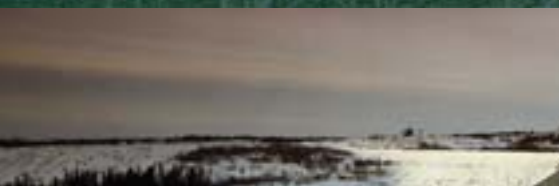




mobilizing energy



Hydro-Québec ranks among the world's largest electric companies For more than 50 years, Hydro-Québec has generated, transmitted and distributed nearly all the electricity consumed in Québec, now totaling more than 165 TWh a year. It has an installed capacity of 33,600 MW and has access to most of the output—or some 5,000 MW—from Churchill Falls generating station, in Labrador.

Hydro-Québec is unusual for an electric company of its size in that it uses water to generate 96% of its output. It also operates thermal generating stations, including gas-fired plants and one CANDU-type nuclear power plant. Its generating, transmission and distribution facilities are located throughout a territory of 850,000 km² and are part of total assets of more than \$58 billion.

In 1997, Hydro-Québec was reorganized to take full advantage of the new conditions on the North American power market. The Hydro-Québec TransÉnergie division was given responsibility for transmission, system control and telecommunications.

Units of Measure

km: kilometre (1,000 metres)

kV: kilovolt (1,000 volts)

MW: megawatt (1,000,000 watts)

TWh: terawatt-hour (1,000,000,000 kilowatt-hours)

Dollars: unless otherwise indicated, monetary amounts are expressed in Canadian dollars.

Experience in Action




Hydro-Québec TransÉnergie operates the most extensive transmission system in North America, and delivers high-quality power to its customers in Québec, other parts of Canada and the United States. Its system comprises over 32,500 km of lines, 18 interconnections and more than 500 transmission substations.

Despite the distance between generating facilities and load centres, as well as the harsh Québec climate, we supply electricity with a high degree of reliability. This performance is based on technical competence and a firmly rooted tradition of innovation, which has enabled the company to make a series of major technological breakthroughs since the 1960s.



In addition to meeting domestic electricity demand, Hydro-Québec TransÉnergie offers its services as a transmission provider to power producers and wholesalers who wish to use its system to supply their customers in other provinces and the U.S. Northeast. It is also active abroad, especially in South America, where it develops and operates transmission systems.

Some 3,600 employees, in every specialty including telecommunications, ensure the smooth operation and growth of Hydro-Québec TransÉnergie's activities. Its total assets currently exceed \$18 billion.

A Sophisticated, Reliable System

Integrated system protection mechanisms		2
A system open to all markets		2
Precise, targeted maintenance		3



The Power of Innovation

The challenge of distance		4
Exporting know-how		5

Focusing on Reliability

Instant information		6
Oversight of activities in Québec		6
North American regulatory environment		7

In Step with the Environment

People first		8
A recognized partner		8

A Sophisticated, Reliable System

Hydro-Québec TransÉnergie is a leader in transmission system design, operation and maintenance. Backed by many years of experience and world-renowned expertise, it mobilizes substantial means—equipment, human and software resources—to offer its customers top-quality service.

For better voltage control, for example, Hydro-Québec TransÉnergie uses different modes of compensation to generate or absorb reactive power. It employs direct current for greater efficiency in transmitting large quantities of electricity over long distances at high voltages and to facilitate interchanges with neighboring systems. It also designs its own automated systems and readily adapts its maintenance methods to suit system requirements.

These are only some of the skills that form the multidisciplinary profile of Hydro-Québec TransÉnergie.

2

STRENGTH

A very robust system

Hydro-Québec TransÉnergie works continually to increase the security of its system in order to handle extreme weather events: intense cold, violent winds, and magnetic and ice storms. Together, the detection systems, special protection systems and specific operating strategies play a direct part in ensuring reliable service.



Integrated system protection mechanisms Since it must transmit electricity over long distances and under difficult weather conditions, which increase the risk of disturbances, Hydro-Québec TransÉnergie has developed highly effective special protection systems. These systems maximize transmission capacity and ensure the stability of the power system.

- Load frequency controllers (LFC) continually adjust the balance between electricity demand and output.
- Automatic switching systems for shunt reactors (called MAIS) help restore the system voltage profile to 735 kV following a disturbance.
- The generation rejection and remote load-shedding (GRRL) system, the world's most extensive, detects disturbances and acts almost instantly—within a few hundredths of a second—to prevent a major blackout.

- Remote undervoltage load shedding (RULS) protects the system against the risk of a voltage collapse following the loss of lines in peak periods.

A system open to all markets To offer its customers a reliable system and transmission services tailored to their needs, Hydro-Québec TransÉnergie can rely on 18 interconnections, most of them with systems in neighboring provinces and states, providing a total export capacity of more than 7,100 MW and an import capacity of more than 9,300 MW. These facilities allow interchanges with Newfoundland and Labrador, New Brunswick and Ontario, as well as the U.S. Northeast.



Hydro-Québec TransÉnergie's customers make use of its transmission system to supply native load or provide point-to-point transmission service. The main customers are:

- Hydro-Québec Distribution, which supplies native load
- power marketers, such as Hydro-Québec Production's wholesale market unit, Brascan, OPG and PowerEX, which provide point-to-point transmission service

Precise, targeted maintenance Day after day, our employees strive to make the system more accessible and efficient so that our customers receive constantly improving services.

Hydro-Québec TransÉnergie carries out a stringent maintenance program to ensure the reliability and efficiency of its facilities and the security of its system control. By refining its maintenance planning processes, it reduces the outage time of the system's main components.



4
BOLDNESS



The challenge of distance To offset the effects of the distance between generating facilities and load centres, Hydro-Québec TransÉnergie has developed high-performance equipment which it has installed at strategic points on the system. In this way, it can deliver high-quality power at a competitive price.

| First 735-kV line | In 1965, Hydro-Québec commissioned the world's first 735-kV line. Using this high voltage, it can transmit more electricity while reducing losses. Today the system has about 11,400 km of extra-high-voltage lines: eleven at 735 kV and one at 765 kV.

| Series compensation | Since 1989, Hydro-Québec TransÉnergie has installed series compensation equipment at strategic points on the 735-kV system. This capacitor-based technology enhances the system's robustness by making the lines behave as if they were shorter. This increases system reliability and avoids the need to build new lines.

| First multiterminal direct current link | Hydro-Québec TransÉnergie's multiterminal direct current system includes the world's first converter station of its kind. Nicolet substation, located midway between Montréal and Québec City, is supplied both by Hydro-Québec TransÉnergie's alternating current system and by a direct current line from the James Bay region. This line links Radisson substation in northern Québec with Sandy Pond substation near Boston, in the United States. Through their ability to transform alternating current to direct current and vice versa, the converters at Nicolet substation allow electricity to be exported and imported, in addition to carrying the output of the La Grande complex to Québec's urban centres.

The Power of Innovation

Over the years, Hydro-Québec TransÉnergie has applied a great deal of ingenuity to providing efficient, cost-effective transmission for the electricity generated by Hydro-Québec. Most of this power must travel more than 1,000 km to reach the load centres, under particularly difficult weather conditions.

Thanks to the innovative solutions developed by its employees and by personnel at Hydro-Québec's research institute, the Québec system continues to offer one of North America's best records of service continuity.

Hydro-Québec's research institute

Hydro-Québec can count on the support of more than 500 experienced specialists working at its research institute. There they design new technologies that enable the company to provide its customers with reliable power, at the lowest possible cost and in a way that is respectful of the environment. Hydro-Québec TransÉnergie also has the use of sophisticated laboratories for various types of advanced testing.

Dialogue between asynchronous systems

In 2004, the world's first variable-frequency transformer (VFT) was installed at Langlois substation, just west of Montréal. The 100-MW VFT allows interchanges across asynchronous system boundaries.

Exporting know-how The know-how acquired by Hydro-Québec TransÉnergie in advanced technologies and system operations is recognized worldwide. A number of electric companies have chosen its technologies, such as its system simulation software, or purchased its specialized training. Others call on its proven expertise in transmission system improvement. Hydro-Québec TransÉnergie is also a partner in installing and operating lines and systems in different countries, especially in South America.

| Peru | Consorcio TransMantaro, in which Hydro-Québec is a majority shareholder, owns the 220-kV Mantaro–Socabaya transmission line linking Peru's northern and southern grids. This 600-km line crosses the Andes at altitudes of 5,000 m or more. Commissioned in 2000, it is to be operated by Hydro-Québec TransÉnergie for 33 years.

| Chile | In October 2000, Hydro-Québec acquired Transelec, the major transmission provider in Chile. This company serves 98% of the country's population by means of over 8,000 km of transmission lines and more than 300 substations. In 2003, Transelec acquired the transmission assets of Sistema Interconectado del Norte Grande (SING), valued at approximately \$140 million; SING comprises 958 km of transmission lines and eight substations.

Hydro-Québec TransÉnergie's specialists are working with their Chilean colleagues on studies to expand and optimize the Transelec system, in addition to offering support and engineering services.

Focusing on Reliability

To ensure a real-time balance between supply and demand with optimum efficiency, Hydro-Québec TransÉnergie takes a great many factors into account, such as anticipated demand, weather forecasts, scheduled outages and safety criteria.

From the System Control Centre (SCC) in Montréal, more than 170 experts work to maintain this balance while meeting maintenance needs, business commitments and system security requirements. There they control electricity generation, transmission and exchanges at interconnections with neighboring systems, virtually to the second.

The decisions made by the SCC dispatchers are carried out by seven telecontrol centres located in the main regions of Québec.



6
CONTROL

Instant information The construction of facilities in remote regions and the need for protection have prompted Hydro-Québec to build its own telecommunications network, the most extensive private network in North America, with installations spread over an area of 850,000 km². This network transmits a multitude of data to the various control centres in order to provide remote protection for lines and switchgear, remote control of generating stations and substations, and overall system management.

Satellite transmission, telephone cables, carrier waves, fibre optics—no effort is spared to ensure reliable connections. Other circuits are reserved for wireline telephony, mobile communications and Internet services. The variety of routes and the redundancy of most of the systems ensure continuous reliability.

Oversight of activities in Québec Electricity transmission in Québec is regulated by the Régie de l'énergie (Energy Board) on the basis of cost of service. Hydro-Québec TransÉnergie's rates, as well as any capital projects worth more than \$25 million, must be approved by that body. The Régie endeavors to reconcile public interest, consumer protection and equitable treatment of electricity distributors and transmission providers.



Recognized reliability

Despite the challenges posed by its complexity and extent, the Hydro-Québec TransÉnergie system complies with Northeast Power Coordinating Council (NPCC) criteria for planning, operations and maintenance. The NPCC brings together power industry players in northeastern North America in order to promote the reliability and security of interconnected systems. All NPCC member transmission providers in the northeastern United States and eastern Canada are required to comply with its criteria.



North American regulatory environment Hydro-Québec TransÉnergie fulfills the responsibilities of regional transmission organization (RTO) for the Québec Control Area. In keeping with regulatory provisions, it offers non-discriminatory access to its transmission system to all customers on the northeastern North America wholesale market. It also places its interconnections at the disposal of customers inside and outside Québec.

The available capacity on the system is displayed on Hydro-Québec TransÉnergie's OASIS (Open Access Same-time Information System) website. This site provides buyers, sellers and other interested parties with information on Hydro-Québec TransÉnergie's transmission service, including available transmission capacities and rates. Capacity can also be booked online through OASIS.

In addition, Hydro-Québec TransÉnergie coordinates secure system operation in the Québec Control Area, which includes Labrador and the Alcan and Brascan systems. It ensures compliance in this area with the criteria and policies of the applicable North American regulatory bodies, namely the Northeast Power Coordinating Council (NPCC) and North American Electric Reliability Council (NERC).

In Step with the Environment

Hydro-Québec TransÉnergie employees each contribute, in their daily practices, to preserving the environment. Environmental considerations play a part in decisions right from the planning stage. For a number of years, we have been designing towers that fit in better with urban surroundings or have a smaller footprint on farmland. A great many specialists work together on impact assessments for new transmission facilities, while others are involved in preserving or restoring the environment during and after construction.

In short, as soon as action needs to be taken on the ground, every employee is responsible for protecting the quality of the natural environment and citizens' quality of life. As a result of this ongoing commitment, Hydro-Québec TransÉnergie has obtained certification confirming the compliance of its operations with the ISO 14001 environmental standards.

8

SYNERGY

An environmental trailblazer

Since the early 1970s, Hydro-Québec has been concerned with reconciling system operating requirements with respect for the environment. It published its Environment Code in 1981 and its Environment Policy in 1984. Today, the company and its divisions incorporate the concept of sustainable development into all their activities.



People first Maintaining a high degree of competence is a daily requirement if we want to achieve the performances expected by customers. Concrete measures have been taken to develop and maintain the skills called for by our role as transmission provider.

Because a company's vitality depends on the commitment of its employees, Hydro-Québec TransÉnergie makes great efforts to support ongoing training and ensure a succession. It has established a plan for maintaining the continuity of know-how in job categories which risk large-scale attrition. Many other precautions cover the safety of every employee, particularly in tasks performed high above the ground or near live equipment.

A recognized partner Hydro-Québec TransÉnergie affirms its technological leadership by supporting industrial chairs at three universities: the chair on atmospheric icing of power system

equipment, in Chicoutimi, the university and industrial chair on transmission lines, in Sherbrooke, and the chair for power system simulation and control, in Montréal. It thus contributes to enriching the knowledge acquired in power transmission and stimulating the search for the technology-based solutions of tomorrow.

With six Québec universities, Hydro-Québec TransÉnergie also helped establish the Institute of Electrical Power Engineering. This participation was its way of investing in training a highly qualified next generation, for its own needs and those of the Québec power industry as a whole.

Finally, Hydro-Québec TransÉnergie works regularly with Hydro-Québec's subsidiaries, as well as Québec companies and suppliers the world over, to carry out projects or to market its products through licences.



Hydro-Québec TransÉnergie
Complexe Desjardins
Tour de l'Est, 12^e étage
Case postale 10000
Montréal (Québec) H5B 1H7

2005?????

*Ce document est également publié en français et en espagnol.
Este documento también ha sido publicado en español y francés.*

