Alstom Grid
Analyst Day
Grégoire Poux-Guillaume
Nantes
28th February 2013
Agenda

I. Grid within Alstom

II. Growing but challenging market

III. Grid 3 strategic priorities

IV. Focus on HVDC

V. Focus on Smart Grid

VI. Conclusion
Grid successfully integrated within ALSTOM

**ALSTOM THERMAL POWER**
- Boost local presence of Grid Services leveraging Thermal Services sites
- GCB and e Bop offering to connect power plants
- Automation & control technologies synergies

**ALSTOM GRID**
- Overheads cost synergies
- Use of Global Power Sales network
- ALSTOM Group a Top 5 customer

**ALSTOM RENEWABLE POWER**
- Optimised AC and DC solutions for wind farms
- Smart Grid solutions for renewable power generation
- Energy storage for solar & wind through power conversion
Alstom Grid Scope

What we do

• Transformers and Switchgear for HV, and associated service
• Automation and Network Management for HV, MV and Smart Cities
• Power Electronics (HVDC, FACTS)
• EPC to sell products

What we don’t do

• Transformers and Switchgear for MV
• LV products
• EPC for the sake of EPC
Orders progressing – Book to Bill > 1

- Good dynamics on order intake
- H1 Book to Bill of 1.2
- 2 HVDC projects booked LTM
  - ca. €250m South West Link in Dec ‘11
  - ca. €400m Champa in Aug ‘12
- Well balanced by region
- Customers slowing down projects, impacting sales

* Consolidated for 10 months (from June 2010 to March 2011)
Margin resilient despite difficult market conditions

Income From Operation (€ million and % of sales)

- Performance driven by strong execution and cost optimisation
- Ramp-up of sales key to support performance improvement

FY* 2010/11: 218
FY 2011/12: 248
H1 2011/12: 107
H1 2012/13: 113

* Consolidated for 10 months (from June 2010 to March 2011)
Orders mix shifting towards more HVDC and Smart Grid

<table>
<thead>
<tr>
<th>Loose Products</th>
<th>Turnkey &amp; Service</th>
<th>HVDC &amp; FACTS</th>
<th>Smart Grid (c)</th>
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<tbody>
<tr>
<td><img src="image1" alt="Graph" /></td>
<td><img src="image2" alt="Graph" /></td>
<td><img src="image3" alt="Graph" /></td>
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- Significant HVDC and Smart Grid increase
- Products flat, in line with market trend
- Turnkey mix moving towards more Power Generation, Industry and Oil & Gas

(a) Consolidated for 10 months (from June 2010 to March 2011)
(b) 12/13 values are April – Dec 12 linearised over 12 months
(c) Automation and Network management
Industrial footprint and orders balanced

**Americas**
- 13 Manufacturing & Engineering sites
- 1 R&D Technology centre
- 20% of global order intake

**Europe**
- 40 Manufacturing & Engineering sites
- 3 R&D Technology centres
- 30% of global order intake

**Asia**
- 22 Manufacturing & Engineering sites
- 1 R&D Technology centre
- 30% of global order intake

**Middle East & Africa**
- 13 Manufacturing & Engineering sites
- 20% of global order intake
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# Solid long term market fundamentals

## Long term Drivers

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<th>Global Importance</th>
<th>Segment</th>
<th>Impact on Grid Market</th>
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<tr>
<td></td>
<td>HV Products</td>
<td>Smart Grid</td>
</tr>
<tr>
<td>Electricity Consumption &amp; Generation</td>
<td>High</td>
<td>Medium</td>
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<tr>
<td>Ageing of the installed infrastructure</td>
<td>Medium</td>
<td>High</td>
</tr>
<tr>
<td>Increase of Renewables within Energy mix</td>
<td>Low</td>
<td>High</td>
</tr>
</tbody>
</table>

**Impact on Grid Market**
- Main driver for Grid expansion, new substations and related HV products
- Challenge to improve Energy efficiency across the value chain
- Challenge to maintain Grid reliability
- Driver for Replacement market
- Challenge to maintain Grid stability
- Impact on HVDC for interconnections and offshore wind tie-in
- Impact on Smart Grid for renewable energy management systems
HVDC and Smart Grid as key market growth drivers

€40 billion market with 3% CAGR

- Growth driven by HVDC and Smart Grid
- Conventional AC flat
- Service and Industrial growing faster

Smart Grid addressed by ALSTOM: Network management systems, Telecom for Transmission, HV and Primary Distribution Automation

Smart Grid not addressed by ALSTOM: Meters, Telecom for Distribution, MDMS, Secondary Distribution Automation

Source: Alstom
AC price stabilising - at low level

- Price erosion stabilizing at low level
- Price pressure maintained by
  - Over-capacity in AC products
  - EPC contractors packaging third party equipment
- Some disparities between regions
  - Anti-dumping in USA for Power Transformers: price increase?
  - Slight uptick in China
  - Price erosion continuing in India

Sources: Alstom, market data
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Strategic priorities

1. Focus on high value segments and growth drivers

**HVDC**
- Growing market with high barriers to entry
- 2 key technologies: LCC and VSC
- Major recent commercial successes in 800kV LCC and VSC
- More to come?

**Smart Grid**
- 3 priorities
  - Control Rooms (market leader)
  - Smart Power Electronics
  - Substation Automation
- 30 commercial projects, 30 ongoing demonstrators
Strategic priorities

1 Focus on high value segments and growth drivers

**Service**
- Achieve double digit growth without sacrificing margins
- 4 key axes:
  - geographical coverage
  - Industry & Power generation
  - third party services
  - asset management

**Industry / Oil & Gas**
- Reinforce our positioning
- Develop Smart Grid offering and Services
- Comprehensive offer through targeted MV partnerships
- Acquisition of O&G SCADA company
... while remaining a key player on AC business

2012 Commercial successes

- **Abu Dhabi** – **TRANSCO**: 2 GIS substations of 220 kV and 400 kV
- **India** – **Power Grid**: world’s first 1,200 kV optical instrument transformer and disconnector
- **USA** – **Florida Power & Light**: fleet management for 350 transformers
- **Chile** – **Transelec**: first contract for 550 kV GIS substation
- **Germany** – **Tennet and TransnetBW**: MSCDN system and switchgear panels for TransnetBW
- **Australia** – **Chevron**: substations for Oil & Gas Wheat Stone project

2012 R&D successes

- Portfolio extended with **GIS 420 kV Single chamber** and **AIS dead tank 362 kV**
- World’s largest **special Industrial transformer** built by Gebze factory for German Railways
- Green offering strengthened with **VL 109 72.5 kV Vacuum Circuit Breaker**
- First sales of **new Resin Impregnated Paper (RIP) 245kV bushing technology**
- **Digital substations** in France and Russia
- **DC Circuit Breaker prototype** successful tests with RTE
Strategic priorities

Key partnerships to support and expand growth focus

**HVDC**

- **China**: commercial and technology partnership with Shandong (SGCC) for 800/1,100 kV DC Transformers
- **Korea**: 49/51 JV with KEPCO to serve local HVDC market (Oct 2012)
- **Russia**: 50/50 JV with KER to serve local HVDC market
- **France**: DC converter solutions with CEA (July 2012) and industry initiative for Supergrid (IEED)

**Smart Grid**

- **Cisco (USA)**: communications and data protection solutions for digital substations (Sept 2012)
- **Toshiba / Landis & Gyr (Japan)**: smart grid solutions for distribution systems (Sept 2012)
- **Cap Gemini**: cloud-based solutions and control room IT integration (Jan 2013)
- **Itron**: smart metering integration
- **Saft**: battery storage
- **Bouygues**: smart buildings
Strategic priorities

Cost optimisation to offset price pressure in AC

Site redeployments

- Adapt to market
  - 4 sites being closed
    (Mexico, Australia, China x 2)
  - Rationalisation in Europe

Product Cost Optimisation

- Double digit % cost reduction
  - Redesign-to-cost on HV Products
  - New product introduction
  - Major quality initiative

Sourcing leverage

- Sourcing Transformation
  - Sourcing in R&D and tender stages
  - Supplier panel rationalisation

Overhead reduction

- Drive down S&A
  - HQ downsized
  - Sales efficiency programme
  - Organisation simplification
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HVDC market to triple in 10 years

**Market Trends**

- Market divided into 2 technologies
  - Line-commutated converters (LCC)
  - Voltage-sourced converters (VSC)
- Solid key drivers: bulk power transfers, renewable energy integration, Supergrid development
- Increased country interconnections in specific markets (Europe, Middle-East, North America)
- Race for higher voltages (800kV+) in China and India
- Offshore wind essentially in Europe

**Technology breakdown next 3 years**

- In € billion
  - 2011/12: 3
  - 2020/21e: 9

Source: Alstom
Alstom Grid HVDC
> 30 GW installed, 50 years of experience

- **McNeill**: 150 MW
- **Nelson River OHL**: 3,000 MW
- **Dürrnrohr**: 380 MW
- **IFA2000 (Fra/UK)**: 2,000 MW
- **Konti-Skan 1**: 380 MW
- **SACOI**: 380 MW
- **South West VSC**: 2x720 MW
- **China-Russia**: 750 MW
- **Lingbao II**: 750 MW
- **3G-Shanghai II**: 3,000 MW
- **Nindong-Shandong**: 4,000 MW
- **Cheju-Haenam**: 300 MW
- **Cheju-Jindo**: 400 MW
- **GCCIA**: 3x600 MW
- **Cahora Bassa**: 1,920 MW
- **Chandrapur**: 2x500 MW
- **Vizag**: 500 MW
- **Sasaram**: 500 MW
- **Champa**: 3,000 MW
- **Rivera**: 70 MW
- **Melo**: 500 MW
- **Rio Madeira**: 3,150 MW

Source: Alstom
Alstom Grid HVDC
Main projects in execution

- **Rio Madeira (Brazil): the longest DC line in the world (2,375 km)**
  - Technology: LCC
  - 600 kV - 3,150 MW
  - Contract award: 2009 – Completion 2013

- **Champa (India): a reference in 800 kV**
  - Technology: LCC
  - 800 kV - 3,000 MW
  - Contract award: August 2012 – Completion 2015

- **South West Link (Sweden): world’s first multi-terminal VSC**
  - Technology: VSC
  - 300 kV - 1,440 MW
  - Contract award: December 2011 – Completion 2015
Alstom Grid HVDC
Ambition: sustainable 20+% market share

• **Target ~€2.5 billion orders over the next 3 years**
  – Break into offshore wind (Germany, Baltic Sea)
  – Leverage partnerships for entry in Korea, China and Russia
  – Build talent base: R&D, Engineering, Project Management

• **Be at the edge of innovation in both technologies**

  **LCC**
  • Integrated offering up to 1,100 kV (valves + converter transformers + bushings)
  • Stafford Centre (UK): HVDC / UHVDC equipment up to 1,100 kV
  • 4 Transformer units qualified to 800 kV

  **VSC**
  • Create world-class reference with Svenska Kraftnät (Sweden)
  • VSC 2nd Generation under development
  • Controlled development in offshore
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Smart Grid market to double in 10 years

- €20 billion market with T&D contributing to the bulk of it

Market driven by
- Renewable integration (intermittency)
- Need to reduce consumption peaks
- Increasing distributed generation
- EV integration
- Requirements for more cyber security

Global Smart Grid market (in € billion)

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<thead>
<tr>
<th></th>
<th>2012</th>
<th>2020e</th>
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<tbody>
<tr>
<td>Homes</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>Buildings</td>
<td></td>
<td></td>
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<tr>
<td>T&amp;D</td>
<td></td>
<td></td>
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<tr>
<td>Generation</td>
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Source: Alstom
### Alstom Grid Smartgrid
Present across the value chain

#### Smart Grid T&D market (in € billion)

<table>
<thead>
<tr>
<th>Segment</th>
<th>2012</th>
<th>2020e</th>
<th>CAGR</th>
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<tbody>
<tr>
<td>Control Rooms</td>
<td>10</td>
<td></td>
<td></td>
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<tr>
<td>Telecom</td>
<td></td>
<td>10</td>
<td></td>
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<tr>
<td>SAS-DA</td>
<td></td>
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<td></td>
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<tr>
<td>Smart Meters</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Power Electronics</td>
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#### ALSTOM Grid Presence

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<tbody>
<tr>
<td>Control Rooms</td>
<td>Full ALSTOM offering</td>
</tr>
<tr>
<td>Telecom</td>
<td>No ALSTOM offering</td>
</tr>
<tr>
<td>SAS-DA</td>
<td>Full ALSTOM offering</td>
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Source: Alstom
Alstom Grid Smartgrid
Leader in Control Room applications

- # 1 in Control Rooms
- Over €40 billion transactions per year on our systems
- > 70% of USA deregulated markets

Online Stability
Renewable Integration
Integrated DMS / Demand Response
Smart-Cities

Continuous integration of new control room applications
Alstom Grid Smartgrid
Deploying its solutions all across the Grid

- Leading innovator in automation and storage for the grid
- > 1,000 HV substations equipped

Digital substation
Energy Storage
Distribution Automation

Extension towards new distribution automation and storage
Alstom Grid Smartgrid
Joint innovation through strategic demonstrations
Alstom Grid Smartgrid
Ambition: double digit growth

- **End-to-end offering for Transmission & Distribution**
  - Transform our 30 R&D demonstrators into large scale commercial projects
  - Consolidate key markets
    - USA: Demand Response, integration of renewable energies
    - Europe: integration of renewable energies, Smart Cities

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**Transmission**

- Roll-out of new systems
  - Digital Substations (Russia, France)
  - Smart control rooms: distributed generation & storage management
- Co-developments on plant flexibility + offshore connections (Alstom Thermal & Renewable)

**Distribution**

- Commercial focus: Distribution Automation (Demand Response)
- R&D: converters for renewables and storage, Demand Response IEDs
- Partnerships in Smart Buildings & Cities and public transport (Alstom Transport)
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Conclusion

Well positioned to capture growth

- Strong technology offering
- Significant R&D spending
- Key partnerships in place

Focus on operational excellence

- Optimise footprint
- Cut overheads
- Competitiveness through new or re-designed products
- Extract cost savings in sourcing, quality, project execution

Still targeting 8% operating margin

- Current market tension will delay but ambition unchanged