sales declined more than expected, our teams turned in an excellent set of financial results, thanks to our broad range of solutions and a strong performance from our service business."




and more recently acquired a stake in BrightSource Energy, an American company that specialises in tower technology for solar thermodynamic power plants and has a presence in the United States, Australia and Israel. The two companies have since signed partnership agreements enabling them to undertake large-scale solar energy projects on the most favourable technical and economic terms, and at costs competitive with fossil fuels.

Alstom has also joined forces with the high-tech companies, Rotem Industries and Gefen Biomed Investments, to create Horizon, a joint venture which will finance and support the growth of start-ups in renewable and alternative energies.

### Automation and control

A major component of Alstom's Plant Integrator and Clean Power Today offerings, automation and control solutions optimise power plant efficiency, quality and safety. Compatible with all types of plant, these products constantly manage

all the processes involved in power generation, safely ensuring that the plant delivers the best possible yield. Alstom automation and controls enable plants to deliver the right amount of power at the right time, at the voltage and frequency required by the grid. They are also invaluable in managing plant lifecycle and maintenance. ●



AN ENGINEER AT  
ALSTOM'S GRENOBLE SITE  
IN FRANCE, ONE OF  
ALSTOM POWER'S FOUR  
HYDROPOWER RESEARCH  
CENTRES.

## **RESEARCH & DEVELOPMENT: 2,300 ENGINEERS STRONG**

Alstom Power's long-term Research & Development programme develops and acquires the best available technologies to serve power plant operators worldwide, today and tomorrow, focusing primarily on the energies of the future. With more than 2,300 staff working on some 80 critical technologies, Power's R&D structure includes performance centres in 32 sites spread across Europe, Asia and North America. Alstom Hydro has its own R&D programme, geared around Global Technology Centres in Vadodara, India; Grenoble, France; and Birr, Switzerland, with a new centre opening soon in Tianjin, China. In addition to these internal resources, Alstom maintains close ties to some forty leading universities and research institutes worldwide, tapping into their laboratories, expertise and talent. Power is also participating in efforts, financed in part by the European Union and US Department of Energy, to develop boiler and steam turbine materials able to withstand temperatures of 700°C and above.

Alstom expects to offer these products in the near future.

Alstom has also forged strategic partnerships with other companies, working with Microsoft to develop new automation and control systems designed to manage individual power plants as well as entire fleets (Optiplant). Power has also partnered with Beijing's Tsinghua University to develop wind converters for the Chinese wind power sector. Finally, Alstom has signed a licensing agreement with Canada's Clean Current Power Systems Inc. for access to its tidal energy technology, and acquired a \$55 million stake in BrightSource Energy, which specialises in solar energy. ●





THE AEP MOUNTAINEER PLANT IN WEST VIRGINIA (USA) IS ONE OF 15 PILOT SITES WHERE ALSTOM IS VALIDATING CO<sub>2</sub> CAPTURE TECHNOLOGIES.

## A CLEAN POWER STRATEGY

As fast-growing demand for carbon-based energy competes with the urgent need to fight climate change, the conflict seems insoluble, but Alstom Power is confident that it can meet this challenge with its three-pronged strategy: Clean Power Today. The first priority is to expand Power's technological mix by developing a broad range of carbonless energy solutions, drawing on the diverse resources available in different parts of the world. Second, the sector continues to update individual components and entire plants, boosting their efficiency and their yields: the ultimate goal is to reach 50% yields for coal-fired power plants and 60% for gas-fired plants. In the third component of its Clean Power Today strategy, Power is promoting carbon capture and storage technology for both existing and new facilities.

Finally, in its quest to become the acknowledged leader for long-term power plant maintenance and service worldwide, Alstom strives to outshine competitors through its technology and its innovative products and services. This is especially true of Alstom's expertise in one of its core areas – extending the life of individual components and entire plants of all types, enabling them to meet ever-greater demands for environmental responsibility, energy efficiency and competitiveness. ●





# 150

million tonnes of CO<sub>2</sub> cut  
annually

## Clean Power Today!

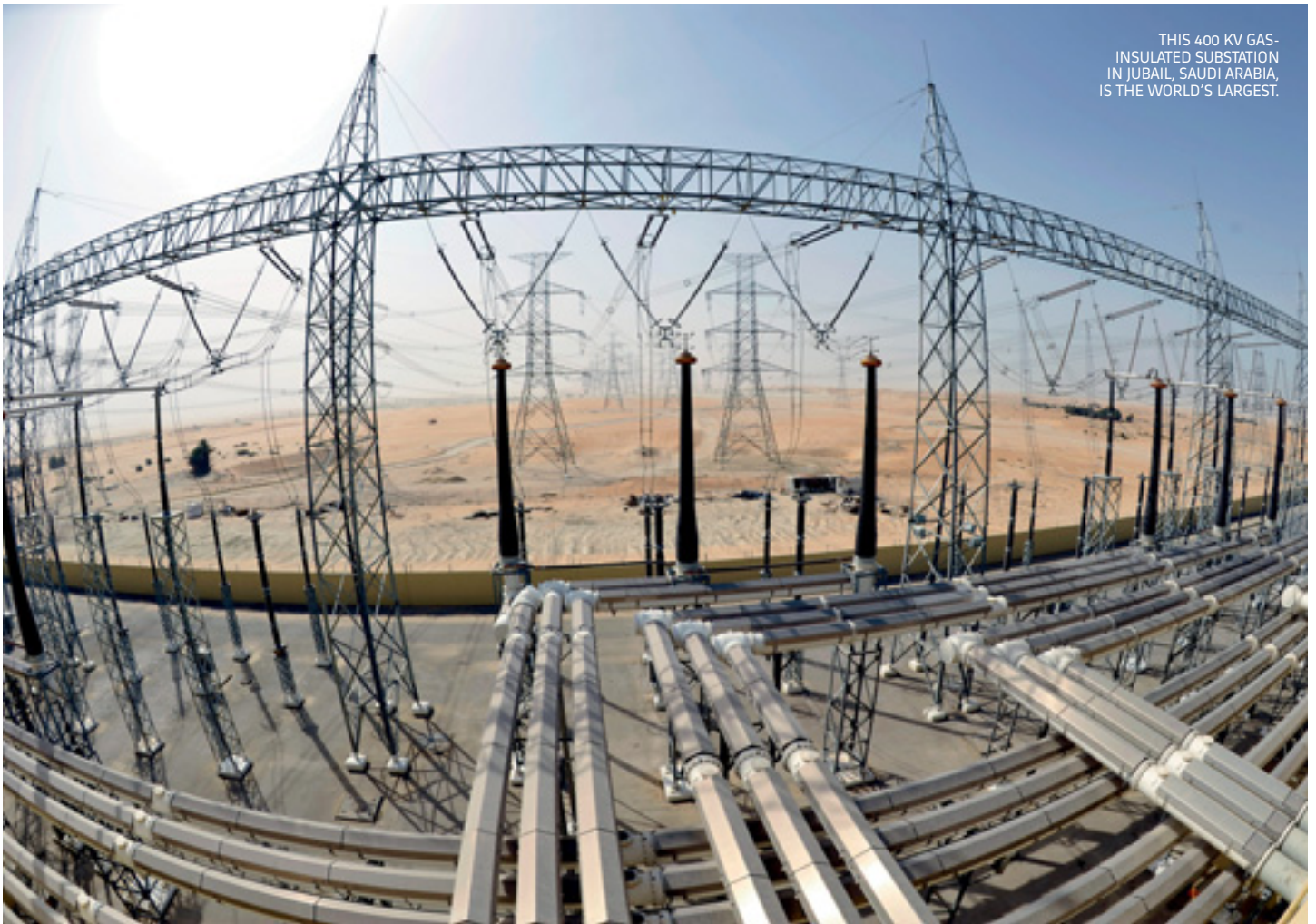
**COMMITMENT** Under Alstom Power's Clean Power Today strategy, the priority is providing "clean", accessible, reliable electricity. How? By offering a balanced portfolio that includes plenty of technologies with low or no CO<sub>2</sub> emissions, by making existing power plants more energy-efficient, and by capturing CO<sub>2</sub> before it is released into the atmosphere. In one study of 944 Alstom-supplied projects, power plant operators reduced annual CO<sub>2</sub> emissions by more than 150 million tonnes.



**The world of electricity is changing.** Countries with fast-growing economies need new power infrastructures to fuel industrial production and meet the requirements of an expanding population. Mature countries are gradually updating their aging grids to make them more efficient. Emerging “smart” technologies are enabling grids to manage intermittent and dispersed renewable energy sources more effectively. And globalisation is accelerating grid interconnection. In the medium and long term, these trends will drive growth in the power transmission market. Alstom Grid is ready to meet these needs.



THIS 400 KV GAS-INSULATED SUBSTATION IN JUBAIL, SAUDI ARABIA, IS THE WORLD'S LARGEST.



## A STRONG CONTRIBUTION TO GROUP PERFORMANCE

On 7 June 2010, Alstom and Schneider acquired Areva's transmission and distribution business, Areva T&D. At the same time, Alstom created Grid – a third Sector dedicated to power grid management and high and ultra high voltage transmission.

region (especially India and China), in Brazil, and in North America. With €3.4 billion in orders and €3.6 billion in sales for the ten-month period between June 2010 and March 2011, Alstom Grid made a substantial contribution to the Group's performance. ●

Since June 2010, Alstom Grid has implemented a strategy geared around innovation and partnerships that focus on smart grids and super grids with ultra high voltage technologies. These solutions make power networks more stable, reliable and efficient – and connect renewable energies to the grid. The new Grid Sector took advantage of the rebound in the power transmission equipment market following the world economic slowdown, booking a large volume of orders across all its business lines and in all its markets – in Europe (Germany, UK, Sweden and Norway), in Russia and Tajikistan, in Africa (Egypt and Libya), in the Middle East (Saudi Arabia and the United Arab Emirates), in the Asia-Pacific

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Alstom Grid is **one of the world's top three** electrical transmission specialists.



## THE FULL RANGE OF SOLUTIONS FOR HIGH AND VERY HIGH VOLTAGE POWER GRIDS

Alstom Grid designs and manufactures a full range of electrical equipment for the entire high and ultra high voltage power transmission industry, from 52 to 800 kV in direct current and up to 1,200 kV in alternating current. Products include power transformers, gas-insulated switchgear, disconnectors, circuit breakers and instrument transformers.

Alstom Grid is also one of the world's three leading suppliers of turnkey engineered transmission and industrial power supply projects, from electrical substations to power electronics-based interconnection solutions. Finally, Grid's Automation Solutions activity ensures that electricity grids are managed in real time, engineering sophisticated, mission-critical information systems and automation equipment and providing sales support and delivery units close to customers worldwide. All Grid's business lines are supported by a full range of services throughout the product lifecycle.

### Power transformers

As a key player and pioneer in transformer technology, Alstom Grid designs and manufactures all types of power transformers for the generation and transmission of electricity, for power-intensive industrial applications and for rail applications. The Sector has dedicated manufacturing facilities on four continents, with current capacity of over 130,000 MVA for medium and large power transformers. Worldwide, the Sector delivers up to 1,000 units annually. In 2010, at its site in Gebze, Turkey, Alstom Grid produced the largest transformer for a 300 MVA electric arc furnace. In another milestone, the Sector successfully produced an 800 kV DC converter transformer in Wuhan, China.

### Disconnectors

Alstom Grid is the world's leading manufacturer of disconnectors, with 140,000 units delivered in 130 countries. Among the most customisable components of switchyard equipment, disconnectors can be matched to a variety of space requirements. Experienced Alstom Grid personnel help customers identify the best solutions for their needs. In March 2011, the Sector opened a new disconnector plant in Charleroi, Pennsylvania, expanding its manufacturing footprint in the United States and positioning itself to provide products and support consistent with US standards.

### Instrument transformers

Instrument transformers are essential to the safe, efficient operation of transmission networks, providing accurate, reliable current and voltage data for secondary equipment such as meters, protection relays and monitoring devices. With more than 200,000 units in service, Alstom Grid offers advanced, reliable, proven technologies and the market's most comprehensive, sophisticated range of transformers up to 1,200 kV, including current and voltage transformers, capacitor voltage transformers and combined metering units.

In 2010, Alstom Grid launched its range of compact optical sensor intelligence transformers. Fully compliant with IEC standard 61850, these COSI transformers are compatible with alternating and direct current transmission grids. The COSI range will be central to the digital substations required by the smart grids of tomorrow.

### Circuit breakers

Alstom Grid is one of the world's top three circuit breaker suppliers, offering Live Tank and Dead Tank ranges as well as compact modules

**20,000 employees worldwide.**

**€3.4 billion in orders (in 10 months).**

**6% operating margin.**



ALSTOM GRID HAS BUILT THE HIGH VOLTAGE DIRECT CURRENT (HVDC) SUBMARINE LINK BETWEEN SWEDEN AND DENMARK (MORE THAN 250 KM LONG).

**10 product lines,  
90 manufacturing  
and engineering sites  
worldwide, 52 service  
centres in 33 countries.**

ranging from 36 to 1,200 kV. Grid's comprehensive product portfolio enables it to meet any need, including power generation with generator circuit breakers for installations up to 59 kV, 1,500 MW.

Over 80,000 Alstom Grid circuit breakers are in service worldwide, and 8,000 new solutions are commissioned every year.

### **Gas-insulated switchgear (GIS) and gas-insulated lines (GIL)**

With 15,000 GIS bays in over 2,000 substations, and more than 150 km of single-phase gas-insulated lines up to 800 kV in service, Alstom Grid's track record is a guarantee of reliability. In 40 years of operational experience with high voltage GIS, Grid has maintained a market-leading position by constantly improving its solutions

and making numerous technological breakthroughs. For example, the size of GIS bays has been cut by 80%, dramatically reducing their use of SF<sub>6</sub> and with it, their environmental footprint. As crowded urban areas need more and more insulated substations, the compactness of Alstom's product is a key feature and a powerful market differentiator.

### **High and ultra high voltage AC substations**

Large electrical substations, with either air- or gas-insulated switchgear, play a critical role in major power grids, moving energy produced by large power plants and acting as interconnection points between regional and national grids. Over the past decade, the growing wind power industry has created

## HENRI POUPART- LAFARGE President, Alstom Grid

### What are the main issues for today's power transmission market?

We're in a period of rapid change, with a number of exciting challenges. Growing demand for electricity is fuelling increased investment in grids worldwide. At the same time, the rise in renewable energies like wind and solar power, which are inherently intermittent and unpredictable, is raising new stability and reliability issues for grids. As consumers become more proactive and electric vehicles become more common, there is also more demand for new technological solutions and for an even smarter grid. We're also seeing a new trend towards super grids, which can transfer electricity across long distances, from distant power plants to consumers and interconnect power grids in different countries and on different continents.

### What will Grid's role be in the Group's efforts in fast-growing emerging markets?

Grid's priority is to stay in touch with our customers, to understand their needs and to offer them effective, competitive solutions. To that end, over the past few months we've opened a number of research, production and manufacturing sites in China, the United States, Turkey and India. We've also forged solid partnerships with customers like FSK and Soyuz in Russia, and we can now manufacture sophisticated equipment at local sites in Brazil and India. But all this is only the first stage in our growth. Our goal is to become the power transmission market's benchmark for high-performance power grids.

a new and large market: collector and transmission substations for renewable energies. With a large installed base of windpower substations off the British and German coasts, Alstom Grid has attained a position of European leader in this market. It has also pioneered the first floating, self-installing substation platform which does not require the use of costly ocean cranes for installation.

### Power electronics

High voltage direct current (HVDC) is the most efficient, most secure way to transmit large quantities of electricity over long distances today. It is also the only way to interconnect two or more asynchronous alternating current grids. Alstom is a pioneer and world leader in HVDC. In 2010, Grid launched its latest HVDC technology, the voltage source converter (VSC), which is ideally suited for connecting offshore wind farms to grids and for multi-terminal applications. Alstom Grid customers can now see VSC technology in operation at a 20 MW demonstrator in the Sector's global HVDC research and development centre in Stafford, UK. Alstom Grid is also one of the world's specialists in flexible alternating current transmission systems (FACTS), solutions that use power electronics to improve the overall performance of long distance alternating current transmission grids as well as certain AC industrial systems.

Alstom Grid provides power electronics-based solutions for commodity manufacturers requiring particularly high current supplies, such as electrolysis plants. These special power supplies include rectifiers and rectifier transformers that furnish these customers with highly reliable and high quality DC current to ensure the stability of their production process.

### Network management solutions

**The e-terra range:** Alstom Grid is the worldwide leader in energy management systems (EMS), which

now carry a hefty proportion of the world's electricity and are the virtual "brains" of national power control centres. EMS provide integrated solutions to ensure grid stability, increase energy efficiency and enable the integration of renewable energy sources. Alstom Grid's market management systems (MMS), which are world leaders in this field, are used by regional and national power utilities and by independent companies in competitive global energy markets. The various features of Alstom Grid's distributed management systems – which include analytical and optimisation applications, fault isolation, self-healing, black-out and switch-over management functions, reliability indices and smart meter interfaces – enable grid operators to operate their networks to their full capabilities.

Lastly, Alstom Grid is a leader in telecommunication systems for electrical grids, with a solution that enables broadband services to be integrated into the main telecom system. The high performance, reliability and competitive price of these systems ensure low operating costs.

### Substation automation solutions

Alstom Grid is among the leading suppliers of sophisticated, high-performance, mission-critical solutions that protect, control and manage electrical substations and grids. Alstom's MiCOM intelligent electronic device (IED) range of protection relays and measurement devices monitor, control and protect motors, generators, feeders, transformers, bus systems and transmission lines. Conventional and digital control systems (PACiS) for electrical substations help ensure design flexibility of electrical installations and support their operation and maintenance.







ALSTOM GRID IS UPGRADING THE HVDC INTERCONNECTOR BETWEEN FRANCE AND THE UK. AT 2,000 MW, IT IS THE LARGEST SUBMARINE INTERCONNECTOR IN THE WORLD.



THE GCCIA PROJECT IN THE GULF INTERCONNECTS THE POWER GRIDS OF ITS SIX MEMBER COUNTRIES.

## Service

Alstom Grid proposes long-term and high-quality services to optimise electrical network infrastructure, increase return on investment and extend the life of equipment, whether designed and supplied by Alstom or not.

Its 1,300 technicians work closely with customers in the field to provide tailored solutions that range from:

- grid design to equipment maintenance and upgrading,
- ad hoc servicing to long-term partnership,
- emergency repairs to predictive maintenance.

As a manufacturer of complete engineered solutions, Alstom Grid has a competitive advantage when it comes to providing technical support

over the entire life cycle of high voltage grids and equipment, from annual inspections to minor and major servicing operations.

These services also include assessing and monitoring substation condition as well as solutions for rehabilitating, upgrading or extending the life of inefficient or obsolete equipment. Alstom Grid's Technical Institute offers a broad range of training on the safety, operation, maintenance, protection, monitoring, control and management of electrical grids. This high value-added training covers all aspects of electrical networks, from basic principles to advanced skills development. ●



## RESEARCH & DEVELOPMENT AT THE HEART OF ALSTOM GRID'S STRATEGY

Innovation is critical to Alstom Grid's growth strategy. This is why about 4% of annual revenue is committed to R&D. Innovation ensures that Alstom Grid's products and services stay competitive and stand apart from those of its competitors, while reinforcing the leadership position gained through its proprietary technology.

### Ultra High Voltage (UHV)

As urban and industrial areas expand, larger quantities of power need to be moved from distant generation points to urban areas, often over very long distances. One solution is to increase transmission voltage to as high as 1,200 kVac, a technological challenge mastered by Alstom Grid. Another option is switch to direct current which offers maximal transmission efficiency and reduced losses. Today's technology allows for transmission voltage of 800 kVdc. In mid-2010, an Alstom Grid 800 kV converter transformer successfully passed all AC and DC tests required under IEC standard 61378-2. One of the next UHV frontiers will be developing solutions for 1,100 kVdc.

### Programmes to optimise production costs

In an environment of increasing competition, particularly from new Asian entrants into its market, Alstom Grid has successfully adapted to new market conditions by increasing the flexibility of production facilities, reducing costs, taking proactive action to ensure the loyalty of its customer base and developing R&D programmes to reduce production costs.

### Integrating renewable energies

In 2010, Alstom Grid launched its voltage source convertor (VSC) HVDC technology, which is the most efficient means of integrating offshore wind energy into power grids when the windfarm is situated more than 50 km offshore. VSC converters can operate in very weak systems and even in passive AC systems with no generation sources. This makes them ideal for connecting island loads and for "black starts" that do not rely on power from the grid.

Alstom Grid has also launched version 2.6 of its e-terra platform, the latest release in its range of energy management systems (EMS),



**5 technological centres** in Stafford (UK), Redmond, Washington (USA), Villeurbanne and Massy (France), Shanghai (China).

**40 specialised skills centres** worldwide, plus active ties to some forty universities and research labs in Europe, Asia and North America.

which can meet current and future needs of grid administrators, including integration of renewables and distributed energy resources into the grid. In addition, Alstom Grid has joined the European Union's TWENTIES\* project, which aims to make significant progress towards developing and implementing new technologies that can integrate wind energy production into the European power grid.

### Smart grids

Alstom Grid is developing and testing intelligent solutions in 14 smart grid demonstration projects in several forward-thinking countries, working in partnership with governments, grid operators and industry. Three of these projects have been finalised: the FENIX project in the UK, which includes Alstom's **e-tertrade** platform and aggregates distributed energy sources via a virtual power

plant: the Pacific-Northwest Smart Grid Demonstration Project (PNW-SGDP) in the United States, which is testing new combinations of Smart Grid solutions in homes and on the grid in five US states; and the North Carolina Smart Grid project, located in the United States; and led by the US Department of Energy, which includes two Alstom management systems and can accommodate and control multiple decentralised energy resources (such as renewable energy sources, storage units, etc). ●

\* TWENTIES = Transmission system operation with large penetration of wind and other renewable electricity sources in networks by means of innovative tools and integrated energy solutions.



## SMART GRIDS: REINVENTING THE POWER NETWORK

**Smart grids are an essential aspect of future grid technology, squarely at the forefront of Alstom's strategy for the next decade.** Grid's solutions are geared around synergies among its top technologies: power electronics, automation solutions and information technologies for control rooms. They are designed for customers along the entire energy value chain, from cleaner, more flexible generation through smarter, more stable, more secure grids to energy-efficient eco-communities.



# THREE STRATEGIC PRIORITIES: CUSTOMER RELATIONS, INNOVATION AND COMPETITIVENESS

Amid dynamic, fast-changing market conditions, Alstom Grid has chosen three strategic priorities.

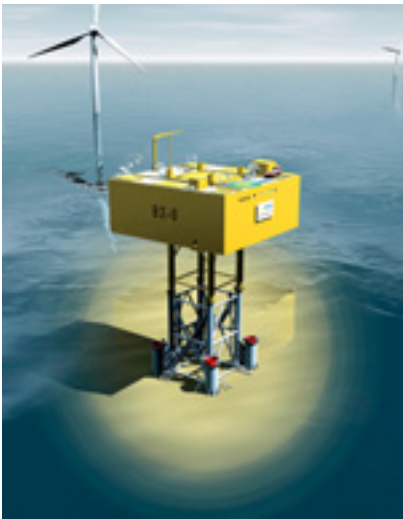
**Customer focus.** With its extensive experience, its longstanding relationships with customers and understanding of their needs, its technical expertise and its portfolio of competitive solutions, Alstom Grid is in a strong position to help customers meet new challenges. By listening to and working closely with transmission utilities and industrial players, the Sector will continue to develop and deliver added value solutions, meeting the needs of all its customers.

**Technology and innovation with added value.** Grid is also taking a leading role in HVDC technology to connect offshore wind farms and build more flexible regional interconnectors. In smart grids, Alstom is working to secure government funding for the joint development of demonstration projects to field-test these technologies. Alstom Grid is also already exploring new R&D applications for smart grid solutions, such as DC grids, electrical vehicle charging systems, electrical storage and the energy management of eco-communities and cities. In addition to these three priorities, Alstom Grid is also committed to strengthening its position in the smart grid market by

investing in an ambitious innovation programme to broaden its solutions portfolio and explore new technologies. With that in mind, Alstom Grid is developing an eco-system of partners that includes technology suppliers, universities, energy systems experts and strategic customers, all of whom contribute their complementary expertise in such areas as smart-building technology, eco-cities, electric vehicles and electricity storage. Alstom Grid has also made strategic acquisitions to strengthen its technological capabilities. These include Psymetrix, acquired in February 2011, and Utility Integration Solutions Inc., acquired in March 2011. Over the longer term, the development of the Super Grid will constitute a major advance in the transcontinental direct current transmission of large quantities of electricity supplied by offshore wind farms or solar facilities. Across North Africa and the Mediterranean basin, Alstom Grid is leveraging its experience with many existing initiatives to offer innovative, value-adding solutions and is actively strengthening its Super Grid capabilities.

**Competitive-edge.** Alstom Grid's third strategic priority is keeping its manufacturing base competitive. This requires a revision of its product strategy in response to new market conditions, using a product line based approach. Alstom has always been well known for the high quality of its products and intends to further strengthen this reputation through its Quality-Built-In programme. ●

A HIGH VOLTAGE DIRECT CURRENT (HVDC) CONNECTION FOR OFFSHORE WIND FARMS.



## THE CASE FOR DIRECT CURRENT

Originally developed in the 1930s, high voltage direct current (HVDC) lines are now a mature, reliable technology. Particularly useful in transmitting electricity across very long distances with minimal losses, they are significantly more efficient than high voltage alternating current lines. They can also be installed under water: HVDC submarine cables already

cross the English Channel and link Scandinavia to Europe. Today, modern static converters are used to convert the alternating current favoured by utilities to direct current, and vice versa. Because this solution is highly efficient, it makes HVDC increasingly attractive, especially because the savings they generate outstrip the cost of the converters.

€50 billion:

the global smart grid market  
in 2020

(Sources: AIE, McKinsey and Gimelec, 2010)

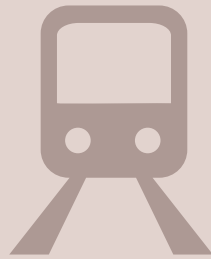
## A key contributor to tomorrow's grid

**INTELLIGENCE** Already a leading contender in the smart grid market, Alstom offers smart grid solutions that manage power generation and transmission by optimising operations, by meeting consumers' every expectation, and by bringing environmentally friendly renewables smoothly into the network.





# LEADING



An environment-friendly, efficient solution to the challenges of mass transit, rail transport has regained its status as one of the

world's best options for meeting massive demand for mobility. Offering new alternatives to motor vehicles and planes for intercity travel, rail is an efficient solution to the pressing problems of congested roads and urban air pollution. The challenge: deliver safe, effective, high-quality, energy-saving transport that offers comfort and interactivity with the environment – and cuts purchase and maintenance costs. Alstom Transport is responding with innovation, constantly sharpening its competitive edge and updating its comprehensive range of products and services.



## AN INCREASINGLY COMPETITIVE RAIL MARKET



LINE 2 OF THE SHANGHAI METRO, ONE OF ALSTOM TRANSPORT'S MANY SUCCESSSES.

**24,000** employees worldwide.

**€5.7 billion** in orders, up 4%.

**7.1%** operating margin.

Over the past two years, competition in the rail market has shifted up a gear as new contenders – many from Asia – have become more powerful, drawing strength from huge domestic markets and low cost bases.

Alstom Transport has maintained its number two position in the world market, thanks to a global presence, a technological edge in many areas, and the most comprehensive portfolio of products and services in the rail industry.

Orders received for the financial year totalled €5.7 billion, up from €5.4 billion the previous financial year, proof of the competitive strength of Transport's offering. The Sector's order backlog reached €19.5 billion, and operating margin remained above 7%.

Alstom Transport booked a number of very large orders during the financial year. In some cases, such as the 14 high-speed train sets ordered for Morocco, this reflected Alstom's continued leadership in certain market segments. In others – the 500 locomotives for rail systems in Russia and Kazakhstan, for example, or the metro in Chennai, India – it was a sign of Transport's momentum in new markets.

In Europe, Alstom Transport's biggest market, passenger traffic, has held firm and even increased in some sub-segments, though freight traffic has never entirely recovered from the sudden drop in business in 2009. Intent on keeping its largely European industrial base competitive, Transport was forced to respond to falling orders in Germany, Italy and Spain with targeted cuts, reducing its workforce by 1,400, or slightly more than 8%. ●



### ALSTOM TRANSPORT FORGES AHEAD WITH ALLIANCES

**Like Grid and Power, Transport is actively pursuing partnerships,** key to expansion in large, growing markets. In 2010, agreements with Russia's Transmasholding became stronger, opening doors to the world's leading rail market, and Transport launched strategic talks with China Northern Railways (CNR) and China's Ministry of Transport to examine every possible avenue of co-operation.

Alstom Transport currently maintains a record 15 alliances in Europe, Asia and the CIS. Covering a broad spectrum of activity – rolling stock, signalling systems, services, components and engineering – these relationships help the Sector meet customer demand for competitive, locally manufactured products and accelerate development of simpler products tailored to market needs.



## ALSTOM TRANSPORT: EVER EVOLVING

From tramways to very high-speed trains, from signalling and control systems to construction of new rail lines, from maintaining fleets to refurbishing them, Alstom Transport designs and manufacture the world's broadest range of materials and services for the passenger and freight transport markets.

### From Citadis tramways to AGVs: a comprehensive line of rolling stock

Alstom Transport has the most comprehensive rail offering on the market. Each market segment has its own platform, which is then adapted to the customer's needs. And each segment has a dedicated production site, with 11 manufacturing centres and 5 engineering centres in all.

Customers in the segment for very high speed trains – faster than 300 km/h – can now choose among three platforms. The articulated TGV Duplex platform is the only double-deck train in the category, offering unrivalled capacity. The AGV is a fourth-generation TGV: designed with an articulated architecture and

distributed power, it can reach a commercial speed of 360 km/h. The first train in its category to integrate interoperability specifications, it is compatible with all European voltages and signalling systems. Finally, Speedelia, unveiled in 2010, is the first non-articulated, very high-speed train platform that can run on the wider track gauges found in Brazil, Russia and other countries.

In the high-speed category – running at 140-250 km/h – Alstom has taken tilting train technology to a new level with the Pendolino platform: worldwide, some 400 Pendolino trains are in service today. In a major success, Transport signed an agreement with British operator Virgin Trains, which operates the West Coast Main Line and moves 28 million passengers a year: Virgin currently runs 52 Pendolino train sets on the line, and 31 will be extended from 9 to 11 cars.

For lines operating at commercial speeds below 180 km/h, the Coradia regional train platform has generated a versatile range which provides tailored solutions: high capacity with Coradia Duplex, modularity with Coradia Continental and Coradia Polyvalent,



### WHY FASTER IS BETTER

**1,000 km in 3 hours:** when very high-speed trains reach this threshold, they can compete directly with air travel. And for any trip shorter than 3 hours, fast trains outclass every other form of transport, offering easier passenger access, better security, higher energy efficiency and lower CO<sub>2</sub> emissions.



# 0.5%

is rail's share of transport-related CO<sub>2</sub> emissions

(Source: International Energy Agency)

## Delivering sustainable mobility

**WIRELESS** Alstom's rail offering meets a triple challenge: delivering solid return on investment, placing technological innovation at the service of travellers, and meeting the challenges of sustainable development. Citadis tramways are a perfect example. Their innovative design features a power supply system with no overhead wires, allowing transport networks to blend seamlessly into the urban landscape.





## PHILIPPE MELLIER President, Alstom Transport\*

### How has Alstom Transport approached the world rail market in the aftermath of the crisis?

We are present in every market, and our offering covers the full spectrum of rail transport equipment and services. That makes us very resilient. We have boosted order intake and emerging markets now account for 50% of orders, versus only 20% in the past. At the same time, we continued to achieve a strong operating performance, with a margin of over 7%.

### Does this mean that the big emerging markets will be driving your growth?

The effort we have made to strengthen our position on these markets is now paying off. Our sales are strong in India, Russia and China, owing in large measure to the strategic relationships we have forged with local partners.

### Are you changing your product strategy in response to these trends?

Urban and intercity rolling stock, infrastructure, signalling, turnkey systems... We're constantly investing in R&D for each of our product lines so that we can carry on meeting all requirements with solutions which are environmentally and economically sound in order to help operators meet their objectives in the areas of profitability, safety and sustainable mobility.

\*Philippe Mellier will leave Alstom on 1 July 2011.



tolerance of extreme cold with Coradia Nordic and non-electric operation with Coradia Lint diesel.

For suburban transport networks, which must combine the comfort of regional trains with the capacity of urban rolling stock, Alstom Transport designed the X'trapolis platform.

With its highly modular design, X'trapolis can accommodate single- and double-decker train sets of varying lengths, different door widths and varying numbers of doors, and it can adapt to any track gauge or electrical tension. Over 300 X'trapolis trains have been ordered for Australia's Victoria state alone.

In urban environments, Alstom Transport's highly successful next-generation Citadis tramway can accommodate an extremely wide variety of designs, allowing each city to work with Alstom designers to create a tramway that reflects its identity. Now running in 80% of major cities in France, Citadis has also been ordered by some twenty large cities in Europe and around the world, from Ireland to Australia. With more than 1,500 train sets ordered, the list continues to grow, and the APS version of Citadis, with ground-level power and no overhead wires, is increasingly popular with cities eager to showcase their urban architecture.

As the boundary between urban and peri-urban transport continues to blur, Alstom is developing a new concept, the tram-train, which can leave downtown areas and travel into peri-urban communities on regional

train track. The original Regio Citadis tram-train, introduced in Germany and later adopted by the Netherlands, now has a successor: Citadis Dualis. The French city of Nantes has placed the first order for this new version.

Finally, metros are an increasingly important core element of urban transport, especially for megacities with populations above 10 million in Asia, India, and Latin America, all major markets for Alstom Transport. To date, the sector has sold over 4,000 Metropolis cars, from Barcelona to Shanghai and from Warsaw to Santiago, Chile. The cities of Panama, Santo Domingo and Chennai are recent customers, and Transport has also sold Metropolis to Lima, Peru for its new network.



ALSTOM TRANSPORT'S OFFERING INCLUDES AUTOMATED TRACK-LAYING WITH THE APPITRACK SYSTEM.



## ALSTOM'S BELFORT LOCOMOTIVE CENTRE

**Power cars for passenger trains,** electric and diesel-electric locomotives, freight and shunting locomotives – all are developed at Alstom's facility in Belfort, France. To date, Alstom has received orders for more than

1,800 Prima locomotive units – including 20 of the new Prima II series for Morocco's railways, over 1,200 TGV Duplex power cars, and 70% of the power cars for very high-speed trains now operating worldwide.



## TURNKEY RAIL SOLUTIONS

**From urban transport to very high-speed rail**, Alstom Transport offers turnkey project management, participating in consortium projects as both leader and partner. These projects include designing, building and commissioning rail systems, as well as lifetime maintenance programmes and financial, administrative and technical coordination.



MAINTENANCE WORK ON THE BARCELONA TRAMWAY LINE.

### Cutting-edge signalling and infrastructure solutions

In addition to making world-class rolling stock, Alstom Transport has expertise in every other area of rail technology, with signalling systems, infrastructure solutions and a comprehensive range of maintenance services.

**Signalling:** on board or trackside, Alstom information systems give rail operators the tools they need to keep passengers and freight moving safely and smoothly.

Designed to reduce congestion in heavily used urban transport systems, Urbalis ranks among the most advanced signalling solutions. Compatible with all types of rolling stock, it delivers continuous radio communication between trains, track, interlocking systems and the control centre, increasing line capacity by reducing the interval between trains.

Urbalis is already installed in the Beijing, Shanghai and Singapore metros, and it has been selected for the City Rail network in Sydney, Australia.

For the intercity network, Alstom offers Atlas, the first technology compatible with the new European Train Control System/European Rail Traffic Management System (ETCS/ERTMS) interoperability standard on very high-speed lines. Automatically controlling train movements, ensuring the safety and flow of traffic as well as optimising train intervals and permanently improving passenger safety....Urbalis and Atlas guarantee an optimal traffic flow without compromising safety. Deutsche Bahn chose Atlas for 121 very high-speed trains in service in Germany, Austria and Switzerland.

Alstom also offers information solutions for passengers, from on-board Wifi access to real-time information displays on trains and in stations, as well as security systems with closed-circuit television and emergency telephones.

**Infrastructure:** In addition to making rolling stock and designing signalling systems, Alstom Transport offers operators a complete range of rail infrastructure solutions. These include laying track, electrifying and supplying power to lines; installing

and supplying power for electric substations and to tramway systems with no overhead wires, and providing electromechanical equipment alongside tracks, in stations and in depots. This infrastructure expertise helped build the metro in Casablanca, Morocco, among many other examples.

**Services:** Maintenance, renovation and other services are a strategic asset for Transport, accounting for 15% of the Sector's sales. In 2010/11, this robust line of business generated major contracts for train maintenance in Spain and Sweden, tramway maintenance in Tunisia and train modernisation in Spain and the United States.

A specialist in preventive and predictive maintenance, which dramatically increases train availability, Alstom Transport has been highly successful in its maintenance contract with Virgin Trains in the UK. In 2010, Transport also launched LocLife Service, a flexible locomotive maintenance programme for European freight associated with the supply of Prima II locomotives equipped with on board signalling equipment. ●



## NON-STOP INNOVATION, FROM DESIGN TO MAINTENANCE

Alstom Transport invests 4% of sales in Research and Development, filing some sixty patents a year. The Sector has also forged numerous partnerships with universities and research centres around the world.

Innovation drives every aspect of Transport's work, from design to maintenance, and it is further fuelled by internal networks that pool expertise and inspire the Sector's various sites to share ideas and build on each other's successes.

During financial year 2010/11, R&D efforts focused on very high-speed rail, including the Speedelia platform, the Regiolis train prototype, and signalling systems. Other innovative breakthroughs include the harmonics & energy saving optimiser (HESOP) system, which recovers train braking energy and returns it to the power grid. Now in testing on an initial

tramway line in Paris, HESOP is currently being incorporated into applications for other types of rolling stock. In another example, Alstom Transport's Traintracer remote monitoring technology uses internet communication to cut maintenance costs and improve train fleet availability. Already in use on the West Coast Main Line in the UK, on Coradia Polyvalent in France as well as aboard the Prima II locomotives delivered to Morocco and on the Citadis Dualis tram-train, the Traintracer remote monitoring technology continues to evolve. Finally, Transport has developed hybrid shunting locomotives that use large nickel-cadmium batteries to cut fuel consumption in half. Designed to update the thousands of obsolete locomotives operating in the European market, this hybrid technology is currently being assessed by MEG, a subsidiary of Deutsche Bahn. ●



## MARKETS AND PRODUCTS: THREE DEVELOPMENT PRIORITIES

To consolidate its position as a world leader with multiple specialities, Alstom Transport is pursuing three strategic objectives:

**Step up geographic expansion** by tapping into high-growth markets in Asia, Latin America, Russia and the CIS through acquisitions, joint ventures and partnership, like the partnership with TMH to penetrate markets in Russia and the CIS.

**Speed growth in business lines other than rolling stock.** With demand set to grow more rapidly in services and signalling systems than in rolling stock, Transport will expand these strategic business lines through organic growth and acquisitions.

**Continue to develop products tailored to local needs** by setting up local production resources as close to customers as possible in a spirit of partnership and exchange, adapting European products to local requirements – like Metropolis for São Paulo in Brazil and Chennai in India – as well as forging co-development partnerships. This approach cuts development time, brings products to market sooner and enables core products to be updated by leveraging shared expertise and technologies. This has notably been Alstom’s strategy with TMH, Russia’s leading rail manufacturer. ●



### DUPLEX: VERY HIGH SPEED MEETS CUSTOM DESIGN

Duplex is the only very high-speed double-deck train on the market, accommodating up to 1,050 passengers (in multiple units) in complete comfort at 320 km/h. Platform-level doors make Duplex accessible for everyone, including travellers with limited mobility and its double-deck architecture allows operators to create a variety of moods – from quiet

relaxation in the lower lounge to a lively atmosphere and stunning views in the upper lounge. Since its debut in 1996, Duplex has covered nearly 500 million kilometres of track and the latest model sets new standards for performance, comfort and stability. Third-generation Duplex trains will begin running on France’s new Rhine-Rhône high-

speed line beginning in late 2011: fully interoperable, they will serve Germany, Switzerland and Luxembourg as well as France. And in 2015, Duplex will reach Africa, where it will run on the Tangier-Casablanca line for ONCF, Morocco’s national rail operator.



A man with short brown hair and glasses is shown in profile, looking towards the right. He is wearing a dark t-shirt. In the background, there are several computer monitors displaying blue and green data visualizations, suggesting a control room or data center environment.

69%

of Alstom employees completed training programmes in 2010.

## Our employees are focused on Alstom's success

**EXPERTISE** As a high-tech corporation with large, complex projects on long timelines, Alstom invests heavily in the individual and collective skills of its employees, fostering their career development and giving them the tools they need to succeed.

# COMMUNITY

With a set of core values – constant dialogue, effective communication with all, equal opportunity, respect for diversity, knowledge-sharing, health and safety, innovation and local community involvement – as their foundation, Alstom employees are working together to build the future.





## TEAM SPIRIT

“All of us put our skills to work for the team”

Under the project code name “IFA 2000”, Alstom is renovating the interconnector for the 400 kV transmission grids in France and the UK. The system has two 1,000 MW bipoles and handles an impressive 2,000 MW of power. Grid won the two-stage contract in 2008, and 53 year-old Francis Lacroux, a thirty-year Alstom veteran, is the project manager.

### What makes the IFA 2000 contract different?

Our job is to renovate and replace conversion, command and control, and cooling system equipment installed more than 25 years ago on both sides of the English Channel – in Calais, France and near Folkestone, England. The first difference is that we obviously can’t shut down the power while we renovate the bipoles. The second is that we have to do the work and the testing in record time – just 54 days for each bipole! We have teams relaying each other night and day to finish the project on time. Finally, we are working for two customers at once – RTE in France and National Grid in the UK – and that is unusual.

### How do you see your role?

My goal is always to make sure that we perform the contract on time, on budget and up to our quality standards. Of course, the ultimate goal is satisfying our customers. To do that, we need to organise our work rigorously, co-ordinate seamlessly with our partners and sub-contractors, and stay close to our customer contacts. Workplace safety is also a fundamental part of the project. This is especially true of IFA 2000 because we always have 150-200 people working near equipment operating under 400,000 volts.

### What do you like about your job?

First of all, I like the variety. Right before IFA 2000, I spent four years working on another interconnector project linking grids in the Gulf countries with the Saudi Arabian grid. In the Gulf region it can be harder to find the human resources you need than it is in Europe. Add the extreme climate and the sandstorms, and you never have time to get bored. No project is really like any of the others, except for the responsibility you shoulder as project leader. And there is nothing magic about that: the project will only succeed if you can harness everyone’s energy and expertise to serve the team.

FRANCIS LACROUX  
IFA 2000 PROJECT DIRECTOR



# INTEGRITY

Though they work in around a hundred different countries, Alstom’s 93,500 employees are united around three shared values: trust, team and action. These values are frequently expressed and reaffirmed through awareness-raising campaigns and training programmes, and new recruits are made aware of them from day one. Alstom’s growth is also grounded in a culture of integrity and an uncompromising Code of Ethics that is provided to each employee.



ALSTOM'S HUMAN  
RESOURCE POLICY  
PROMOTES EQUAL  
OPPORTUNITY.

## ALSTOM IS MOVING

Alstom employees are the cornerstone of its success. United around shared values, they serve the company with their expertise and commitment. Alstom supports their career development with a human resources policy that fosters individual growth, helps employees fulfil their potential for initiative and rewards personal and team effort.

### **Building consensus**

Alstom believes in listening to employees, sharing information with them and negotiating collective agreements with their representatives. The company is also committed to encouraging social dialogue, which motivates employees and fosters a sense of belonging. Alstom management is in constant contact with the European Works Forum (EWF): talks have focused on integrating the new Grid Sector into the Group and on reorganising and restructuring selected Power and Transport Sectors, and several innovative agreements have been recently implemented. In July 2010,

for example, Alstom and Schneider Electric signed an accord with the European Metalworkers' Federation (EMF) on integration of Areva T&D employees into Alstom and Schneider Electric. In the agreement, Alstom and Schneider Electric reaffirmed their goal: to offer all employees positions commensurate with their skills and qualifications within their employment pool. Similarly, in February 2011, Alstom and EMF signed a new agreement laying the groundwork for change in the 30 European countries where they are present. The contract is based on best practices in each country, including the French approach to jobs and skills planning, Germany's use of temporary reductions in hours and Italian geographic mobility. The goals of the agreement are to preserve jobs, help employees find alternative positions and cultivate new skills and pursue social dialogue at local, national and European levels. Adjustment plans were announced for 4,000 positions in selected Power businesses and 1,380 positions at Transport manufacturing sites in three

European countries. During financial year 2010/11, targeted reorganisation plans were also implemented at sites in Brazil, Italy, the Czech Republic, Hungary, Switzerland, the UK and Canada.

Alstom is doing its utmost to limit the impact on employees: the goal is always to ensure that no one is left without a job. For each affected employee, the Group seeks a customised solution – an internal transfer to another business, part-time employment, training, help with launching a new business or outplacement.

### Promoting equal opportunity

Alstom values the broad range of nationalities, cultures and mentalities among its employees and sees this diversity as source of strength. Local initiatives have also been implemented to take advantage of this asset. The ratio of French senior executives dropped from 52% in 2006 to 37% in 2010, while the number of Asian expatriates rose by more than 50% between 2007 and 2010. The Group has a policy of gender equality whereby men and women with identical job descriptions and qualifications receive identical pay. Though its workforce has traditionally consisted of mostly male engineers, Alstom is committed to hiring more

women, who still make up only 16% of its workforce.

The company actively encourages women students to consider careers in industry and is implementing policies that maximise career development opportunities for its female employees.

Alstom is also committed to making it easier for the disabled to find and keep jobs within the Group: the Code of Ethics prohibits all discrimination for reasons of health or disability.

### Cultivating expertise

For a high-tech corporation like Alstom, which manages large, complex projects with long timelines, the quality and expertise of its workforce are critical to success.

The Group's high-profile brand and active commitment to forging ties with schools and universities are major recruiting assets, and during financial year 2010/11, Alstom hired more than 5,700 employees under permanent contracts.

The company is also committed to giving its employees meaningful opportunities for personal growth by actively managing their careers and enhancing their skills. A total of 42,000 employees participated in annual performance reviews with their supervisors, and 40,000 were evaluated by co-workers in "people reviews". Internal mobility is also a







MARINA HASHIM

## “Selling Alstom’s global image to the Middle East”

**Marina Hashim’s career path is impressive.** *“In 1996, Cegelec hired me to work on automatic controls for thermal power plants. At the time there were very few women engineers, but I settled in without much trouble. I was passionate about technical engineering work.”* In 1998, Cegelec became a part of Alstom, and the young engineer moved rapidly up the rungs, shifting from technical engineering work to sales and taking assignments in China, France, the Middle East – *“My father is Iraqi, so I took the opportunity to learn Arabic”* – Tunisia, Indonesia and other countries. She changed positions and companies frequently, moving from Alstom T&D to Bouygues Construction and finally back to Alstom in 2009, when she became Country President for Iraq, Syria, Jordan and Lebanon. *“I sell Alstom’s global image to the Middle East,”* says Marina Hashim simply. Her philosophy has paid off: Alstom recently won a contract to retrofit Iraq’s Nadjaf power plant, and several more attractive projects are in the offing for Power, Transport and Grid...



DAVID BRIGGS

## “Training may be our best management tool”

**It is hard to find a stronger advocate for training than David Briggs.** *“When I joined Alstom Power in 2007, I made it my priority to strengthen the Cap Savoir knowledge-transfer programme. The stakes were high: in the unit I was managing, 50% of the staff were about to retire, and their expertise in steam turbine maintenance was peerless. We used Cap Savoir, which combines traditional training methods with modern ones like interactive 3D, to train both their successors and certain customers.”* Four years on, the same maintenance unit has 20% more staff and its profitability has increased 300%. An engineer by training – *“I’m no human resources specialist”* – Briggs has since made Cap Savoir an integral part of his management strategy and has stepped up co-operation with Alstom University. Now Managing Director of Alstom Power’s service business for the countries of southern Africa, he is setting up a training centre in Johannesburg, which will centralise much of the company’s power plant maintenance activity...



YU WU

## “There’s nothing like mobility to open up your mind”

**If there is anyone who really knows Alstom’s various business areas, it is 36 year-old Yu Wu.** Now Human Resources Director for Alstom Transport in China, he has worked in turn for Grid, Power and Transport, primarily in human resources. Wu has benefited from cross-functional mobility within the Group, but he also exemplifies vertical mobility, rising from a position as a managing director’s assistant to his current post in corporate human resources. Finally, Yu Wu has made the most of geographic mobility at Alstom, holding positions in Shanghai and Beijing – and in Singapore, where he will oversee Transport’s human resources policy for the entire Asia-South Pacific region. *“It’s really opened my mind to different cultures. Because I’ve benefited from genuine mobility myself, I’m passionate about promoting it.”* Faced with the problem of turnover among young Chinese managers, Yu Wu believes strongly that international mobility can help retain talent. *“Alstom really can offer assignments in Europe, and that clearly gives our employees career opportunities that are hard to find in other companies...”*



**42,000** employees participated in personal performance reviews.

**70%** of employees completed training programmes in 2010.

**108** videos were shared on Alstom University Tube knowledge platform.

key component of career development within the Group: in 2010/11, internal candidates were selected to fill 80% of open senior executive positions.

Employees also have access to local career management programmes. In Poland, for example, 250 senior executives and promising managers enhanced their qualifications through a career development programme called "Power Lider", which receives 60% of its funding from the European Union.

Equally essential to employee development is Alstom's continuing education policy, which cultivates the expertise the company will need in the future and enables employees to meet their goals for professional growth. In 2010, nearly 70% of the workforce enrolled in training programmes averaging 20 hours long. As a complement to Sector-based training programmes, in 2007 the Group created Alstom University to design and teach a core training curriculum shared by all its businesses. With campuses in Asia, Europe, North America and Latin America, Alstom University has received ISO 9001 certification confirming the quality of its methods. The curriculum includes management programmes as well as sessions designed to deepen professional knowledge in fields such as finance, project management, sales and human resources.

In 2010, 8,650 employees participated in more than 760 training sessions offered by Alstom University.

Alstom University has also successfully launched an original initiative called "Alstom University Tube". Employees can use this intranet platform to upload and share videos that they have made, individually or jointly, as part of their work. Alstom University Tube encourages employees to share knowledge, expertise – even little tricks that simplify their work and move the company forward. Alstom University Tube reflects the philosophy of the Alstom Collaborative Way programme, which uses fast-changing communications technology to foster

a web-based culture of shared knowledge and learning among employees.

### Improving working conditions

Better working conditions begin with preventing workplace accidents and work-related illnesses, but they are also a product of concern for employee well-being.

Alstom is at particularly high risk of serious accidents owing to its manufacturing and construction businesses, and preventing workplace accidents has been a priority for many years. Over the past five years, the Group's accident frequency rate has dropped from 7.6 (as of 31 March 2006) to 1.9 (as of 31 March 2011). Alstom's Zero Serious Accident programme is designed to improve management of risks specific to subcontractors, to develop an incident analysis programme to help anticipate risks, and to foster a culture of workplace safety. Country-specific programmes also focus on improving health and well-being in the workplace. In France, for example, a call centre gives employees and their families access to psychological counselling, and in Brazil a "quality of life" programme provides simple health testing for workers at the Taubate plant. ●



# 700

entries submitted for  
the Alstom Innovation Awards  
since they began.

## Inspiring all to innovate for the Alstom of tomorrow

**"IT'S NEW AND IT WORKS."** At Alstom, innovation never stops with R&D: it is a state of mind shared by every employee. The annual Innovation Awards contest recognises employees who design and implement innovative projects in four categories: Processes, Products & Systems, Green Innovation and Small but Smart.





## ALWAYS INVESTING IN INNOVATION



### CO-OPERATE TO INNOVATE

Among the 187 projects entered in the 2010 Alstom Innovation Awards, one drew special attention from the judges, who gave it a special "co-operation" prize. The idea was simple. For the technicians who maintain power plants, it is critical to be alerted to the risk of power-disrupting equipment failures as far in advance as possible. With that in mind, a team of four Alstom Power engineers, led by Switzerland-based Niklaus Hugi, proposed designing a small robot to inspect the rotors of generators rated below 300 MW. *"Generators with capacity above 300 MW are relatively easy for our technicians to inspect, but accessing the smaller ones is very awkward."* The robot, which is fitted with a small camera, cuts inspection time sharply by transmitting information directly to the operator. *"This result,"* says Niklaus Hugi, *"recognises a truly co-operative effort by Alstom's R&D team and the Swiss Federal Institute of Technology in Zurich. It's not often that you get a good idea all by yourself!"*

To keep pace with rapid changes in technology, employee expectations and relationships with customers and outside partners, Alstom is adapting, laying the groundwork for the company of the future.

Promoting innovation, both internally and with outside partners, is part of this effort. From high-speed trains to CO<sub>2</sub> capture and from new gas turbines to HVDC technology, innovation is the core of Alstom's growth strategy.

In 2010/11, the company stepped up its efforts even more, increasing R&D spending by 26%. Over 12,000 engineers and researchers work on product development in around forty laboratories, R&D centres and in-house design and engineering departments. Alstom engineers stay close to the manufacturing sites and teams that are in daily contact with customers, seeking to develop solutions that mirror trends in the infrastructure markets of tomorrow. At the same time, Alstom invests in innovative businesses offering new materials, components,

concepts and solutions that may be compatible with the Group's markets and products. The company is also involved in large joint projects that benefit the entire industry. In France, for example, Alstom engineers are working with university researchers and with their counterparts in other companies to advance the seven competitiveness clusters designated by the French government. Worldwide, Alstom has forged relationships with about a hundred universities and research institutes, including some of the most prestigious.

Internally, the company cultivates innovation through the "I Nove You" programme, which includes the Alstom Innovation Awards, an annual contest that recognises employees who develop and implement innovative ideas. Since its creation in 2008, some 700 projects have been entered in the contest, and 16 have won awards. In 2010, 640 participants entered 187 projects under four different categories: Innovation Processes, Innovation Products and Systems, Green Innovation and Small but Smart. ●



2010 ALSTOM INNOVATION AWARD WINNERS  
NIKLAUS HUGI,  
SIMON HONOLD,  
PHILIPPE MACHARD  
AND ROLAND MOSER.

## “NO ONE HAS A MONOPOLY ON INNOVATION”



GHISLAIN LESCUYER,  
DIRECTOR OF STRATEGY  
AND DEVELOPMENT

### **What are the goals of Alstom’s innovation policy?**

In a highly competitive environment, innovation is more vital than ever – in providing new products and solutions, in improving our existing offering and making it more cost-effective and in adapting our range to the needs of customers in emerging countries.

### **What areas are you targeting?**

First of all, our goal is to continue Alstom’s high-level R&D effort over the next few financial years. Between 2004/05 and 2009/10, we nearly doubled our R&D spending. This is a major focal point and it is enabling us to develop new solutions that meet our customers’ needs – CO<sub>2</sub> capture, a new offshore wind turbine, improved smart grid and HVDC solutions and more effective rail signalling systems, to name just a few. To accelerate the Group’s efforts in targeted areas, we are pairing this innovation policy with new partnerships – with Brightsource in solar thermal power, for example, and with the start-up Clean Current in tidal energy.

To encourage and support innovation, we have set up a variety of initiatives. The I Nove You programme, created in 2008, includes a range of different approaches, like the annual Innovation Awards contest, which rewards the teams with the most innovative entries, and our Innovation Conferences, which bring innovators and managers together to discuss topics of mutual interest. Other initiatives promote sharing of best practices within the Group and step up our dialogue with universities and start-ups in particular. For example, Alstom has joined Schneider Electric and Rhodia as a sponsor of the Aster Capital venture capital fund, which invests in companies that develop solutions in energy, infrastructure, mobility and the environment. And in 2011, working with our partners Rotem Industries and Gefen

Biomed Investments, we created the incubator Horizon Ventures to support the growth of innovative clean-technology companies.

### **Do engineers have a monopoly on innovation?**

Not at all. We have two important messages. First, innovation is not limited to R&D: it affects everything we do and it is just as important for our internal organisation as it is for the comprehensive solutions we provide to our customers. Secondly, innovation is not limited to researchers: all of us can innovate, no matter where we are in the Group. ●



## MAKING A DIFFERENCE IN LOCAL COMMUNITIES

Wherever Alstom does business, its employees get involved. And as they work to make life better for their local communities, they are often supported by the Alstom Foundation.

Alstom employees express commitment to their local communities in many ways – working for economic development, supporting education and training, contributing to charitable and humanitarian causes,

and protecting the environment, to name just a few. These projects can be ambitious, and many are supported by the Alstom Foundation which was set up in 2007. A few examples:

**In France**, where Alstom Power has a site in the disadvantaged community of La Courneuve, outside Paris, Alstom has renewed its commitment to fight high unemployment by recruiting local residents as employees and interns.





## “WORKING TOWARDS A BRIGHTER FUTURE FOR YOUNG PEOPLE”



It would be hard to find two people more committed to employee development in Brazil than Jose-Gabriel David, Alstom's Human Resources Director for Brazil, and Jacqueline Takemasa, head of Sustainable Development. For the past few years, they have done their utmost to advance two training and education

projects designed to make life better for certain disadvantaged groups. The first was inspired by a new hydroelectric equipment plant built in Porto Velho, Rondônia by IMMA, the joint venture launched by Alstom and its local partner Bardella. *“We have major hydropower projects underway in the region, like the Santo Antonio dam on the Rio Madeira,”* says Jacqueline Takemasa, *“but the area has no history of heavy mechanical industry at all.”* Enter “Guapore” a programme designed to train young men and women from agricultural communities with no job qualifications. The effort is paying off. *“In three years, we trained 650 young people, and IMMA hired two-thirds of them. In 2011, we plan to train 120 new professionals,*

*and the plant should hire 100 of them.”* The second project is located in Taubate, where Alstom operates its largest hydroelectric turbine factory worldwide. The “Escola Formare Alstom” programme prepares young people for the work world by offering a one-year, on-the-job training programme for 16- and 17-year-olds from disadvantaged families. In addition to teaching technical subjects, the coursework addresses behaviour and life in the workplace. *“This project is truly co-operative. Nearly 130 Alstom employees teach the courses,”* says Jose-Gabriel David. *“We’re very proud to be working towards a brighter future for these young people by applying Alstom’s values: trust, team and action.”*

**100,000** trees planted in Thailand.

**5,000** South African children introduced to environmental science.

**130** Alstom volunteers teaching youth in Brazil.

The site is also creating partnerships and sponsorships with local schools and is striving to place as much subcontracting business as possible with providers in La Courneuve and surrounding communities.

**In South Africa,** Alstom is funding training programmes to cultivate the skills needed to expand and maintain the energy industry. The programmes have already benefited 650 workers and technicians and 176 engineers.

**In the United States,** Alstom has provided funding to groups fighting illiteracy in public schools and other institutions.

**The Alstom Foundation** supported 19 different projects around the world in 2010, promoting economic development, social

initiatives, education, environmental awareness and nature conservation. These projects include supplying small wind turbines to salt farmers in India; providing access to drinking water for 5,000 people in the Democratic Republic of Congo; promoting green technologies and environmental awareness in Mexico; and restoring Brazil's Atlantic Forest. The Foundation has also responded to some of the world's most devastating emergencies, providing aid to earthquake-stricken Japan and to Hungary after its toxic sludge spill. ●



# 43

projects funded by the Alstom  
Foundation in three years

“We do not inherit the earth from our  
parents. We borrow it from our children.”

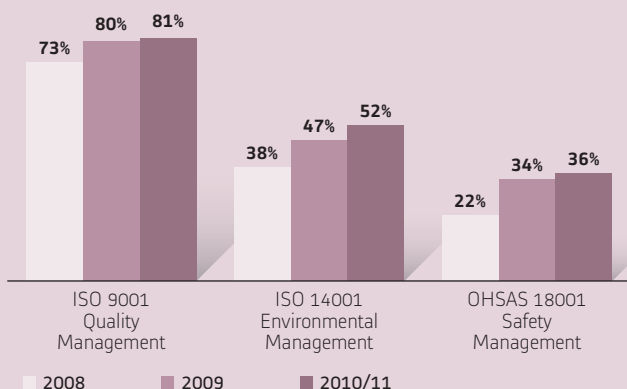
(Antoine de Saint-Exupery)

**IN HARMONY** Worldwide, the Alstom Foundation supports a broad range of initiatives, from public education and awareness campaigns to support for renewable energies, reforestation programmes and access to drinking water. The common denominator? Support for communities that want to preserve their natural environments in ways that are compatible with social and economic progress.

## NUMBER OF CERTIFIED SITES

(as % – all types of sites)

Indicators for 2008-2010 (excluding Alstom Grid)



## TOTAL ENERGY CONSUMPTION

(in GWh)

Indicators for 2008-2010

2008	2009	2010
1,712	◆ 1,483	1,605

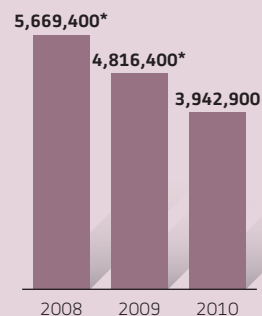
◆ Indicators verified by PricewaterhouseCoopers.

## WATER CONSUMPTION AT PERMANENT FACILITIES

(in m<sup>3</sup>)

Indicators for 2008-2010

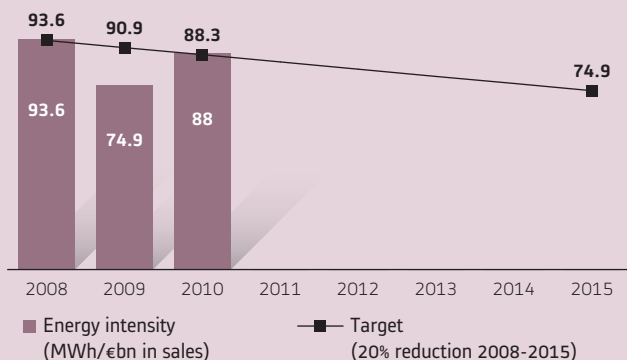
NB: The data published in the 2009 Reference Document (total consumption of 5,670,000 m<sup>3</sup> for 2009 and 6,539,000 m<sup>3</sup> for 2008) do not match the table below.



\* Indicators verified by PricewaterhouseCoopers.

## ENERGY INTENSITY OF ALSTOM SITES

(MWh/€bn in sales)



## SAFETY

Indicators for 2008-2010

Target: an accident frequency rate below 1 by 2015.

	09/2008	09/2009	09/2010
Accident frequency rate* Alstom employees	3.7	◆ 2.4	2.0
Accident severity rate** Alstom employees	0.11	◆ 0.08	0.07

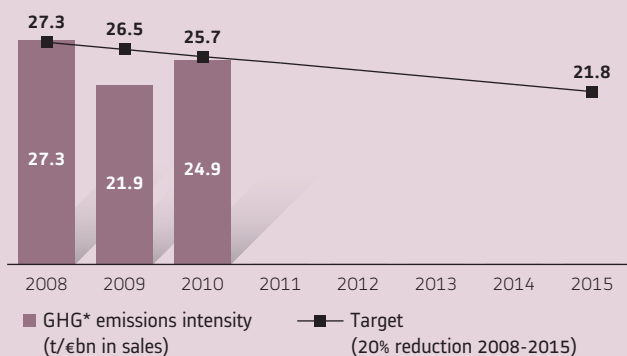
◆ Indicators verified by PricewaterhouseCoopers.

\* Number of accidents with time lost to injury per million hours worked.

\*\* Number of days lost per 1,000 hours worked.

## GHG\* EMISSIONS INTENSITY OF ALSTOM SITES (EXCEPT GRID)

(t/€bn in sales)



\* Greenhouse gas

## TRAINING

Indicators for 2008-2010

	2008	2009	2010
Percentage of employees trained	ND	67%	69%
Average training hours	ND	21 h	20 h
Number of employees trained by Alstom University	5,600	6,300	8,649



## CONSOLIDATED INCOME STATEMENT

Financial year ended at 31 March 2011 (in € million)	2011	2010	2009
<b>Sales</b>	<b>20,923</b>	<b>19,650</b>	<b>18,739</b>
Cost of sales	(16,938)	(15,982)	(15,225)
Research and development expenses	(703)	(558)	(586)
Selling expenses	(902)	(669)	(666)
Administrative expenses	(810)	(662)	(726)
<b>Income from operations</b>	<b>1,570</b>	<b>1,779</b>	<b>1,536</b>
Other income	46	8	44
Other expense	(852)	(158)	(137)
<b>Earnings before interest and taxes</b>	<b>764</b>	<b>1,629</b>	<b>1,443</b>
Financial income	57	59	122
Financial expense	(193)	(101)	(101)
<b>Pre-tax income</b>	<b>628</b>	<b>1,587</b>	<b>1,464</b>
Income tax charge	(141)	(385)	(373)
Share of net profit attributable to equity-accounted associates investments	3	3	27
<b>Net profit</b>	<b>490</b>	<b>1,205</b>	<b>1,118</b>
Attributable to:			
– the owner of the parent company	462	1,217	1,109
– non-controlling interests	28	(12)	9
<b>Earnings per share (in €)</b>			
Basic earnings per share	1.57	4.21	3.87
Diluted earnings per share	1.56	4.18	3.81

## BREAKDOWN OF CHANGE IN NET CASH POSITION (\*)

Financial year ended at 31 March 2011 (in € million)	2011	2010	2009
Changes in cash and cash equivalents	(1,670)	1,284	862
Changes in marketable securities and other current financial assets and liabilities	(57)	14	(162)
Changes in bonds	(1,500)	(1,475)	559
Changes in current and non-current borrowings	(33)	12	(11)
Changes in obligations under finance leases	41	33	27
Net debt of acquired entities at acquisition date	(264)	-	(12)
Exercise of put option by Bouygues	-	175	-
Net effect of exchange rate variations and other	(25)	128	(116)
<i>Decrease (increase) in net debt</i>	<b>(3,508)</b>	-	-
<i>Increase (decrease) in net cash</i>	-	171	1,147
<b>Net cash (net debt) at the beginning of the period</b>	<b>2,222</b>	<b>2,051</b>	<b>904</b>
<b>Net cash (net debt) at the end of the period</b>	<b>(1,286)</b>	<b>2,222</b>	<b>2,051</b>

(\*) The net cash/(net debt) is defined as cash and cash equivalents, marketable securities and other current financial assets and non-current financial assets directly associated with liabilities included in financial debt, less financial debt.

## CONSOLIDATED BALANCE SHEET

Financial year ended at 31 March 2011 (in € million)	2011	2010	2009
<b>Assets</b>			
Goodwill	5,396	3,904	3,886
Intangible assets	1,934	1,453	1,397
Property, plant and equipment	2,651	1,958	1,735
Equity-accounted associates and other long-term investment securities	207	66	66
Other non-current assets	567	535	529
Deferred taxes	1,287	982	1,012
<b>Total non-current assets</b>	<b>12,042</b>	<b>8,898</b>	<b>8,625</b>
Stocks and work in progress	3,363	3,033	2,876
Construction contracts in progress, assets	2,479	3,637	3,139
Trade receivables	6,053	3,446	3,873
Other current operating assets	2,945	2,578	2,773
Marketable securities and other current financial assets	50	35	15
Cash and cash equivalents	2,701	4,351	2,943
<b>Total current assets</b>	<b>17,591</b>	<b>17,080</b>	<b>15,619</b>
<b>Total assets</b>	<b>29,633</b>	<b>25,978</b>	<b>24,244</b>
<b>Equity and liabilities</b>			
Equity – attributable to the owners of the parent company	4,060	4,091	2,852
Shareholders' equity – attributable to non-controlling interests	92	10	32
<b>Total equity</b>	<b>4,152</b>	<b>4,101</b>	<b>2,884</b>
Non-current provisions	1,095	460	444
Accrued pension and other employee benefits	1,145	943	970
Non-current borrowings	3,346	1,845	65
Non-current obligations under finance leases	491	527	543
Deferred taxes	88	113	70
<b>Total non-current liabilities</b>	<b>6,165</b>	<b>3,888</b>	<b>2,092</b>
Current provisions	1,387	1,181	1,226
Current borrowings	578	196	706
Current obligations under finance leases	51	46	42
Construction contracts in progress, liabilities	9,166	10,169	10,581
Trade payables	4,071	3,613	3,866
Other current operating liabilities	4,063	2,784	2,847
<b>Total current liabilities</b>	<b>19,316</b>	<b>17,989</b>	<b>19,268</b>
<b>Total equity and liabilities</b>	<b>29,633</b>	<b>25,978</b>	<b>24,244</b>

## CONSOLIDATED STATEMENT OF CASH FLOWS

Financial year ended at 31 March 2011 (in € million)	2011	2010	2009
<b>Net profit</b>	<b>490</b>	<b>1 205</b>	<b>1 118</b>
Depreciation, amortisation and expense arising from share-based payments	671	419	439
Accrued pension and other employee benefits	(150)	(41)	(156)
Net (gains)/losses on disposals of assets	70	(6)	4
Share in net profit attributable to equity-accounted associates (net of dividends received)	–	3	(24)
Deferred taxes charged to income statement	(107)	186	200
<b>Net cash provided by operating activities – before changes in working capital</b>	<b>974</b>	<b>1,766</b>	<b>1,581</b>
<b>Changes in working capital</b>	<b>(743)</b>	<b>(960)</b>	<b>555</b>
<b>Net cash provided by operating activities</b>	<b>231</b>	<b>806</b>	<b>2,136</b>
Proceeds from disposals of tangible and intangible assets	44	58	14
Capital expenditure (including capitalised R&D costs)	(791)	(679)	(671)
Decrease in other non-current assets and liabilities	(1)	22	4
Acquisitions of Grid (– €2,351 million) net of cash acquired (€328 million)	(2,023)	–	–
Acquisitions of businesses, net of cash acquired	(242)	(12)	(40)
Disposals of businesses, net of net cash sold	(68)	(25)	36
<b>Net cash used in investing activities</b>	<b>(3,081)</b>	<b>(636)</b>	<b>(657)</b>
Capital increase	9	65	29
Treasury shares	–	(34)	–
Dividends paid, including payments in respect of non-controlling interests	(378)	(333)	(233)
Issuance of bonds	1,500	1,750	–
Repayment of bonds and notes issued	–	(275)	(559)
Changes in current and non-current borrowings	33	(12)	11
Changes in obligations under finance leases	(41)	(33)	(27)
Changes in marketable securities and other current financial assets and liabilities	57	(14)	162
<b>Net cash provided by (used in) financing activities</b>	<b>1,180</b>	<b>1,114</b>	<b>(617)</b>
<b>Net increase (decrease) in cash and cash equivalents</b>	<b>(1,670)</b>	<b>1,284</b>	<b>862</b>
Cash and cash equivalents at the beginning of the period	4,351	2,943	2,115
Net effect of exchange rate variations	24	135	(27)
Other changes	(4)	(11)	(7)
<b>Cash and cash equivalents at the end of the period</b>	<b>2,701</b>	<b>4,351</b>	<b>2,943</b>
<i>Income tax paid</i>	<i>(248)</i>	<i>(191)</i>	<i>(192)</i>
<i>Net of interest received and paid</i>	<i>(107)</i>	<i>(29)</i>	<i>22</i>



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