Alstom in Saudi Arabia

Alstom’s commitment in the Kingdom

Alstom’s Presence

Key Data:

- Alstom is present in Saudi Arabia in three main geographical clusters:
  - Riyadh (Headquarters)
  - Khobar (Grid)
  - Jeddah/Shoaiba (Grid, Thermal Power)
- Alstom Saudi Arabia is active in three main areas:
  - Equipment supply and services for power generation projects
  - Equipment supply and services for power transmission projects
  - Equipment and services for rail transport projects
- Alstom in Saudi Arabia employs 416 people.

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History

Alstom installed its first gas turbine in Saudi Arabia in 1951. Since then, Alstom’s presence in Saudi Arabia has continued to grow. Some of the latest milestones achieved are as follows:

1998: Alstom-led consortium signed the contract with Saudi Electricity Company (SEC) to build stage 1 of the Shoaiba power plant project consisting of five 400 MW units, completed in 2003.

2004: Alstom-led consortium signed the contract for stage 2 of Shoaiba power plant project including six 400 MW units, completed in 2007.

2008: Alstom-led consortium signed the contract to build stage 3 of Shoaiba power plant, completed in 2012 and delivered ahead of schedule.

2009: Alstom completed the Gulf’s largest high voltage direct current (HVDC) converter station (3 x 60 MW) and the network management system that connects the six member states’ energy systems with GCCIA.


2012: Automation systems and protection relays factory built in Al Khobar.

2012: Alstom started construction of a power generation service workshop in Rabigh, in Saudi Arabia’s Makkah province.

2012: Alstom awarded the supply and supervision of 21 x 380 kV gas-insulated switchgear for the DAWADMI substation.

2013: Alstom awarded contract by SEC for the Al-Salam substation and associated circuits in Saudi Arabia.

2013: Launch of “Expert Development Programme” with SEC and “Graduate Development Programme” in Saudi Arabia.

2013: Alstom awarded a contract to supply equipment for SST 620 MW each units for Yanbu 3 + 5 SC Boilers power and desalination plant.

2013: Alstom awarded €1.2 billion turnkey metro project in Riyadh Saudi Arabia

2013: Alstom awarded €170 million to supply steam turbine generators for Shuqaiq Power Plant

2013: Alstom and Arabian Bemco Contracting Co. Ltd create a joint venture (JV) company, Alstom Arabia Power Factory Ltd. The joint venture will establish a world-class manufacturing facility in Saudi Arabia for power generation components. It will be in operation by mid-2015

2013: Alstom inaugurated Rabigh Workshop in Saudi Arabia to provide high-quality services for power plant equipment

2013: Alstom awarded €39 million contract by SEC/NG to supply a National Control Center for one whole transmission network in KSA.

2014: Alstom awarded a €98 million contract by SEC for 380/132/33Kv Al Madhaya BSP

2014: Alstom awarded a €112million contract, 2 EPCs by Al Toukhi & NCC, for loose products supply of Riyadh Metro.

2014: Alstom awarded a €47 million contract by SEC for SVC to increase power transmission stability and quality across Saudi Arabia.

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Partnerships

Technology collaboration agreement with King Abdullah University of Science and Technology (KAUST)

The agreement involves a partnership with the university in the scientific research project of heavy fuel oil (HFO). The research topic is ‘fuel reforming for supercritical steam power plants’ and more specifically, to study the makeup of HFO’s and analyze the composition of ‘cenospheres’ - tiny airborne droplets of fuel associated with less efficient combustion. This partnership is fully supported by the Saudi Electric Company (SEC) and will pave the way to cleaner power generation in the Kingdom.

This research project comes as electricity demand grows in the Kingdom, and the Saudi government reduces domestic usage of higher grades of oil to raise export revenues as part of a more sustainable long term economic strategy. This partnership is a key milestone in our localization strategy in Saudi Arabia, and sustains a continuous historical presence of over 60 years.

Long term commitments to Saudi Electric Company (SEC)

A memorandum of understanding has been signed between Alstom and SEC to establish a pilot expert development programme. The brainchild of SEC’s leadership, this programme will embed top SEC experts within Alstom businesses for on-the-job training placements, and further cement Alstom’s commitment to develop local expertise.

This MoU is the latest step of Alstom’s thirteen year-long partnership with SEC, both companies having worked very closely on Shoaiba 1, 2 and 3.

Long term commitments to Saudi Arabia

Alstom has equipped over 20% of Saudi Arabia’s power generation base and continues to pursue a Win-Win Partnership with the Kingdom. Our ultimate goal is to be as contributing to the Kingdom’s advancement as we are seeking to benefit from it.

Alstom contributes to the Kingdom’s objectives to expand its power generation base while minimising the impact on the environment: its air quality control systems in operation at projects like Rabigh IP, Shoaiba 3 and Yanbu 2 are enabling the country to reduce power plant emissions.

The scope of Alstom’s Saudi partnerships includes:

- Local manufacturing ventures
- Power generation workshop in Rabigh aligned with Saudi ‘Economic cities’ programme
- Contributions to various training programmes for Saudi clients and partners
- Ongoing technology and knowledge transfer initiatives
- Alstom employees empowered social responsibility initiatives

Awards

Alstom was honoured with an award for “Growth Strategy Excellence” in recognition of its outstanding achievements in the field of air quality control systems at the 2012 Middle East Environment Industry Meet in the United Arab Emirates.

Power

Alstom Power presence in and contribution to Saudi Arabia

Saudi Arabia today has 55 GW in installed base out of which Alstom is serving 90% (including services). With a growing population and new industries, power needs are expected to grow with another 60 GW planned over the next 10 years.

Technology excellence in steam power plants

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Estimated 1.5 GW/year of new steam power plants are planned to be built in the Kingdom during the years 2012 – 2016. Growing efficiency awareness is orienting the steam plant towards supercritical technologies with lower grade fuels (HFO rather than crude oil).

Alstom is bringing its leadership supercritical technology to the next generation of steam plants in Saudi Arabia. One example of this is its management of all stages of the Shoaiba power plant, the largest in Saudi Arabia and the Middle East (5600 MW). The power plant provides electricity to the western grid of Saudi Arabia including the holy city of Makkah and supports the country’s initiative for clean power and technology: this was the first use in the Gulf of sea-water flue gas desulphurisation (SWFGD) systems to reduce SO2 emissions.

After Shoaiba, Alstom will once again demonstrate its technology excellence at Yanbu 3 power and desalinisation plant that will be among the first supercritical plants for the region running on HFO. The plant will provide power to holy city of Mecca and the desalinisation plant will serve the holy city of Madinah.

Alstom is scaling up its existing products and working on new products for Saudi Arabia to increase firing temperature in a HFO-fired boiler as high as 600 °C. These generations of plants are the most efficient steam power plants commercially available.

Flexible gas-fired power plants:
There is growing concern for more efficiency and flexibility for power generation in the Kingdom. Alstom is answering this market shift by supplying steam add-on solutions in Saudi Arabia and the entire Middle East, totalling more than 1.8 GW of order of steam add-on in the region.

Leadership in environmental control systems
There is an increased awareness for clean energy, higher efficiency and lower emissions in Saudi Arabia. Alstom is a leader in air quality control systems in the Middle East. The most recent projects include:

- Marafiq phase 2 power plants in Yanbu: engineering, supply, installation and commissioning of seawater flue gas desulphurisation (SWFGD) systems for Phase 2 of the Marafiq power plant, which includes three steam power plant blocks, each generating 276 MW. The technology is also implemented in Yanbu units 5 and 6 and in Shoaiba.
- In Rabigh, Alstom serves as the subcontractor for the design, supply and installation of two 660 MW SWFGD systems at units 1 & 2 for an oil-fired power plant. Alstom supplied two 660 MW electrostatic precipitators.
- Moreover, HFO supercritical technology used in Yanbu 3, for example, enables emissions to be reduced by increasing efficiency.

Excellence centre for servicing the installed fleet
Alstom will soon be launching a major services workshop to recondition, repair and modernise the infrastructure of the Kingdom’s growing power sector. The Rabigh workshop to support KSA’s installed fleet will include:

- Investment in hi-tech equipment and machinery
- Localised capabilities on gas turbine structural parts
- Skilled jobs for local employees
- Training programmes for local experts and workers

It will cover 3500 m². To facilitate later growth of the site, a 26 000 m² piece of land has already been acquired to allow for expansion.

The Rabigh facility will be the best equipped and one of largest workshops of its kind in the Kingdom’s Western Region. The initiative will extend local partnerships though investment in resources and people.

A large portfolio for all energy sources
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A diversification towards renewables and nuclear is announced by KA-CARE (an independent organisation established by royal decree to define and establish Saudi Arabia's atomic and renewable energy program), by 2032 the plan includes:

- Concentrated solar plant (CSP): 25 GW
- Nuclear: 17 GW
- Solar photovoltaic (PV): 16 GW
- Wind: 9 GW

In this context, Alstom has a portfolio that covers all energy sources: coal, gas, oil, nuclear, wind, solar, hydro, biomass, geothermal, ocean energies.

Alstom Power’s references in the area

SEC Shoaiba power plant project including:
- stage 1- 5 x 400 MW units
- stage 2- 6 x 400 MW units
- stage 3- 3 x 400 MW units

SWCC Shoaiba power plant including:
- 5 x 120 MW units

Nearly 100 gas turbines including:
- 69 units of type GT 11 (plus 2 x 130 MW Steam Turbines in combined cycle)
- 21 units of type GT 9
- 1 unit of type GT 8

Air quality control systems in:
- Yanbu units 5 and 6, a 2 x 275 MW extension of the existing Marafiq power station in Yanbu

Alstom Power’s on-going projects

- SEC - Riyadh PP12 gas-fired power plant:
  This contract includes the supply of two 342 MW steam turbine generator sets and eight heat recovery steam generators (HRSG) for the power plant. This is Alstom’s first steam tail offering for the Saudi Arabia market and the equipment is being offered in a novel integrated package which will augment power output from the plant by an additional 4 MW.

- SWCC - Yanbu 3 HFO steam power plant:
  This is one of the country’s first supercritical power plant to run on heavy fuel oil. Alstom’s part includes the basic engineering of the power block, advisory services during detailed engineering and procurement, supervision services during construction and commissioning and delivery of main equipment for 5 x 620 MW units including the steam turbines and generators, the HFO-fired supercritical boilers, electrostatic precipitators and flue gas desulphurization system.

- Air quality control systems in Marafiq phase 2 power plant

Customers

- SEC
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- SWCC
- Saudi Aramco
- MARAFIQ

Transport

Alstom Transport’s presence in and contribution to Saudi Arabia

Alstom Transport has a local presence in Saudi Arabia. The Kingdom is the fastest growing infrastructure market in the Middle East region with ambitious plans in the urban transport sector including several key projects (submission 1.12.2012) such as:

- Riyadh metro (6 lines, 181 km in length)
- Makkah metro (4 lines, total length of 182 km with 88 stations.)
- Jeddah LRT (3 Lines, total length of 79 km with 46 stations)

With an extensive in-country support network and experience established, Alstom is one of the three consortia that submitted the Riyadh Metro tender on 20<sup>th</sup> February 2013. The decision is expected in June 2013.

Alstom Transport’s on-going projects

Alstom, as a member of the FAST consortium, has received a letter of award by the Riyadh Development Authority (ADA) to provide a complete automatic and driverless metro system to equip three of the six lines to be built, of which Alstom’s share represents more than €1.2 billion.

It’s a fully integrated metro solution that combines company’s state-of-the-art metro sub-systems. It includes the rolling stock (69 Metropolis trains), Urbalis signaling, the energy recovery system, HESOP, as well as the fast track laying technology, Appitrack – a technology that installs tracks three times faster than traditional methods.

Each train is composed of two cars and is 100% motorized. It is about 36 meters long and 2.71m wide. This metro has three levels of comfort: First class, Family and Single. To minimize delays between trains, the Metropolis trains will be controlled by two operational control centers equipped with the Urbalis driverless system.

In order to optimize energy consumption, the traction power system will be equipped with HESOP, Alstom’s innovative reversible substation solution, which allows the energy recovered during braking to be re-used by the network.

Alstom Transport’s references in the area

Alstom Transport is a subcontractor to Thales for a € 6 Million ML signalling contract.

Grid

Extensive industrial development across the Kingdom of Saudi Arabia is expected to drive up electricity demand to an estimated 85 GW by 2022. Six major economic cities currently being built across the Kingdom already require massive energy resources; demand is already rising at around 8% a year.

Alstom Grid in Saudi Arabia

Alstom Grid has been present in Saudi Arabia for more than three decades, with the first substations delivered by Alstom in the Hail region in the 80’s. The Group brings to the market strong capabilities in engineering, manufacturing and project management in

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addition to the supply of products and solutions. Alstom Grid employs a workforce of 217 people in 3 sites at Riyadh, Jeddah and Al-Khobar.

Leader in network management systems and integrated smart solutions:

Alstom’s solutions support the flow of energy across the entire electricity value chain, allowing its customers worldwide to optimize global grid performance.

Alstom is the market leader in network management in the region, with various projects in the Middle East including:

- Regional control centres of the Central, Western and Eastern regions
- Wide area monitoring systems (WAMS) and stability solutions for GCCIA interconnection project
- Integrated distribution management system (IDMS) for WRCC

Local facility:

Alstom’s facility in Damman is set to integrate protection and control and automation panels up to 380 kV level. It has a capacity of 1,200 panels per year and is capable of delivering all types of control - LCC and relay panels for all substation voltage levels.

Key player in the Kingdom’s major projects:

- Alstom completed the Gulf’s largest HVDC converter station (3x600 MW) and the network management system that connects the GCCIA six member state’s energy systems. HVDC is the only way to connect 2 asynchronous alternating current networks
- Alstom was one of the main players for Hail Network by constructing 15 x132kV substations and 52 x 33kV substations in addition to the network control centre.
- References include 18 substations in Southern Region and several projects constructed in Aljouf and Madinah.
- 400 kV gas-insulated substation (GIS) in Jubail with Saudi Electricity Company (SEC), the biggest GIS in the Middle East.

Integrating renewable energies:

A diversification towards renewables energies is expected in the Kingdom: wind and solar energies will have a growing part in future energy mix. Alstom smarter solutions integrate power generated by these sources by actively managing power flow, guaranteeing network stability and better managing load.

Alstom Grid’s references

- 380/33kV gas insulated substation for SEC
- 380kV substation, 380 kV power transformer, automation systems and network management for SEC
- Loose products for gas insulated substation, power transformer and automation for EPC
- 380/132/13.8kV gas insulated substation for MHI & Shuqaiq Co power plant in Shuqaiq
- 380/132/13.8kV for SEC-SOA
- 380/230/115/13.8kV substations for SEC-EOA
- 110/13.8kV for NWC in Jeddah
- 132kV capacitor bank for SEC-WOA WOA in Jeddah / Madinah / Mekkah
- 2x110/13.8kV gas insulated substation for Knowledge Economic city in Madinah

Alstom Grid’s on-going projects

Current Alstom Grid’s projects in Saudi Arabia include:

- Fixed series compensation in Madinah / Qassim

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- Power factor correction West
- Tiyam 132 KV substations packages in Madinah - Mekkah
- Power factor correction Southern Region
- As Salam 380 KV transmission substation in Madinah
- PP12 380 KV power plant substation in Riyadh
- Bawadi 110 KV substation package (4 substations) in Madinah / Jeddah
- 380 Kv substation at Al Madhaya BSP
- Loose products supply of Riyadh Metro (GIS, PTR, SAS, NMS)
- SVC for increasing power transmission stability and quality across Saudi Arabia in Jeddah/Mekkah
- National Control Center

Customers

Major customers of Alstom Grid in Saudi Arabia include:
- SEC
- National Grid
- SWCC
- ARAMCO
- Royal Commission (RC)
- MAADEN
- SABIC
- Government and private sector clients

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