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## **Hydro-Québec: a Major North American Player in the EV world**

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### **Abstract**

Hydro-Québec is the largest electric utility in Canada. A full 97% of Québec's electricity is renewable. It is also very involved in transportation electrification. Hydro-Québec already has enough electricity to power at least one million electric cars. In April 2011, the Government of Québec launched a 10-year Action Plan to encourage the shift towards transportation electrification, with the objective of having electric vehicles account for 25% of new light passenger vehicle sales by 2020 (for a total of 300,000 EVs).

Hydro-Québec is conducting projects to study EV charging behavior and drivers' charging preferences, as well as the impact of cold weather on all-electric vehicles. In December 2010, Hydro-Québec initiated Canada's largest all-electric vehicle pilot project with 30 Mitsubishi i-MiEVs currently being tested under real-life conditions. Lessons were learned about charging behavior and so-called «range-anxiety» in the past two years, and they will be shared with the audience. In June 2011, Hydro-Québec and four major retail partners launched The Electric Circuit, Canada's first public charging station network. In the initial rollout phase, launched in March 2012, one hundred 240-V charging stations were made available on The Electric Circuit partners' sites (restaurants, retail outlets and public parking lots). Quick charge stations should be added in the next year. The presentation will allow the audience to learn about the network and the decision-making behind this initiative and issues regarding future developments, notably those regarding collaboration with other jurisdictions.

*Keywords: Car, charging, demonstration, infrastructure, range*

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## **1 Introduction**

### **Hydro-Québec: a clean energy provider**


Hydro-Québec is the largest electric utility in Canada. It is also very involved in transportation electrification. As part of its 2009-2013 Strategic Plan, Hydro-Québec has been active in four thrusts: financial support for the development of electrical infrastructure for public transit; development and marketing of advanced technologies; test-driving electric vehicles and planning of infrastructure for vehicle charging.

A full 97% of Québec's electricity is renewable . It is a leader in terms of hydroelectric installed capacity (35,285 MW).

Hydro-Québec already has enough electricity to power at least one million electric cars.


Furthermore, this clean, renewable energy source is available at very competitive rates.

#### A snapshot of Hydro-Québec



- Hydro-Québec is the largest power generator in North America (Installed capacity: 36,971 MW)
- 98% renewable energy (60 hydroelectric generating stations)
- Hydro-Québec is among the largest power transmission providers in North America (33,630 km of power transmission lines)

#### Energy will be available



**1 million EV**  
=  
**Eastmain-1**  
(3 billion of kWh)

## Hydro-Québec Action Plan for electric transportation

### 4 thrusts

- 1 Provide financial support for the development of electrical infrastructure in public transit
- 2 Develop and market advanced technologies
- 3 Test-drive plug-in vehicles and experiment with their integration into the power grid
- 4 Plan support infrastructure for vehicle charging

## 2 An ambitious plan

In April 2011, the Government of Québec launched a 10-year Action Plan to encourage the shift towards transportation electrification, with the objective of having electric vehicles account for 25% of new light passenger vehicle sales by 2020 (for a total of 300,000 EVs).

Among the measures implemented under this plan, the Government is offering a rebate of up to \$8,000 for the purchase or lease of an electric vehicle and grants for purchasing and installing home charging stations. It also plans to launch (Spring 2012) a large call for tenders to purchase at least 400 EVs.

The presentation will therefore address the necessity of state and provincial involvement in transportation electrification.

## 2011-2020 Québec Government Action Plan

### Electric vehicles

- Objective: 25% of new light passenger vehicle sales will be EV in 2020
- Up to \$8,000 rebate on purchase or lease of an EV starting in January 2012
- Financial support on purchase and installation of home charging station (240 volts) starting in January 2012
- With municipalities and private partners, calls for tenders for the purchase of at least 400 EV
- Hydro-Québec, the public utility of Québec, has the responsibility to formulate and coordinate the public charging infrastructure deployment strategy



## Test-drive plug-in vehicles and integrate into the power grid

### 2 Plug-In Ford Escape



In collaboration with EPRI: testing within our fleet

3 years

### 30 Mitsubishi i-MiEV



In Boucherville: testing impact of the cold

3 years

### 20 Chevrolet Volt



Volt to be integrated in HQ's fleet

July 2011

### 1 Plug-In Toyota Prius



In collaboration with Laval University and the Québec Government: testing with external users

completed

### Charging Infrastructure for 30 Nissan LEAF



With a carsharing organization, testing of Level 2 and DC charging stations

July 2011

### Carpooling Pilot Project 10 Chevrolet Volt



Partnership between HQ, GM, STL and AMT

Fall 2011

In December 2010, Hydro-Québec initiated Canada's largest all-electric vehicle pilot project with 30 Mitsubishi i-MiEVs currently being tested under real-life conditions until 2013. Lessons were learned about charging behavior and so-called «range-anxiety» in the past two years.

## Mitsubishi pilot project in Boucherville

- Canada's largest all-electric vehicle pilot project : 3 years, \$ 4.5 million, 30 vehicles, charging infrastructure
- Aims to promote larger-scale adoption of EV in Québec
- Objective to test in real-life conditions :
  - Driving experience and overall driver satisfaction
  - Charging behavior
  - Vehicle performance under winter conditions
  - Impact on electrical power grids



## First results of survey (will be updated)

- Participants use their EV on a regular basis
- Travel an average of 350 km per week
- Are satisfied with their VE and give a rating of 8.6 out of 10
- Consider charging as a very easy operation
- Winter average range of 80 km by cold temperature (down to -15° C)



## 3 Lessons learned

Hydro-Québec is conducting projects to study EV charging behavior and drivers' charging preferences, as well as the impact of cold weather on all-electric vehicles.

In August 2011, Communauto, one of the largest car-sharing services in North America, added 15 Nissan LEAF all-electric vehicles to its fleet, with 35 more slated for 2012. Hydro-Québec is providing technical and financial support to Communauto for deployment of the necessary charging facilities.

Last fall, Hydro-Québec added ten Chevrolet Volts to its fleet, thus broadening its road trials to extended-range vehicles. Among other things, the company intends to assess their potential contribution in reducing greenhouse gas emissions. Other ten Volts will join the fleet in spring 2012.

The program to test the Toyota Prius Plug-in Hybrid under real-world conditions ended in September. Hydro-Québec, the Québec government and Université Laval participated in the program, which yielded data on vehicle performance and user habits.

## 4 A new kind of partnership for public charging

In June 2011, Hydro-Québec and four major retail partners launched The Electric Circuit, Canada's first public charging station network. In the initial rollout phase, launched in March 2012, one hundred 240-V charging stations were made available on The Electric Circuit partners' sites (restaurants, retail outlets and public parking lots). Quick charge stations should be added in the next year.

This network offers 4 basic services:

- Charging stations
- Free parking
- 24-hr emergency service
- GPS-based charge station locator

In the very near future, apps will become available, providing EV users with real-time information on charge station availability. The network will continue to be rolled out gradually, as more EVs arrive on the Québec market.

**Public charging infrastructure: "The Electric Circuit"**


**First public charging network for plug-in electric vehicles in Canada**

Hydro-Québec and its partners RONA, St-Hubert Restaurants, METRO and the Agence métropolitaine de transport (AMT)

Launch : June 2011  
Deployment : March 2012


**Objective :**

Provide a public charging infrastructure to meet drivers' backup or emergency needs.



**The Electric Circuit**

- 120 240-V stations deployed in spring 2012
- More to be rolled out gradually as EVs arrive on the Québec market
- Starting points: metropolitan areas of Montréal and Québec
- Flat fee/charging station locator/emergency service
- Quick-charging stations to be added in 2012
- More details: [www.lecircuitselectrique.com](http://www.lecircuitselectrique.com)



## Author



**Pierre-Luc Desgagné**, a native of Québec City, Mre Desgagné holds a Bachelor of Law degree from Université Laval. He has been a member of the Québec Bar since 1992. In 1996, he joined the Québec government, working for the Ministère de la Métropole. In the fall of 1997, he moved to the Office of the Premier of Québec where he became Deputy Chief of Staff. When he joined Hydro-Québec in the spring of 2001, Mr. Desgagné first served as Director – Media and Public Affairs before his appointment as General Manager – Environment and Public Affairs. In August 2004, he assumed responsibility as Senior Director of the newly created Communications division. Since 2007, he has been Senior Director – Strategic Planning and Government Affairs. In this capacity, he is responsible for coordinating Hydro-Québec's initiatives related to the electrification of transportation. Actively involved in the community, Mre Desgagné belongs to the Conseil des parrains of the Jeune Chambre de commerce de Montréal. From 2007 to 2009, he was president of the Fondation des Offices internationaux jeunesse du Québec. In May 2007, Mre Desgagné received an award at the 30th edition of the Concours Arista (Jeune Chambre de commerce de Montréal) for his achievements in the «under 40» Manager category.