Flexible Alternating Current Transmission Systems (FACTS)

The advancement of technology, evolution of electricity use, and focus on renewable and other intermittent technologies bring new challenges for reliability and stability of the power grid. Technologies like FACTS power electronic devices are an essential consideration when planning for network control and stability, and for increasing the power transmission capability of existing assets.

Since the 1970s, we have established ourselves as a world-renowned consulting provider of high voltage direct current (HVDC) and (FACTS). As both systems share many technological similarities, our combined expertise has proven to be technically and economically beneficial for clients in assessing and selecting technologies, as well as designing efficient, reliable and economic solutions. We have worked on interconnecting industrial loads, integrating renewables to an existing grid, converting between alternating and direct current transmission systems, while adapting to the regional requirements of a specific power grid.

Our FACTS Expertise

Our field of expertise includes the study, conceptual design and specification of a variety of FACTS devices, such as static VAR compensators (SVCs), STATCOMs and series compensation. We also provide full EPC services for interconnecting overhead lines and underground/undersea cables at voltages ranging from 66 kV to 800 kV.

We have a team of experienced FACTS specialists, supported by a network of world-renowned industry experts and skilled project delivery teams that provide complete power grid design solutions. The power systems we design perform optimally, ensuring the complete integration of complex technologies into a predominately alternating current network.

Our Services

We deliver the full suite of system studies, design studies, detailed specifications, proposal packages, technical evaluation of tenders, owner’s engineering, installation and commissioning, as well as the complete EPC delivery for the balance of plant. These services support the surrounding transmission infrastructure, including incoming transmission lines, interconnecting AC substations, as well as complete protection and control (P&C), SCADA and telecommunications interfaces.

Our team can provide the technical scope for FACTS projects, including:

- Planning studies, system impact assessment, and techno-economic analysis
- Load-flow, short-circuit and dynamic studies to determine the functional parameters
- Harmonic impedance studies required by manufacturers for filter design
- System network model processing for the purpose of FACTS application
- Technology selection (Thyristor valves vs. insulated-gate bipolar transistors)
- Development of detailed ratings specifications
- Detailed review of manufacturer studies and design against required performance
- Supervision of real time digital simulator (RTDS) testing of the control systems
- Supervision of specialized equipment factory testing, such as thyristor valves, capacitors, reactors
- Detailed validation of the user-defined PSS®E and PSCAD™ models; and,
- Supervision of final commissioning and acceptance tests on site

End-to-End Solutions

- Capital
- Engineering
- Procurement
- Construction
- Operations & Maintenance
Key Projects

We have global experience in FACTS and are a Tier 1 provider in Canada. Our familiarity with these systems allows us to understand and challenge the potential of these technologies, and to design the best options for our client and their grid.

Areva De-Icer at Lévis Substation
Canada
› Provided detailed engineering based on AREVA’s studies for de-icing HVDC transmission lines
› Provided support for procurement and field work

Hansman Lake SVC
Canada
› EPC of 20-km interconnecting 240-kV double-circuit transmission line and substation upgrades
› 100/+200 MVAR SVC substation reinforcement of the 240-kV system in a region with heavy industrial load and volt fluctuations
› Extensive load flow and dynamic analysis to mitigate voltage instability from integration of wind power

Western Alberta Transmission Line
Canada
› EPC of two 1000-MW, 500-kV monopole HVDC converter stations (with STATCOM on one facility)
› 350 km (217 mi) of 4000-MW +/-500-kV HVDC transmission line
› 995 towers and 500 kV and 240 kV AC switchyards to establish an HVDC link

South Foothills Transmission Project
Canada
› EPC for 124 km (77 mi) of double-circuit 240 kV transmission lines
› Constructing a 240/138-kV substation
› Building a new 240-kV series capacitor station, the first of its kind for AltaLink

Dogtown Road SVC
USA
› Owner’s engineering services for 0/+70 MVAR SVC at the Detroit Substation located in Maine and in association with the Blue Sky West Wind Farm