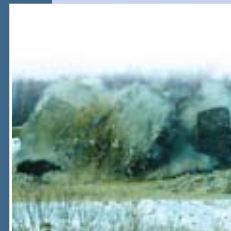


## 315/230-kV **Outaouais** Substation Start of Work

Following an agreement between Hydro-Québec TransÉnergie and Hydro One Networks for a new, 1,250-MW interconnection with Ontario, Hydro-Québec Équipement recently began construction of the 315/230-kV Outaouais converter station in the municipality of L'Ange-Gardien.

The new facility will allow energy interchange between Québec and Ontario. In addition to supplying Ontario with clean, renewable energy, the interconnection will improve the reliability of transmission for serving the native load in Québec.

The estimated cost of the substation is \$364 million, and commissioning is scheduled for April 2009.



## Technical Characteristics

Outaouais substation will be located northwest of the junction where Donaldson Road meets River Road and north of the 315-kV Chénier-Vignan line. It will occupy an area 350 m by 480 m.

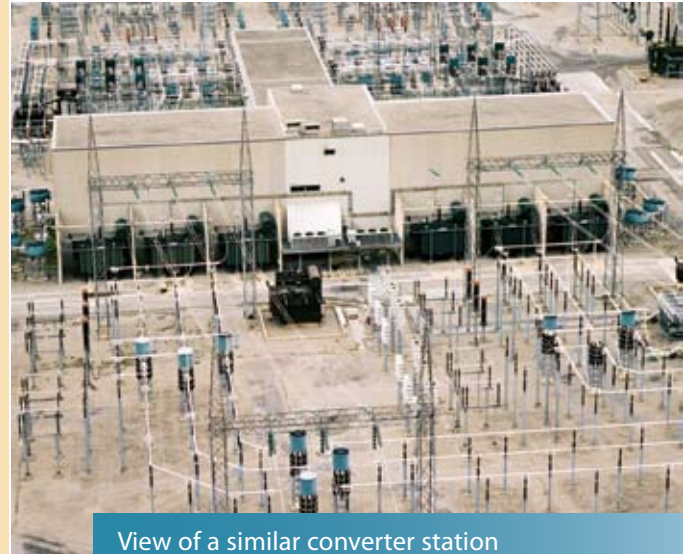
It will be a back-to-back converter station, with the switching section and converter section built in separate stages.

The **switching section**, which is common to all substations, will have a 315-kV side connected to the Québec grid and a 230-kV side connected to the Ontario grid, as well as a maintenance building, two transformers for ancillary services and a 25-kV distribution line.

The **converter section** is specific to interconnections. It will include two 625-MW converters for a total capacity of 1,250 MW. Each converter will consist of transformers and specialized equipment located in the switchyard and connected to the switching section. Other equipment will be installed in the main building, which will also house the control system.

The substation's special feature is its back-to-back configuration. The alternating current from the 315-kV line in Québec will be converted to direct current, then converted again to alternating current at 230 kV, which is the voltage used by the line on the Ontario side. Power interchanges will be possible in both directions.

Hydro-Québec already owns and operates other such substations, but this is the first to connect our grid to the Ontario power system. The project is therefore a technological asset for the Outaouais region.



View of a similar converter station (Châteauguay)

## Asynchronous Interconnection

An interconnection generally involves connecting two separate power grids with one or more transmission lines.

It is *synchronous* if the connected systems operate at the same frequency and the same phase.

In this project, the interconnection is *asynchronous*, since the Hydro-Québec grid is not synchronous with neighboring grids, specifically the Ontario power system. An asynchronous interconnection, achieved with back-to-back converters, allows energy interchange while the grids remain electrically independent. In this way, the fluctuations on one grid do not affect the neighboring grid, and the reliability of both power systems is thus enhanced.

## Construction Stages

Work on Outaouais substation began in November 2006 and will continue until April 2009. The contract for the converter section was awarded to ABB, which is handling the engineering, manufacturing, construction, installation and commissioning.

The switching section will be built by Hydro-Québec Équipement. Civil work will begin at the end of June, as soon as the clearing and earthwork have been completed. This construction stage consists in laying the foundations, erecting the maintenance building and installing the substation equipment.

The main stages of construction are as follows:

- **Clearing**  
The substation site has been cleared in preparation for construction.
- **Blasting, crushing and earthwork**  
Hydro-Québec applied various measures to reduce environmental impacts during site preparation. After blasting, the rock was crushed at the site. Nearly 158,000 m<sup>3</sup> of rock, representing 438,000 tonnes of crushed stone, was removed, stockpiled and reused as backfill to level the ground for the substation. As a result, less construction material needs to be hauled to the site, reducing traffic by some 12,500 trucks.
- **Foundations and buildings**  
In this stage, the contractor will lay the foundations for the buildings and electrical equipment. The control and maintenance buildings will then be built.
- **Equipment assembly and installation**  
The various types of equipment, including transformers, breakers and switches, will be assembled and installed at the beginning of 2008, once the framing and steel supports have been erected.
- **Testing and commissioning of equipment**  
Various tests will precede the commissioning of the entire substation.



Clearing



Blasting



Crushing

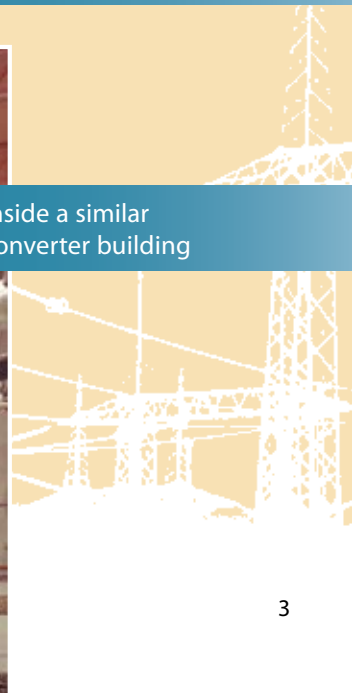


Earthwork

Software model of the converter building



Inside a similar converter building



## Environmental Compliance Assurance

As for all of its projects, Hydro-Québec is monitoring environmental compliance of the construction operations.

The company has also ensured that the tender documents, plans and specifications include the following:

- All environmental standards, directives and measures indicated in its environmental assessment
- All requirements specified in the government authorization certificates
- All requirements set forth by the parties consulted and accepted by Hydro-Québec.

An environmental compliance officer is present on the jobsite to ensure that Hydro-Québec's mitigation measures are implemented.

When the work is completed, the company will review all the measures deployed and ensure that the site is restored.

## Solid Support for Community Development

Hydro-Québec ensures that each project is an opportunity to participate in the development of host communities. The company therefore gives eligible organizations access to an integrated enhancement budget equal to 1% of the authorized value of new line and substation projects for which environmental assessments are completed in compliance with the Québec *Environment Quality Act*. The funds are for community projects.

## Public Relations

Hydro-Québec encourages ongoing dialog with organizations and citizens of host communities. The company periodically informs stakeholders about the project's progress and minimizes the inconveniences caused by construction.

## Information

**For more information, to obtain more copies of this bulletin, or to send us your comments, please contact:**

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