Alstom in India

Integral part of India’s economy for over a century

Alstom’s Presence

**KEY DATA**

- More than **8,000 Employees** in India
- **4 R&D Centres** in Bangalore (Transport), Vadodara (Power) and Hosur & Padappai (Grid)
- **3 Engineering Centres for Power** in Noida, Kolkata and Shahabad
- **Manufacturing Units**
  - **Power** - Vadodara, Durgapur, Shahabad, Sanand*
  - **Transport** – Coimbatore, Sricity
  - **Grid** - Padappai, Pallavaram, Hosur, Vadodara, Naini, Noida

*upcoming facility

Alstom "India", March 2015
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History

1911: First factory built in Kolkata.

1950: Participated in setting up the first major manufacturing unit of BHEL, Bhopal

1957 - 1959: Power Transformers manufacturing facility set up at Naini
   - Power Boilers facility established in Durgapur
   - Automation facility established in Pallavaram

1963: Boiler/Mill facility established in Shahabad

2002: Through a series of amalgamations ALSTOM Projects India Limited is formed

2004 - 2008: Hydro manufacturing facility established in Vadodara
   - Global Technological Centre (GTC) established in Vadodara

2009 - 2011: Four Green Field manufacturing units were setup in Hosur, Padappai, Vadodara and Shahabad

2012: - Areva T&D became Alstom T&D India Limited
   - ALSTOM Projects India Limited became ALSTOM India Limited

2013: Foundation stone laid for Bhutan Hydro Services Ltd. (BHSL) Hydro Service Centre in Bhutan
   - Foundation stone laid for ABFPL manufacturing site in Sanand, Gujarat
   - Digital Automation Competence Centre inaugurated in Pallavaram

Partnerships

Alstom in India has made strategic partnerships with strong local players to bring in frontline technologies and enhance the quality and efficiency of its products:

Alstom and Druk Green Power Corporation in 2011

The JV will set up a hydropower service centre in Bhutan to provide repair services for hydro runners and other underwater parts of hydropower plants

Alstom and Bharat Forge Ltd. JV in 2009

The JV will manufacture steam turbines and auxiliary equipment with an annual capacity of 5000 MW

Alstom and BHEL in 2005

Alstom and BHEL entered into a 15-year License agreement for manufacture, supply and technology transfer for supercritical boilers and pulverisers (Coal Mills)

Alstom and NTPC in 1999

This 50:50 joint venture undertakes renovation, modernization, retrofit and refurbishment of old and ageing power plants

Corporate Social Responsibility

Provision of BioOrja Plant for Akshaya Patra Kitchen:

The Foundation inaugurated a BioOrja biogas Plant for the Akshaya Patra Vadodara kitchen which provides meals to the underprivileged children in a sustainable way. The Foundation is collaborating with Akshaya Patra and Green Power Systems for the project which aims to use food waste of Akshaya
Patra's kitchen as a source of energy for cooking the meals while saving fuel and reducing pollution.

**Establishment of ‘Alstom Eco Village’ in Durgapur:**
Alstom Foundation has adopted Moldanga village in association with Swami Vivekananda Vani Prachar Samiti to usher in balanced and all-round development. Under this initiative, solar powered lamps, water filters, individual sanitation units and a community centre is provided to the villagers in Moldanga.

**Partnering with Alamgarh Village in Gujarat:**
Alstom T&D India partnered with Alamgarh village in Gujarat to provide various amenities for the villagers. It included setting up of a school for the children residing in the area.

**Unique initiative to electrify rural India through Dry Gasification system:**
In an effort to minimise water usage and reduce carbon footprint, Alstom Foundation is collaborating with Husk Power Systems (HPS) to fund a dry gasification process for low-cost manufacturing and retro-fitting gasifiers at 65 biomass-based power plant sites in Bihar. The project also promotes women empowerment by providing vocational programmes and training to women for a consistent and high quality manufacturing of incense sticks at the sites. Through this unique initiative Alstom is contributing towards electrification of rural India as also social and economic empowerment of women.

**Restoring soil to increase farming in Gujarat:**
To provide ecological management techniques of degraded natural resources, education and awareness for bio-diversity, Alstom Foundation with the help of GNCS (Gujarat Nature Conservation Society) is working to restore the quality of the soil by planting Vetiver and setting up check dams and bunds to bind the soil and to provide more drinking water to the residents.

**School expansion and remodelling in Zanskar, Ladakh:**
In order to encourage education of young population and promotion of women through parity education, Alstom Foundation in collaboration with Aide au Zanskar – AAZ-is extending and remodelling the only High School in Zanskar Valley in order improve study conditions for a larger number of students, promoting passive solar housing architecture and local culture.

**Nature preservation through Lake restoration Project in Chennai:**
This project aims at restoring two local lakes at Tambaram and Pallavaram, near Chennai, contaminated by waste with bad water quality, through removal of debris and waste from lakes with the help of the government. The main benefits of the project will include nature preservation supporting eco-system, good quality of water, sustainable fishing and environmental awareness.

**Local education Initiatives in Durgapur and Shahabad:**
As a part of the education initiative, Alstom facilities in Durgapur and Shahabad have constructed a school building and provided it with the infrastructure along with financial assistance for the children residing in those areas. Alstom T&D India also supported the Panchayath Union middle school in Athanancheri by providing the school children with uniforms, shoes and Identity cards.

**Social empowerment of Tihar Inmates:**
Alstom T&D India provides a platform to Tihar inmates who are creative and actively involved in making daily goods. Stalls on various festivals have been put up to motivate them for a good and noble living.

**Durlung Khola Project in Nepal:**
In order to provide a better life to more than 7000 households near Durlung Khola district in Nepal, Alstom Foundation in association with South Lalitpur Rural Electric Cooperative aims to construction a 900kW hydropower plant to generate 5.1GWh annually along with construction of 3km 11kV line to connect to the grid. Along with training of the local staff, side activities include setting up bio digesters and development of microfinance to ensure that the electricity generated by the plant will be used productively by the local economy.
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- More than 90% of the country’s aluminium smelters use our pollution control systems
- Boilers from the largest local manufacturer come with Alstom technology
- Supplied more than 40 mills for 660MW supercritical boilers worldwide from Shahabad unit
- Supplying hydro equipment to the upcoming single largest hydro power project in the country – Subansiri 2000 MW for NHPC
- Secured order for one of the largest ESP retrofit contracts in India

Thermal Power

Thermal Power consists of seven businesses: Steam, Gas, Nuclear, Power Automation and Controls (PAC), Environment Control Systems (ECS), Steam Auxiliary and Thermal Services. The Sector is a supplier of all types of power generation technology: coal, gas, fuel oil, nuclear.

Steam

Steam designs, engineers and constructs turnkey steam power plants in addition to offering a range of products such as boilers, turbines, generators, environment control systems and CO2 capture & storage technologies.

References

- APGENCO – Krishnapatnam - Supercritical Boilers – 2 x 800 MW – Unit 1 - 2015
- NTPC – Barh II – Supercritical Boilers – 2 x 660 MW – Unit 4 - 2014
- CSEB – Korba – 4x 50 MW R&M – 2007
- STCMS – Neyveli ‘o’, 1 x 250 MW Lignite Fired Power Plant full turnkey – 2002

Ongoing Projects

- NTPC – Barh II – Supercritical Boilers – 2 x 660 MW - under execution*
- APGENCO – Krishnapatnam - Supercritical Boilers – 2 x 800 MW - under execution*
- Jay Pee - Bara - Supercritical Boilers – 3 x 660 MW - under execution*
- NTPC – Mouda - Supercritical Boilers – 2 x 660 MW - under execution*
- NTPC – Solapur Supercritical Steam Turbine Islands - 2 X 660 MW – under execution
- NTPC – Nabinagar Supercritical Steam Turbine Islands and Boilers* – 3 X 660 MW - under execution
- BHEL – Gadarwara Super Thermal Power Plant - 2 X 800 MW – under execution*
- BHEL – Suratgarh Super Thermal Power Plant - 2 X 600 MW – under execution*
- BHEL – Neyveli New Thermal Power Plant - 2 x 500 MW – under execution*
- BHEL – Banharpalli coal power plant - 2x660 MW – under execution*
- BHEL – North Karanpura STPP – 3x660 MW – under execution*
- NTPC – Tanda coal power plant – 2x660 MW – under execution

* Through our technology licensee, BHEL
Gas designs, engineers and constructs turnkey gas power plants in addition to providing the equipment at the heart of thermal power plants, such as gas turbines, heat recovery steam generators, hot gas path parts HRSG’s for the MEI region and part of Europe.

**References**

- Anta 414 MW CCPP for NTPC – 1990
- Kawas 656 MW CCPP for NTPC – 1991
- Gandhar 657 MW CCPP for NTPC – 1995
- Jegurupadu Phase I - 235 MW for GVK – 1997
- Hazira 156 MW for GSEG – 2002
- Jegurupadu Phase II - 228 MW for GVK –2006
- Utran 370 MW CCPP for GSECL – 2009
- Gautami 469 MW CCPP for GVK -2009

**Ongoing Projects**

- Khulna 180 MW for NWPGCL

**Nuclear Power Plants**

Nuclear offers a full portfolio of components for nuclear turbine island that suit all reactor types, including emergency generators, pumps, nuclear systems and heat exchangers.

**References**

- Kakrapar units 1 & 2 for NPCIL – 1973 and 1981

**Ongoing Projects**

- Rajasthan Atomic Power Project (RAPP) units 7 & 8, 2 x 700 MW for NPCIL
- Kakrapar units 3 & 4, 2 x 700 MW for NPCIL

**Environment Control Systems (ECS)**

Alstom is a market leader in the AQCS business in India offering full spectrum of products and services for power, cement, sugar, chemical, steel, copper, zinc, aluminium and other Industries.

**References**

- Nalco - EPC turnkey contract for 8 GTCs
- Balco – 4 GTCs of 250 KT per Annum (Korba) – 2004
- NTPC – Talcher, ESP for 4 X 500 MW - 2006

**Ongoing Projects**

- Hindalco – EPC turnkey contract for 4 GTCs of 2 x359 KT/Annum (Aditya & Mahan)
- Vedanta – EPC turnkey contract for 8 GTC of 1.25 MT/Annum (Jharsuguda)
- JSW – Sea water FGD plant for 4 x 300MW units coal fired power plants
- NALCO – Fume Treatment plant (Angul)
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- Rastriya Ispat Nigam Limited (RINL) – Stock House Dust Extraction System for RINL’s Vizag steel plant
- NTPC – Limestone based FGD plant for Vindyachal STPP
- NTPC – ESPs for Talcher STPP

Power Automation and Control (PAC)

Alstom’s Power Automation & Controls offers energy management for utilities and industrial customers from plant automation and management to grid connection and information solutions.

References

- GVK, Jegurupadu Phase II, 235 MW (CCPP) - 2006
- GVK, Gautami, 469 MW (CCPP) - 2008
- GSECL, Utran, 370 MW (CCPP) – 2009
- NHPC, Chamera Stage I, 3 X 180 MW (Hydro) - 2011
- NHPC, Chamera Stage II, 3 X 100 MW (Hydro) - 2011
- NHPC, Chamera Stage III, 3 X 77 MW (Hydro) - 2011
- Lanco, Kondapalli, 120 MW (STPP)

Ongoing Projects

- Panduranga Energy, Panduranga, 100 MW (CCPP)
- NTPC, Solapur and Mouda II (Maharashtra) 660 MW (Supercritical projects)

Steam Auxiliary

Auxiliary business supplies Pulverisers and Coal mills for Power Industry as well as for Cement, Steel and other Mineral Industries. It caters to the Indian subcontinent and the rest of Asia.

Mills

References

- Coal Mill HP 743 for HINDALCO Renusagar – 2 x 67.5 MW
- Coal Mill HP 643 for NTPC Tanda - 4 x 110MW
- Coal BRM 109(10) for CESC Budge Budge – 2 x 250MW
- Coal BRM 85(09) for MPSEB Birsinghpur – 2 x 210MW
- Coal Mill HP 643 for Ultratech , Ginigera Cement Plant
- Coal BRM 109(10) for Holcim (Ambuja) Rabriyawas Cement Plant
- Clinker Ball Mill for JK Laxmi Jaykaypuram Cement Plant
- Iron Ore Ball Mill for Janki Steel Bellary Plant
- Limestone+Coke Ball Mill for ESSAR Paradeep Plant
- Bentonite RRM 86614 for Essar Paradeep
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Ongoing Projects

- Coal Mill HP 1103 for PPGCL Bara – 3 x 660MW
- Coal HP 1103 for RPCL Yermaras – 2 x 800MW
- Coal HP 1103 for KPCL Bellary – 1 x 700MW
- Coal HP 1023 for TNB Manjung, Malaysia – 1 x 1000MW
- Coal HP 1103 for MCB Tanjung, Malaysia – 1 x 1000MW
- Coal Mill HP 1003 for SKS Raigarh - 2 x 300MW
- Coal Mill HP1103 for NTPC Mouda 2 X 660 MW
- Coal Mill HP1103 for NTPC Nabinagar 3 X 660 MW
- Coal Mill HP1203 for NTPC Gadarwara 2 x 800 MW
- Coal SM 29/18 for NMDC Nagarnar Blast Furnace
- Coal HP 1003 JSW Toranagallu Blast Furnace # 4
- Coal Mill BRM 120(10) for Holcim -Ambuja Darlaghat Cement Plant

Thermal Services

Specialists in customer care, Thermal Services provides cradle to grave operation, maintenance and service of components and power plants from Alstom and beyond.

References

- Major Overhaul – 100 to 500 MW Units at NTPC, MSPGCL, TNEB, DPL, UPRVUNL, NPCIL and many others
- Rihand 500 MW Generator excitor repair
- Mill upgrades at various plants
- ESP retrofits & upgrades – State Electricity Boards and M&M segment

Ongoing Projects

- Utran O&M and other Annual maintenance contract (AMCs) on Turbine Generator, Boiler and Environment
- Long Term Service Agreement with GVK Projects for retrofit and servicing
- NTPC – Jhanor Gandhar 657.39 MW
- NTPC – Talcher STPP
- Wanakbori 3
- Ukai 4

Renewable Power

Hydro

As one of the world’s major suppliers of hydropower generation equipment, Alstom Hydro offers a complete range of products and services in hydro electricity.

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- Chamera I 3 x 180 MW for NHPC – 1994
- Chamera II 3 x 100 MW for NHPC – 2004
- Vishnuprayag 4 x 100 MW for Jaiprakash Power ventures Ltd. – 2005
- Dhauli-Ganga 4 x 70 MW for NHPC – 2005-06
- Dulhasti 3 x 130 MW for NHPC – 2006-07
- Chamera Stage III 3 x 77 MW for NHPC – 2012
- Chuzachen 2 x 55 MW for GATI Infrastructure
- Uri-II 4 x 60 MW for NHPC

Ongoing Projects
- Shuakhevi 185 MW for Adjaristsqali Georgia LLC
- Ratle 850 MW for GVK
- Tehri 1000MW for THDC
- Phatabyung 2 x 38MW for Lanco
- Subansiri 8 x 250 MW for NHPC
- Jorethang 2 x 50 MW for Dans Energy
- Lower Jurala 6 x 40 MW for APGENCO
- Teesta VI 4 x 125 MW for Lanco
- Thac Mo 75MW for EVN

Solar

Globally Alstom is active in solar market through Solar Thermal technology products. It intends to participate in solar projects in India as well.

Grid

A market leader in transmission in India since 2008, Alstom Grid’s solutions brings electricity from the source onto the power network through high-voltage substations and technologies to manage power grids worldwide. At the heart of the development of Smart Grid, Alstom Grid offers products, services and integrated energy management solutions across the full energy value chain.

Our Achievements

- Manufactured India’s first 1200 kV Capacitor Voltage Transformer
- Commissioned India’s first 765 kV indigenously developed substation
- 70% of India’s power flows through the networks managed by our Network Management System
- Over 50% of India’s 765kV Extra High Voltage substations are built with Alstom’s technology and solutions

- Commissioned India’s first digital solution for Substation in Gujarat
- Delivered and commissioned a record 88 substations from 66 kV to 765 kV in 2012-13
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**High Voltage Products**
Manufactures a full range of equipments for long-distance transmission at voltages up to 1200 kV.

**Grid Automation**
Provides software solutions and platforms for grid control rooms and market management systems in charge of piloting and controlling the power grid. It also provides solutions that protect, control and monitor electrical substations and grids for utilities and electro-intensive industries.

**AC Substations**
Provides a comprehensive offering of AC and DC transmission systems, comprising of substations ranging from 66 kV to 765 kV, for all the segments and electro-intensive industries and infrastructure.

**Power Electronics**
Provides high performance applications for the AC/DC conversion and for the interconnection of DC and AC power in High Voltage and Medium Voltage grids, for different uses.

**Services**
Offers services to optimise the electrical infrastructure, increase return on investment, and increase the life cycle of existing electrical grids.

**Key References**
Maximum 765kV AC (EHV) substation orders awarded to Alstom Grid
- Commissioned 765 kV s/s for PGCIL in a record time of 8 months at Bhiwani
- Commissioned Rajasthan’s first 765 kV substation at Anta
- India’s first 765 kV AIS substation Project for NTPC Sipat (19 Bays)
- Commissioned the first 765 kV transformer completely designed, engineered and manufactured at Vadodara, India for Lanco – Anpara “C”

**Strong Leadership in Network Management System**
- 3 out of 5 Regional Load Dispatch Centres
- All 4 National Control Centres in SAARC Region: India, Bangladesh & Bhutan (Commissioned) & Sri Lanka (under execution)
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Building the National Transmission Infrastructure on UHV AC & DC
- Pioneer in Inter-Regional Power bulk power transfer by building 3 Back-to-Back HVDC projects
- Executing 800 kV/6,000 MW HVDC projects at Champa 1 and Champa 2 for Bulk Power flow over long distances [Central to North] in India.
- Successfully manufactured and tested India’s first 800 kV HVDC Transformer locally at Vadodara manufacturing facility.

Transport

A promoter of sustainable mobility, ALSTOM Transport provides the most complete range of systems, equipment and services in the railway sector. In India, ALSTOM Transport comprises of four main businesses: Rolling stock, Systems & Infra, Transport Information Solutions (TIS) and Train Life Services (TLS). It offers full range of state of the art products and solutions, catering to both Urban and Mainline railway networks, and is strongly positioned as a leading supplier of rolling stock, train control and infra system for metro networks in India. As the Group’s leading centre of excellence in engineering and manufacturing, ALSTOM Transport India offers end-to-end rail based solutions for India and beyond. We ‘Make in India’ for India and for the world.

Contributing to Infrastructure Development in India Region:
- Rolling Stock for Chennai Metro & Kochi Metro
- Train Information Systems for Delhi, Bengaluru, Jaipur & Kochi Metros
- Infrastructure Systems for Chennai & Kochi Metros
- ALSTOM designed LHB Coaches for India’s fastest trains: Shatabdi & Rajdhani

Ongoing Projects
- Rolling Stock (25 train sets) contract for Kochi Metro
- Signaling & Telecom, Electrification and Power Supply contracts for Kochi Metro
- Track work contract for Line 7 of Delhi Metro
- Rolling Stock (42 train sets) contract for Chennai Metro
- Rail Infrastructure contract for Chennai Metro
- Train control, Traffic management and Signaling systems for:
  - Delhi Metro Line 1 & 2
  - Bangalore Metro Line 1 & 2
  - Jaipur Metro Corridor 2

References
- Signalling system - Delhi Metro, Bangalore Metro and Jaipur Metro
- Electric traction components for DMRC
- Refurbishment of 38 motor coaches for Western Railway
- Audio Frequency Track Circuits (AFTC) for Zonal Railways and Mumbai Railway Vikas Corporation Ltd (MRVC)
- Smartway Digital Track Circuits (SDTC) for Delhi, Bangalore and Jaipur Metro
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- LHB design technology for railway coaches to RCF, Kapurthala
- System Engineering design for projects across the globe

Manufacturing & Engineering Capabilities:

2013 Metro Rolling Stock Factory, Sricity, Andhra Pradesh
- Alstom Transport’s state-of-the-art facility for manufacturing of rolling stock.
- Most modern facility incorporating best practices from other Alstom factories across the world
- Employs over 135 people
- Production capacity of 120 metro train cars per year
- Boasts of energy-efficient design which includes double insulation, heat recovery systems, geothermal heating and cooling system that consumes less energy and rainwater recycling

1998 Signalling & Rolling Stock Engineering Centre, Bengaluru, Karnataka
- Alstom Transport’s Bengaluru unit is a global innovation hub for both Signalling and Rolling Stock Engineering
- Employs over 575 people for Signalling & Product development and 150 people for Rolling Stock Engineering. The site plans to add over 1000 people in next 3 years
- Caters to Signalling projects in India and worldwide
- Equipped with latest technology labs for Mass transit Signalling projects. Full signalling system can be tested including control centre, train control, interlocking, trackside & telecom equipments
- Highly competent in design and implementation of urban (Metro & Tramways) and mainline (from freight to very high speed lines) signalling solutions
- One of the global centres for development of system and products for TIS; delivering critical signaling product/solutions for smart interlocking, Integrated Control centre, PACIS and security solutions
- Robust project and program management
- It is also into manufacturing and integration of Coded Track Circuits for Railways/ Metros; More than 3000 track circuits deployed in India so far

1968 Manufacturing Site for Track Circuits & Traction Equipment, Coimbatore, Tamil Nadu
- State-of-the-art facility for Rolling Stock Components Operation
- Specializes in manufacturing and testing of looming, cubicles, tractions and other electrical components
- Completed over 60 different projects since 2005
- In-house capability for functional testing of inverters and auxiliary converters
- Produces RMS relay, switchgears, driver desk devices and looms that build traction cases
- Efficient and skilled work force catering to Indian as well as global projects