Traction Power Supply

ABB Portfolio
Traction Power Supply
Value Propositions

- The portfolio for traction power supply applications covers:
  - Products for traction power supply applications
  - Traction substations for AC and DC applications; Complete electrification projects
  - Reversible DC traction substations; Wayside energy storage systems
  - Static frequency converter stations
  - FACTS (flexible AC transmission systems)
  - Network management systems
  - System studies and dynamic traction power supply simulations
Traction Power Supply
Value Propositions

HV Network
20 .. 220 kV 50 or 60 Hz

FACTS

HV Network
... 132 kV 16.7 Hz

DC Traction Substations
600 ... 3000 V

AC Traction Substations
25 kV
50 / 60 Hz

AC Traction Substations
2x 25 kV
50 / 60 Hz

Static Frequency Converter Stations
15 kV 16.7 Hz

AC Traction Substations
15 kV 16.7 Hz

AT Station
AT Station
AT Station
Traction Power Supply
Value Propositions

Products
Circuit breakers and switches
Air- or gas-insulated switchgear
Protection & control relays

Modules
Pre-fabricated and factory tested 1AC & 2AC indoor and outdoor modules including protection and control

Traction Substations
AC and DC traction substations
Energy storage systems
Frequency converter stations

Multidisciplinary Projects
Complete electrification projects comprising different domains, such as:
AC or DC traction substations, OCS, energy storage systems, SVC, SCADA, etc...

Systems
Traction Power Supply
Selected References per Application
A modern people mover system is being built in the campus of King Saud University in Saudi Arabia.

ABB has been awarded the contract for the traction power supply system in 2010.

---

### Customer’s need
- SICE building a modern trolley bus system serving the campus of King Saud University, requesting a complete electrification package.

### ABB’s response
- Design and turnkey delivery of the traction power supply package:
  - 3 DC traction substations 13.8 kV / 750 VDC including network calculations;
  - Power SCADA system.

### Customer’s benefits
- System package using high-tech and high quality Power Technology Products delivered turnkey.
- Experienced partner in electrification of modern trolley bus systems taking care of the interface management with other contractors.
ABBB has been awarded the contract from Bombardier Transportation for the traction power supply package feeding the new Gold Coast Light Rail System.

The traction substations will provide power for the first light rail system being built in Queensland. Passenger services are scheduled to commence in 2014.

**Customer’s need**

- The GoldLinQ consortium is delivering stage one of the Gold Coast Light Rail, requesting a complete power supply package.

**ABB’s response**

- Design and supply of 6 pre-assembled and factory tested traction substations rated at 11 kV / 750 VDC in fully equipped transportable substations buildings, comprising:
  - Transformer / rectifier groups
  - Medium-voltage switchgear and auxiliary transformers
  - DC switchgear and its associated protection and control
  - Leakage current monitoring system

**Customer’s benefits**

- System package using high-tech and high quality Power Technology Products delivered turnkey.
Traction Power Supply
Warsaw Metro Line 2, Poland

- **Customer’s need**
  - AGP Metro Polska is building metro line 2 in the city of Warsaw looking for an experience partner to take full responsibility to construct the power supply package.

- **ABB’s response**
  - Design, delivery, installation and commissioning of the turnkey traction power supply package, comprising:
    - 4 combined traction and auxiliary substations 15 kV / 825 VDC / 400 VAC and 3 auxiliary substations 15 kV / 400 VAC
    - 1 energy storage system rated at 40 MJ based on double-layer super-capacitors.
    - Power SCADA system integrating the existing line

- **Customer’s benefits**
  - System package with high-tech and high quality Power Technology Products delivered turnkey, utilizing ABB’s long standing experience in railway electrification.

AGP Metro Polska has awarded the contract to ABB in 2011.
Commercial operation of the new metro line is planned to start in 2014.
Traction Power Supply
Delhi Metro Rail Corp., India

After successful completion of line 1, ABB has been awarded the contract for the electrification of line 3, 4, 5 and 6. Work started in 2004 and will be completed in 2011.

- **Customer’s need**
  - DMRC looking for a reliable partner for the electrification of metro line 1, 3, 4, 5 and 6 (Phase I and Phase II of DMRC).

- **ABB’s response**
  - Turnkey delivery of the complete electrification system, comprising design, supply, installation, testing and commissioning of:
    - 370 track km of 25 kV overhead contact line and related 25 kV switching posts.
    - 3 traction substations feeding the lines with 1AC 25 kV and 150 auxiliary substations for the railway infrastructure.
    - SCADA system including asset and building management systems.

- **Customer’s benefits**
  - Reliable system completed ahead of schedule using high-tech and high quality Power Technology Products.
Traction Power Supply
Channel Tunnel Rail Link, UK

The ABB feeder substations and autotransformer stations, tailored specifically for trackside applications are a key element in the 25-0-25 kV power distribution system.

This system is widely used for European high speed services, allows a transmission voltage of 50 kV, while the voltage seen by the train is only 25 kV.

- **Customer’s need**
  - EdF looking for an experienced supplier to provide systems to feed the Channel Tunnel Rail Link Phase II, balancing large single phase loads and enhancing the voltage profile along the track in two phases.

- **ABB’s response**
  - Turnkey delivery of the traction power supply package, comprising:
    - Three 400/33/25 kV feeder substations and four 2x25 kV autotransformer stations;
    - Six 1-phase SVC’s - 33 kV -5 to +40 MVar;
    - One load balancer - 33 kV -84 to +168 MVar.

- **Customer’s benefits**
  - By using the optimized ABB system design the customer profits from a reduced number of feeders and safeguards a symmetrical voltage with minimum disturbances.
Traction Power Supply
Converter Station Wimmis, Switzerland

Customer’s need
- BLS AlpTransit - building one of the longest railway tunnels in the world - requesting a significant increase in 16,7 Hz traction power.

ABB’s response
- Support in an optimized design including study for BKW being the main contractor for the converter station.
- Turnkey delivery of substation and converters:
  - 132 kV 16,7 Hz AIS switchyard and substation automation for 132/15 kV 16,7 Hz and 50 kV 50 Hz switchgear;
  - Complete renewal of auxiliary power supply;
  - 4 standardized 20 MW converters modules.

Customer’s benefits
- On time delivery of a complex system package within a short delivery schedule utilizing high-tech and high quality Power and Automation Technology Products.

The 80 MW static frequency converter station Wimmis is in service since end of 2006.
The 132 kV switchyard has been upgraded having two out of four 16.7 Hz transmission lines in service.
The picture shows a 20 MW converter module.
Traction Power Supply
Load Balancing Evron, France

The SVC Light® at Evron is in operation since 2004. Further installations are planned.

Customer’s need

- SNCF feeding 1-phase loads out of 3-phase EdF grid. Request for an application that is balancing the unsymmetrical railway load and mitigating voltage and load fluctuations as well as harmonics.

ABB’s response

- Turnkey delivery of Static Var Compensation utilizing SVC Light® rated at 90 kV, ±16 MVAr dynamic.

Customer’s benefits

- Compared to the alternative - connection to the closest 225 kV EdF infeed - the investment costs were cut by one third.

- ABB is providing a turnkey application with high availability and performance solving all requirements in one compact device.
ABB offers a vast portfolio for reliable and efficient traction power supply systems.

ABB takes over responsibility for design, supply, installation and commissioning of complete traction power supply and distribution systems for rail infrastructure projects.