

Energy Sector Power Transmission Division

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Siemens HVDC technology to transmit eco-friendly electric power from Georgia to Turkey

Siemens Energy is to install two turnkey HVDC (high voltage direct current) back-to-back links in Georgia to connect the Georgian power supply network with the grid system in Turkey. As part of the Black Sea Transmission Network Project, one of the most significant infrastructure projects in Georgia, the two HVDC back-to-back links are each to transmit 350 megawatts (MW) of controlled electric power generated in various hydropower plants in Georgia to Turkey. Purchaser is Energotrans Ltd. based in Tiflis, Georgia. The order volume for Siemens is approximately EUR170 million. In addition to the HVDC back-to-back links the scope of supply will also include system control equipment, converter transformers, switchgear (500/400/220 kV), thyristor valves and AC filters. The first HVDC back-to-back-link will come on line in late May 2012, with the overall project scheduled for completion in May 2013.

“With our HVDC technology we’re creating an energy bridge for the transmission of eco-friendly electric power between Georgia and Turkey, which will help to meet Turkey’s growing power demand,” said Udo Niehage, CEO of the Power Transmission Division of Siemens Energy. The Siemens HVDC back-to-back links will not only connect the two power supply networks but will also enable control of the flow of electric power on the energy bridge to Turkey. The HVDC technology with its fast control function will also contribute toward stabilization of the connected grids, which is a major advantage in the event of system disturbances and blackouts. “As one of the leading providers we’re now also represented with our HVDC systems for the first time on the territory of the former CIS states and are pleased to be able to contribute toward strengthening Georgia’s power supply network.”

The converter substation with the two 350-MW back-to-back links and the associated switchgear will be erected in the vicinity of the city of Akhaltsikhe, which is located in southern Georgia on the Turkish border. There, the systems will be connected via overhead transmission lines with

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Georgia's and Turkey's high-voltage networks to enable hitch-free transport of electric power between the two countries. HVDC back-to-back links are necessary when two power supply networks with varying technical parameters (frequency, phasing) are to be interconnected.

By contrast with HVDC systems, where there are a thousand and more kilometers between the rectifier and inverter stations, with an HVDC back-to-back link the two converter substations are connected practically back-to-back. The three-phase alternating current of the one network is converted in the converter substation into direct current and transmitted directly via a DC link to the inverter station. There, the direct current is converted back into three-phase current with simultaneous adjustment to the parameters of the network into which it is to be fed. This enables hitch-free interconnection of the two networks. Furthermore, the HVDC back-to-back link provides protection against cascading grid disturbances because it acts like an automatic firewall, which can control stop and restart the transport of electric power.

Energy-efficient high-voltage direct-current transmission technology (HVDC) is part of Siemens' Environmental Portfolio. In fiscal 2009, revenue from the Portfolio totaled about EUR23 billion, making Siemens the world's largest supplier of ecofriendly technologies. In the same period, the company's products and solutions enabled customers to reduce their CO₂ emissions by 210 million tons. This amount equals the combined annual CO₂ emissions of New York, Tokyo, London and Berlin.

The **Siemens Energy Sector** is the world's leading supplier of a complete spectrum of products, services and solutions for the generation, transmission and distribution of power and for the extraction, conversion and transport of oil and gas. In fiscal 2009 (ended September 30), the Energy Sector had revenues of approximately EUR25.8 billion and received new orders totaling approximately EUR30 billion and posted a profit of EUR3.3 billion. On September 30, 2009, the Energy Sector had a work force of more than 85,100. Further information is available at: www.siemens.com/energy.