ITC
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Lake Erie Connector

The ITC Lake Erie Connector is a proposed 1,000 MW, bi-directional, high-voltage direct current (HVDC) underwater contracted transmission line that will provide the first direct link between the markets of the Ontario Independent Electricity System Operator (IESO) and PJM Interconnection (PJM).

This project will help deliver more affordable, cost-effective electricity to customers as a result of increased energy trading between these power markets.

What is HVDC? A high-voltage, direct current (HVDC) electric power transmission system uses direct current to transmit electrical power, in contrast with more common alternating current (AC) systems. HVDC systems are particularly appropriate for underwater applications and have a long record of reliable and safe performance around the world.

PROJECT SPECIFICATIONS

- The ITC Lake Erie Connector is a proposed +/- 320kV HVDC bi-directional transmission line, approximately 73 miles in length, that will connect converter stations located in Nanticoke, Ontario and Erie, Pennsylvania. A 500kV Alternating Current (AC) line will tie the Nanticoke converter station to Hydro One's Nanticoke substation 345kV AC line, while a 345kV Alternating Current (AC) line will connect the Erie converter station to Penelec's existing Erie West substation. The majority of the transmission line will be buried beneath Lake Erie or underground using existing roadway rights-of-way.
- Ontario is Canada's second largest province, covering more than one million square kilometers (415,000 square miles) with a population of 13.5 million. PJM comprises all or part of 13 states, with a regional population exceeding 60 million – the largest energy market in the world.

PROJECT STATUS

The Lake Erie Connector project is fully permitted in Canada and the U.S. Remaining key milestones include completing project cost refinements and securing favorable transmission service agreements with prospective counterparties. Upon completion of these steps, the project is expected to begin construction in 2020, be completed in 2022, and enter commercial operation in 2023.

- October 16, 2017: The U.S. Army Corps of Engineers issued the necessary permits for the project. This completed the major permit application process for the project in the U.S. and Canada.
- June 26, 2017: Canada's National Energy Board issued a Certificate of Public Convenience and Necessity for the project.
- May 25, 2017: The Pennsylvania Department of Environmental Protection issued two permits for the project: a State Water Obstruction and Encroachment Permit, and a National Pollutant Discharge Elimination System Permit for Stormwater Associated with Construction Activities.
- January 12, 2017: The U.S. Department of Energy granted the project a Presidential Permit, which is required for international border-crossing projects.
- ITC has completed the necessary system impact studies in IESO and PJM, signed service agreements with the manufacturers of the converter stations and the submarine cable, and secured nearly all land necessary for the terrestrial cable route, converter stations and construction laydown areas.
- ITC has held or participated in numerous public consultations in Ontario and Pennsylvania – the respective terrestrial points of the line – to discuss the project and gather community input.

About ITC: ITC is the largest independent electricity transmission company in the United States. Through ITC Grid Development and its subsidiaries, the company also focuses on expansion in areas where significant transmission system improvements are needed – exemplified by the Lake Erie Connector project. ITC is a subsidiary of Fortis Inc., a leader in the North American regulated electric and gas utility industry. For further information visit www.fortisinc.com.

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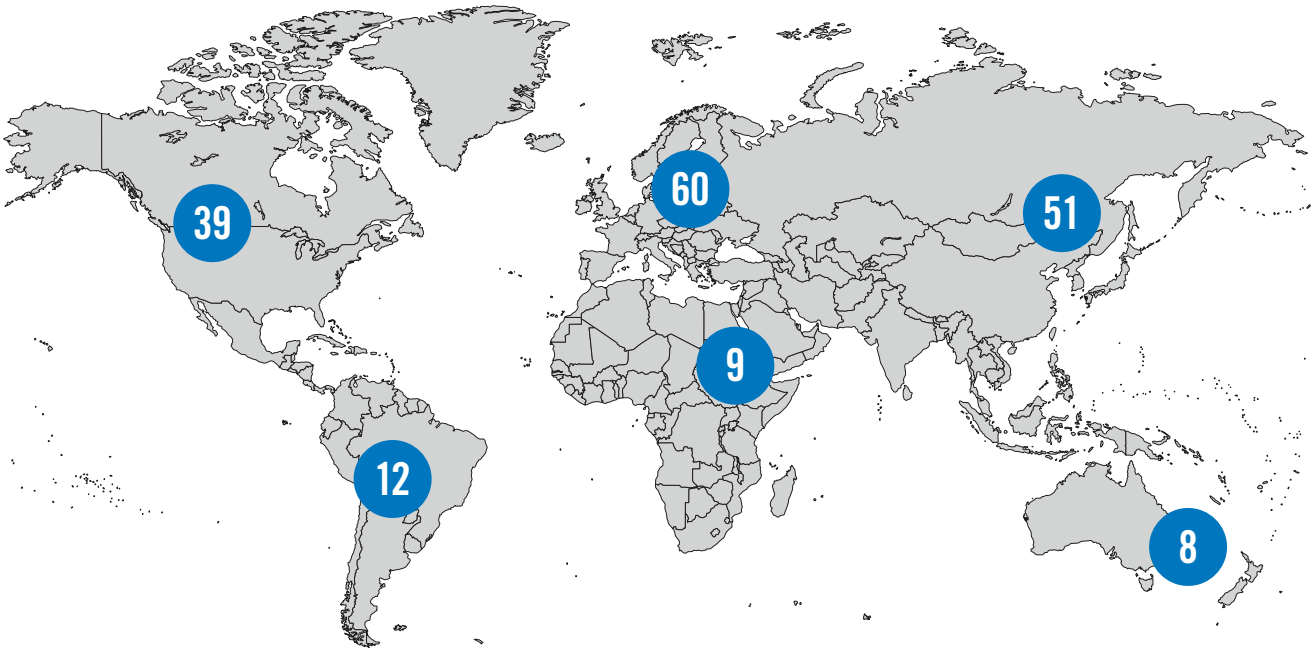
HVDC Projects Installed Since 1951



High-voltage direct current (HVDC) Transmission

HVDC electricity transmission is a proven technology with successful projects in operation around the world. Although the vast majority of power is transmitted via high-voltage alternating current (AC) lines, there are applications and situations where HVDC technology is preferred or even required. HVDC systems provide unique benefits and solutions in specialized circumstances, including underwater transmission applications such as the Lake Erie Connector.

TECHNOLOGY

A high-voltage direct current (HVDC) transmission system consists primarily of a converter station where high-voltage alternating current from the existing transmission system is converted to high-voltage direct current, transmission cables that connect the converter stations and transmit the HVDC power, and a converter station on the other end of the transmission cables that converts the power from direct current to alternating current for delivery back into the grid.

Electricity transmitted in this fashion can be moved in either direction and precisely controlled. HVDC cables can traverse long distances and may be installed overhead, underground, in water, or buried in lake or ocean beds.

ADVANTAGES

- Cables longer than approximately 25 miles (40 km) usually require HVDC transmission because inductive and capacitive elements of AC cables cause resistance and losses, limiting their maximum useful length.
- HVDC lines have significantly lower losses than comparable AC lines
- HVDC transmission systems can move considerably more power than an AC system over the same size line
- HVDC systems help prevent the transmission of faults between connected AC grids and can serve as a system "firewall" against cascading faults
- Higher efficiency and lower losses reduce the total amount of power that must be generated. For an HVDC link with submarine cables, such as the Lake Erie Connector, there will be an energy loss of less than 3% in total, including cable and converter station losses.

MARKET

Demand for HVDC transmission is increasingly markedly. In the past forty years, HVDC transmission links with a total capacity of 100 gigawatts (equivalent to the capacity of 100 large power plants) were installed. Another 250 gigawatts are projected to be added in this decade.

Source: Siemens