

Running on Green Power!

Electric Vehicles: 2011-2020 Québec Action Plan



Alternative Fuel Vehicles Conference
September 27th, 2012
The Biosphere, Montréal



 A PLAN FOR
QUÉBEC

Québec 



Promoting a Market Transformation

Technological Innovation

- Energy innovation support program (PAIE)
- Technoclimat Program

Education and Awareness

- Education and awareness programs on choosing, using, maintaining, and repairing vehicles

Financial Incentives

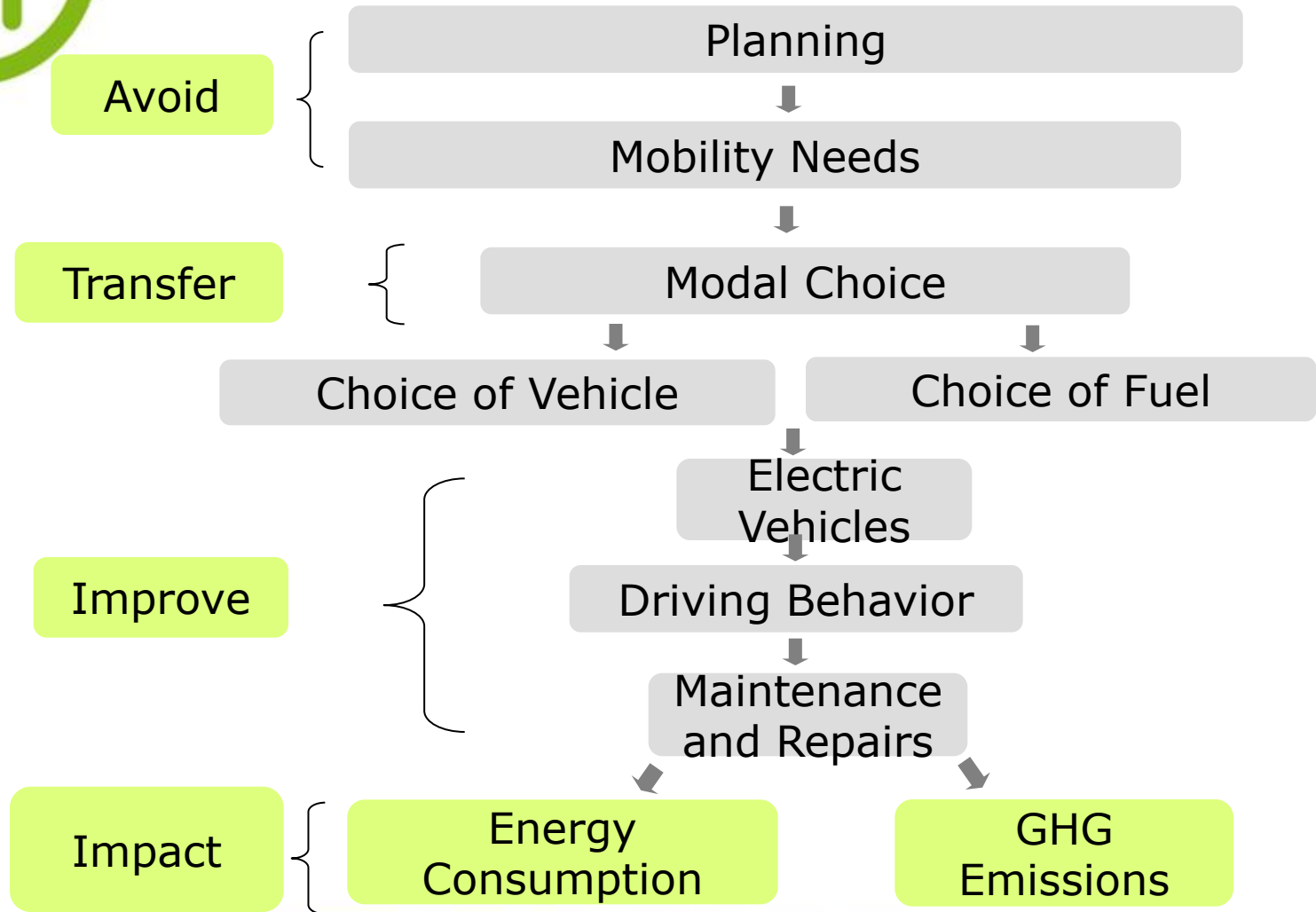
- Rebate on the purchase of an electric or hybrid vehicle

Regulations

- Regulation on light-duty vehicle GHG emissions



Role of Electric Vehicles in Sustainable Transportation





Conventional Efficiency vs. EVs

- The following energy efficiency measures can be applied to conventional cars :
 - Use of efficient tires : 2 % to 4 % savings
 - Nitrogen-filled tires : 1 % to 2 %
 - Synthetic motor oil : 2 % to 5 %
 - Energy efficient driving : 7 % to 10 %
 - Total potential energy savings amount to about 15 % to 20 %



Conventional Efficiency vs. EVs (cont.)

- Electric vehicles have the following features:
 - A lightweight, highly efficient electric motor
 - Bigger, lighter wheels
 - Highly efficient tires with a low profile to minimize deformation and rolling force

Energy savings of more than 75 %!





2011–2020 Electric Vehicle Action Plan (PAVE)

- Launched on April 7, 2011
- Government action plan





Objectives

- Reduce GHG emissions
- Reduce our dependence on oil
- Develop a world class industrial sector





Targets

- Achieve 25 % in sales of new light-duty electric or plug-in hybrid passenger vehicles (5 % of automobile fleet) by 2020
- Electrify 95 % of the public transit network by 2030
- Increase the number of jobs in the sector from 1,500 to 5,000



Financial Impacts

Measures in place before April 2011	\$85 million
New measures	\$165 million
TOTAL	\$250 million



2011–2020 Electric Vehicle Action Plan (PAVE)

Four focuses :

1. Support and inform EV users
2. Plan and implement deployment of EVs
3. Accelerate electrification of public transit
4. Bolster the industrial sector



Focus on Users – Actions





Users

- Rebate for purchase or rental of an electric vehicle, in effect since January 1, 2012
- Home charging station rebate, in effect since January 1, 2012
- Awareness and promotional efforts
- Green license plate





Rebate on purchase (Running on Green Power)

	2012	2013	2014	2015
All-electric plug-in hybrid vehicles with one battery	\$5,000 to \$8,000	\$4,500 to \$8,000	\$3,000 to \$4,000	\$2,000 to \$3,000
Low speed electric vehicles	\$1,000	\$1,000	\$800	\$600
Hybrid vehicles (e.g., Toyota Prius, Hybrid Honda Civic)	\$1,000	\$500		





Focus on Users – Results





Running on Green Power Statistics

As of September 15th, 2012

- More than 250 dealers signed up
- 9 eligible brands of EVs
- 500 EV rebates provided
- 100 home charging station rebates





Running on Green Power Statistics

As of September 15th, 2012

- Distribution of Participants by Type of Clientele

	Individuals	Businesses	Municipalities	Total
EV	➔ 393	65	16	474
AEV (%)	29,3	46,2	62,5	➔ 32,7
PHV (%)	70,7	53,8	37,5	67,3

Legend

EV: Electric vehicles (all types)

AEV: All-electric vehicles

PHV: Plug-in hybrid vehicles





Running on Green Power Statistics

As of September 15th, 2012

- Sales by Location

	Purchase (%)	Rental (%)
AEV	➔ 87,1	12,9
PHV	93,4	6,6

Legend

AEV: All-electric vehicles

PHV: Plug-in hybrid vehicles





Electric Vehicle Models

Currently available :

- Nissan Leaf, Mitsubishi iMiEV, Chevrolet Volt, Ford Transit Connect, Fisker Karma

Announced for 2012 :

- Ford Focus, Ford C-Max, Mercedes Smart, plug-in Toyota Prius, Tesla S





Recharging Station Rebate (Running on Green Power)

50 % of eligible expenses for purchase and installation, up to

2012	2013	2014	2015
\$1,000	\$1,000	\$800	\$600



Green License Plate

Available at

- SAAQ service outlets
- Dealers selling EVs





Awareness and Promotion

- Promotion of Running on Green Power program
- Website overhaul
- *Québec en action Vert 2020* Video
- Support for Équiterre
- EV20 global alliance



Focus on Electric Vehicle Deployment – Actions





Electric Vehicle Deployment

- Major projects
- Infrastructure deployment strategy for public charging stations
- Recharging manual
- Building code and new buildings



Focus on Electric Vehicle Deployment – Results





400 Electric Vehicles for Québec Project

- Part of the Québec government electric vehicle action plan launched in April 2011
- Purchase of at least 400 EV for professional use by the public, municipal, and private sectors by 2015
- Responsibilities
 - MRNF, principal contractor and project administrator
 - Hydro-Québec, responsible for deploying the project for private partners and government corporations
 - *Centre de gestion de l'équipement roulant*, in charge of deploying the project for government ministries and agencies, and municipalities
 - The project is under development with private sector partners



400 Electric Vehicles for Québec Project Rebate for Purchasing and Installing Recharging Stations for Professional Use

- Financial assistance for purchasing and installing Level 2 recharging stations for professional use
 - For all participants of the 400 EV project in the private and municipal sectors
 - To offset purchase and installation costs
 - Covers up to 50 % of the cost
 - Up to \$3,000



Other Pilot Projects Underway

- Hydro-Québec and Mitsubishi – Phase 3 started in December 2011 with the addition of 10 vehicles, for a total of 30 iMiEVs on the road in Boucherville
- Communauto – 50 Nissan Leafs added to the automobile fleet in spring 2012



Deployment Strategy

- The Electric Circuit project, headed up by Hydro-Québec, was announced in January 2012 and inaugurated on March 30. Objective : 150 recharging stations in operation by 2013
- Partners : AMT, Metro, Rona, Rôtisseries St-Hubert



Deployment Strategy

- Charging stations have also been installed by other organizations (Café Morgane, AddÉnergie, etc.)





Recharging Manual

- Published in February 2012
- Designed for electricians, construction contractors, etc.





Building Code

- Plans to change regulations are under study
- Objective is to require the installation of basic recharging infrastructure (240 V) in new buildings



Focus on Public Transit – Actions





Public Transit

- Increased support to help transit companies convert to electricity
- Government policy directions to speed up electrification of public transit
- Purchase of hybrid buses by transit companies



Public Transit (cont.)

- Transit company service vehicles
- Electric bus technology watch
- Taxis
- Electric vehicle carpooling



Focus on Public Transit – Results





Public Transit (cont.)

- Transit company service vehicles
- Electric bus technology watch
- Taxis
- Electric vehicle carpooling



Public Transit

Hybrid buses:

- 100 % hybrid buses in 9 transit companies' calls for tenders
- Purchase of 475 hybrid buses to be delivered between 2013 and 2016 (total fleet of 3,500 buses)
- Replacement of 100 % diesel buses by hybrid and electric buses to start by 2030



Public Transit

Electric bus technology watch :

- \$5 million to help transit companies try electric buses
- Société de transport de Laval, first transit company with an all-electric bus
- Société de transport de Montréal has ordered 7 electric minibuses



Public Transit

- Additional \$15 million (Green Fund) for the public transit energy efficiency program
- Pilot projects leading to the addition of all-electric buses and taxis



Focus Road, Rail and Marine Transportation (Marine and Rail Component)





Road, Rail and Marine Transportation (Marine and Rail Component)

- Assistance Program for Improving Energy Efficiency in Road, Rail and Marine Transportation (Marine and Rail Component) - road transportation
- Aims to promote the introduction of new technologies to improve the energy efficiency of road, rail and marine transport and thus reduce the industries' greenhouse gas (GHG) emissions





Eligible equipment

Equipement	Eligible expenses	Max. financial assistance
Onboard generator or auxiliary electrical system	\$10,000	\$3,000
Heating or air conditioning system	\$3,000	\$900
Onbord computer	\$2,000	\$600
Equipment improving aerodynamics	\$5,000	\$1,500
Additional cost for hybrid or alternative fuel powered vehicle	\$50,000	\$15,000





Examples of return on investment

- Trailer fairings (skirts)
 - Equipment price : \$2,500
 - Financial assistance : \$750
 - Vehicle fuel consumption : 40 L/100 km
 - Fuel economy : 5 %
 - Annual distance traveled : 100 000 km
 - \$ Saving : \$2,000
- Return on investment in years : 0,88 year





Examples of return on investment

- Onboard generator or auxiliary electrical system
 - Equipment price : \$11,000
 - Eligible expenses : \$10,000
 - Financial assistance : \$3,000
 - Hours of idling : 1 500 hour/year
 - Fuel economy : 3 L/h
 - Annual saving : \$4,500
- Return on investment in years : 1.78 year





Focus on Industrial Sector





Industrial Sector

- Support for R&D and innovation
- Electric vehicle research group
- Québec electric vehicle cluster
- Support for investment projects in Québec
- Attracting international manufacturers



Focus on Industrial Sector – Results





Support for Research and Innovation, Funded Projects

- Transmission for EVs
- Refrigerated truck
- Recharging station, AddÉnergie Technologies
- Electric engines, TM4
- Hybrid bucket truck
- Electric bogie
- Electric vehicles for mines
- Electric motorcycle



Research Support

Major electric bus project :

- Official launch with partners on March 7, 2012
- Two prototypes (microbus and city bus) for spring 2014
- \$73 million, including \$30 million from the government
- 100 people assigned to the project



Québec Cluster

EV Group

- Created in summer 2011
- Part of the Québec ground transportation cluster of excellence
- Tasked with mobilizing EV stakeholders to ensure the sector's competitiveness
- Made up of industry and government representatives





Electric Vehicle Research Group

- Brings together industry members and research centers
- Applied research to meet industry needs
- Overseen by the Québec ground transportation cluster of excellence
- Budget of \$4 million over 3 years
- In approval stage



Support for Investment Projects

Süd-Chemie-Phostec Lithium

- \$7.4 million subsidy for a new lithium iron phosphate (LFP) plant in Candiac (04/2011)
- \$78 million investment
- 52 jobs created



Support for Investment Projects

Canada Lithium

- Lithium mining and processing project for batteries near Val-d'Or
- Investment of about \$200 million
- 200 direct jobs, including 70 in processing
- \$75 million loan guarantee from Investissement Québec



Attracting International Manufacturers

Bathium Canada

- \$16 million subsidy to expand a battery plant in Boucherville (03/2011)
- \$176 million investment
- 245 jobs created



Industrial Sector and International Profile

- Alliance between Hydro-Québec, Süd-Chemie, and other partners on LFP licences (07/2011)
- Süd-Chemie-LG Chem : Joint venture to manufacture LFP in South Korea (12/2011)
- TM4-Prestolite : Joint venture to provide electric engines for heavy vehicles in Asia (02/2012)



Technology Innovation Programs

- Two financial assistance programs
 - Green Technologies Demonstration Program
Aiming to Reduce Greenhouse Gas Emissions
(Technoclimat)
 - ✓ 50 % of eligible expenses
 - ✓ Maximum of \$3 million per project
 - Energy Innovation Assistance Program (PAIE)
 - ✓ 25 % to 75 % of eligible expenses depending on the activity type
 - ✓ Maximum of \$1 million per project



Transportation Projects

	Technoclimat	PAIE	Total
Number of projects accepted since 2007	10	25	35
Assistance granted since 2007	\$14.6 million	\$2.8 million	\$17.4 million
Total cost of accepted projects	\$41.2 million	\$9.5 million	\$50.7 million



Transportation Project Examples

- Propane conversion of gas-powered vehicles
- Propane conversion of diesel-powered vehicles
- Natural-gas conversion of diesel-powered tractor-trailers
- Hybrid system for garbage trucks
- Fuel MaximiZer (FMZ) – technology for limiting truck engine power based on the weight carried
- Electrification of a watersports boat
- High-performance electric bicycle
- Development and commercial demonstration of charging infrastructures for electric and plug-in hybrid vehicles



Example : Gaz Métro Solution Transportation – Montreal

- Project title
 - Blue Road – natural gas conversion of diesel-powered tractor-trailers
- Main objective
 - Demonstrate the performance of liquid natural gas (LNG) technologies for heavy-duty trucks in Québec (in partnership with Transport Robert)



Example : Gaz Métro Solution Transportation – Montreal

- Project cost
 - \$4,458,887
- Technoclimat financial assistance
 - \$1,783,555
- GHG avoided/year
 - 52 tons of CO₂ /truck





Example : LTS Marine Inc. – La Prairie

- Project title
 - Electrification of a watersports boat
- Main objective
 - Demonstrate that electric motors can perform as well as or better than conventional combustion engines



Example : LTS Marine Inc. – La Prairie

- Project cost
 - \$284,312
- PAIE financial assistance
 - \$165,000
- GHG avoided/year
 - 3.54 tons CO₂/boat





Example : Groupe Procycle Inc. – Saint-Georges

- Project title
 - Performance demonstration and precommercialization of a high-performance electric bicycle
- Main objective
 - Produce an electric bicycle that is a real alternative to cars for daily travel



Example : Procycle Group Inc. – Saint-Georges

- Project cost
 - \$121,820
- PAIE financial assistance
 - \$83,615
- GHG avoided/year
 - 0.23 tons of CO₂/bike
- Gigajoules saved/year
 - 3.3 GJ/bike





Example : AddÉnergie Technologies Inc. – Québec City

- Project title
 - Development and commercial demonstration of electric and plug-in hybrid vehicle charging infrastructures
- Main objective
 - Create an electric-vehicle charging infrastructure in Québec adapted to northern environments



Example : AddÉnergie Technologies Inc. – Québec City

- Project cost
 - \$529,550
- PAIE financial assistance
 - \$251,961
- GHG avoided/year
 - 17 tons of CO₂
- Gigajoules saved/year
 - 661,388 GJ





Conclusion

- The shift to EV is well underway
- Québec has assets that enable it to take a leading role in the field of sustainable mobility
- Conditions are favorable
- There's a keen interest in EVs and electrification of public transit
- The know-how and innovation capacity of Québec businesses and research centers provide impetus for stakeholders in the electric vehicle sector