



# Plug-in electric vehicles and North American hydro: a winning combination

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The land transportation sector is one of the largest sources of GHG in Canada

Nearly **30%** of total Canadian GHG emissions come from transportation

It is a significant mean of GHG reduction

# Canada is uniquely positioned with respect to electrical mobility

- **Hydropower represents close to 60% of all Canadian electricity.**
- **There is huge potential for more.**
- **Canadians are sensitive to environment.**
- **They look for cleaner cars.**
- **They are willing to pay more for an EV.**

# CO<sup>2</sup> reduction for ONE electric vehicle

For 18 000 km / year

Vehicle type	Annual consumption	CO <sub>2</sub> Emissions
<b>1 ICE vehicle</b>  Based on a city/highway consumption of 8,2 liters/100 km	<b>1 476 liters</b> 1 gas liter = 2,4 kg of CO <sub>2</sub> (Source : Natural Resources Canada)	<b>3,5 tons</b>
<b>1 electric vehicle fueled with hydropower</b>  Based on a 16 kWh/100 Km consumption	<b>2 880 kWh</b> 1 kWh from a hydro plant = negligible amount of CO <sub>2</sub> (Source : HQ)	<b>negligeable</b>

Imagine 500 000...

## Improving the country's environmental record

- Replacing fossil fuels with renewable electricity like hydropower would play a key role in reducing GHGs and atmospheric pollutants.

**The winning duo – EVs and hydropower – could very well place Canada as an environmental leader on the international scene**

# EVs are coming...soon...

Vehicle (battery capacity)	Vehicle availability in Canada	Announced US Price	Announced range (average notwithstanding cold weather)	Charging time	
				Level 2 (240 V)	Quick charge (400 V)
<b>GM Volt</b> (16 kWh only 8 used)	Mid-2011	\$41,000	64 km	3 hours	Not available
<b>Nissan Leaf</b> (24 kWh)	Mid-2011	\$32,000	160 km	8 hours	30 min (80%)
<b>Mitsubishi i-MiEV</b> (16 kWh)	End 2011	\$30 – 40,000	120 km	6 hours	20 min (80%)
<b>Ford Focus</b>	2011	undetermined	160 km	6 hours	Not available
<b>Ford Classe C Vehicle (PHEV)</b>	2012	undetermined	50 km	3 hours	Not available

# Hydro-Québec Strategic Plan

## 4 thrusts

- 1 Provide financial support for the development of electrical infrastructure
- 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

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

#### 2 plug-in Ford Escape



In collaboration with EPRI : testing within our fleet

#### 50 Mitsubishi i-MiEV



In Boucherville : testing impact of the cold

#### 1 plug-in Toyota Prius



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

#### Charging infrastructure for 50 Nissan Leaf



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

# Conditions to favor the arrival of EVs in Canada

- Consumer awareness
- Financial incentives for vehicles and charging infrastructure
- Public authorities' involvement (federal, provincial, municipal) in the planning of charging infrastructure outside home towards a « plug-in ready » jurisdiction



# The CHA Working Group on Electric Transportation

- ◉ Strategic alliance with Mobility Electric Canada
- ◉ Participation to OEM/Utilities partnership to raise the Federal Government awareness towards EVs
  - Development of a Position paper asking for:
    - Support for codes and standards harmonization
    - Incentives for charging infrastructure
    - Investment and loans in support of EV production
    - Incentives for the purchase of EVs
  - Actions to meet with Government representatives

# Charging infrastructure: theory



**PUBLIC**



**WORK**



**HOME**

# Charging infrastructure : real life experience

## Issues

- Charging station ratio and location
- Charging station types (smart or not)
- Charging duration (level 1 or level 2)
- Weather impact
- Business model



# Electric vehicles and hydropower

- A winning duo
- Part of a widespread adoption of EVs, for a major environmental benefit
- A new electric product and fun to drive



**Thank you!**