

Hydroelectricity Low-cost Green Energy for Your Industry



Presentation

Hydro-Québec profile
Environmentally friendly energy
Long term security of supply
Customized services
Exceptionally low rates
Concluding remarks

Hydro-Québec Profile

Publicly owned joint-stock company with a single shareholder, the Québec government

North America's top-ranking electricity company in terms of energy sold and generating capacity

World leader in renewable energy generation -99 % hydropower

Recognized for its expertise in high-voltage transmission

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Key Figures – 2013

4,14 million customers accounts in Québec > 20 243 employees Annual sales : 205,5 TWh - 27,7 % large industrial sector (56,9 TWh) Available capacity : 45 294 MW - 98 % of Hydro-Québec's own energy is hydropower 114 843 km of distribution lines 33 885 km of power lines Total assets of CA\$ 73 billion Long-term Credit Ratings (December 31, 2012) – Moody's Aa2 ; – Standard & Poor's A+ ; far Tag

Regulatory Agency

HQ Distribution and HQ TransÉnergie are both regulated by the <u>Régie de l'énergie</u>

The Régie must foster the conciliation of the:

- public interest,
- consumer protection and
- fair treatment of the grid operators

The Régie has authority to :

- hold public hearings on distributor demands
 fix the rates and conditions for the distribution of electric power
- use incentives to improve the performance in satisfying the consumer needs

Environmentally Friendly Energy

First in the world in environmentally friendly hydroelectricity

Accounts for close to 45% of all hydropower generated in Canada

Long term price stability

No pollution rights to pay

Hydroelectricity: One of the Best Generating Options in Terms of Greenhouse Gas Emissions

CO₂ Emissions (g/kWh) Life Cycle Analysis*



* CO₂ produced by technologies used in north-eastern North America, including facility construction and operation and any fuel supplies required.

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** Estimated gross emissions from the Romaine complex. Net emissions will be lower.

*** Emissions mainly associated with the manufacture of solar panels.

Generating Stations – 45 294 MW (Owned & Firm Contractual Capacity Access in Dec 2013) Hydroelectric stations : 40 792 MW - James Bay complex : 16 527 MW - Manic complex : 5 233 MW - Churchill Falls : 5 428 MW Wind Turbines : 2 399 MW Thermal stations : 704 MW Other independent power producers: 1 146 MW

Hydroelectric development - 2005-2020 Sarcelles - 150 MW Tracé de 1927 du conseil privé ≻Eastmain-1-A – 768 MW (non définitif) ≻Eastmain-1 — 480 MW **Rupert Diversion** ≻Toulnustouc – 526 MW La Romaine – 1 550 MW – 8 TWh ₩éribonka – 385 MW >Chutes-Allard and Rapides-des-Cœurs – 138 MW Diversion ≻Commissioned > 2005 >Under construction

Long Term Security of Supply

Québec is home of the second world's largest hydroelectric complex: 16 527 MW

Highly reliable network

Excellent power quality



Isolated and reinforced network



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Hydro-Québec network



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Highly Reliable Network

 Compliant with North American Electric Reliability Council

13 interconnections with neighbourir systems secure supply through exchanges

Major consumption centres are electrically looped

735 kV Montréal area loop

The great Montreal area is looped with a 735 kV belt that feeds 5 main substations. This belt is directly linked to 5 lines that comes from the dams up north.



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Customized Services

 First class customer services
 Advice on electro technology applications and energy efficiency programs

Close cooperation on R&D: expertise on power quality and industrial applications – HQ research institute IREQ (test beds up to 735 kV) – HQ test center LTE

Other options available to meet specific needs of supply

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Double feeding at delivery point available

- Technical support to enhance quality of power

Innovation



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Electric Transportation

- Road tests and interface with the grid
 - Canada's largest test program completed in June 2013 in Boucherville (30 Mitsubishi i-MiEVs – 740,000 km driven)
 - **Charging infrastructure**
 - The Electric Circuit: Canada's first network of public charging stations
 - V2G / V2H power exchange experiments in real conditions - Tests underway since early 2014

Development of battery chemicals

- Hydro-Québec's research institute is world renowned
 - Research partnerships with Arkema (France), Department of Energy (U.S.), etc.
 - Licences granted to BASF, Prayon, Mitsui, etc.

Innovation

Technologies Esstalion

- A Sony Hydro-Québec joint venture.
 - "Ess" for energy storage system, "sta" for station and "ion" for lithium-ion.

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R&D for large scale energy storage system for grid operators.

Exceptionally Low Rates

Stable rates not subject to the variability of oil and gas prices

Patrimonial energy means stability of rates and long term security of supply

Annual average rate increase for the last 10 years : 1.4%

Very competitive industrial electricity rates

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Electricity Cost Index in the world

Industrial customer 2012



Rates Stability in Real Terms HQ large power user industrial rate



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Electricity Cost Index in North America

Industrial customer 2 500 kW * 25kV - 1 170 MWh/mth LF 65%



^{*}From rates before taxes Source : Hydro-Quebec, Comparison of Electricity Prices in Major North American Cities ; Rates in Effect, April 1st, 2013

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Electricity Cost Index in North America

Industrial customer 5 000 kW * 25 kV - 3 060 MWh/mth LF 85%



^{*}From rates before taxes

Source : Hydro-Quebec, Comparison of Electricity Prices in Major North American Cities ; Rates in Effect, April 1st, 2013

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Electricity Cost Index in North America

Industrial customer 50 000 kW * 120 kV - 30 600 MWh/mth LF 85%



^{*}From rates before taxes

Source : Hydro-Quebec, Comparison of Electricity Prices in Major North American Cities ; Rates in Effect, April 1st, 2013

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Concluding Remarks

Security of supply Quality and reliability of supply Low cost energy for your industry Long term stability of rates Customized services for your particular needs Green & emissions free energy

Thank you

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