Electric Mobility Canada
Mobilité électrique Canada

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ELECTRIC VEHICLES – OPPORTUNITIES FOR CANADA

1. Why the interest in electric vehicles (EV's)?

The global interest in electric vehicles has been nothing short of astounding in the past year or so. With the growing acceptance that the supply of fossil fuels is indeed limited, and with the growing economies around the world placing more demand on this limited supply, significant price increases at the pump will inevitably continue, notwithstanding occasional dips in the prices as demand fluctuates in responses to dips in economic activities. The other key reason for the growing interest in electric traction is the growing concerns about increasing emissions from transportation. Despite improvements in internal combustion engines, emissions continue to increase as kilometres travelled for personal and commercial uses continue their upward trend in Canada and in most other countries.

2. Greenhouse Gas (GHG) Emissions Reduction

EVs are able to dramatically reduce GHG emissions due to their high energy efficiency and their ability to be recharged by clean sources of energy. Canada already has a relatively clean electricity grid and plans to make it still cleaner in the future. An EV recharged from the current Canadian grid would, on average, reduce GHG emissions by about 85% compared to a gasoline-powered vehicle. The reduction ranges from about 98% in hydro-dominant BC, Manitoba and Quebec, to 45% in coal-dominant Alberta, with the other provinces being somewhere in between.

3. What is an electric vehicle?

An electric vehicle is one where one or more electric motors provides the traction for the vehicle part of the time (hybrids and plug-in hybrids) or all of the time (grid connected, battery and/or fuel cell). For purposes of this document, 'Electric Mobility' is defined as vehicles using electric drive technologies provided by:

- Batteries
- Grid connected (tethered) (i.e. subways, streetcars and trolleys)
- Hybrid (with or without Plug-In facilities)
- Fuel Cells (hydrogen or others)

4. The technology situation

The search for alternatives to internal combustion engines has focused research, development and commercialization activities for EV's technologies in several parts of the world, including Canada.

Batteries and related items

Batteries, which are needed to operate electric vehicles, including hybrid vehicles, are the principal area of interest. Currently, the lithium ion batteries seem to be the most promising and can power a small car for around 100 km between charges, a distance which more than satisfies the daily commuter needs of most Canadians. In commercial applications, current batteries are

well suited to meet the full needs of local delivery vans and other vehicles operating within local areas. Improvements in battery technologies are continually being sought to extend the range of battery only operation. Other technologies for EV's include motors, control electronics and charging infrastructures. However, batteries are currently attracting the most research and development dollars.

Vehicles

Hybrid vehicles have been around for nearly a decade and show significant fuel savings (30% to 50%) in urban settings. Commercial hybrid vehicles have been around for about 5 years and also show fuel savings in the order of 30%.

Plug-In hybrid vehicles (where the battery pack is plugged into the grid for recharge) will be commercially available by 2009 and 2010. Many hybrids are currently being retrofitted to become plug-in hybrids.

Full EV's (operated only by batteries) are currently only available in low speed electric vehicles (LSV's) for personal use or commercial use. These LSV's (i.e. the Zenn car) do not meet all Canadian safety standards for vehicles and are therefore restricted as to where they can operate. Commercial full EV's are now at the demo stage in Canada (i.e, the van developed for Purolator by Unicell) and showing promising results. In other countries, such as the US and the UK, commercial electric vehicles have been used in service for over 50 years in niche markets and are now becoming more commercially available.

On the public transport side, Canadian companies already offer trolley buses, streetcars and subway cars.

Major OEM's are currently offering a wide range of hybrid cars and trucks. They have also announced the commercialization of plug-in hybrids but none of these are currently slated for production in Canada, although Canadian companies are involved in research and in the supply of components for these EV's.

5. Activities in other countries

Most G8 countries have adopted significant goals and programs to accelerate the use of all forms of electric vehicles. Examples include:

- The UK Government … by 2020 Prime Minister Gordon Brown wants all new cars sold in the UK to be either PHEVs or EVs and to make his country "the European capital for electric cars".
- The Australian Government… Prime Minister Kevin Rudd said "we don't just want a green car, we want a green car industry." Rudd has commissioned an inquiry into the Australian car industry, and expects the final report on July 31, 2008.
- The Spanish government has announced plans to have one million electric cars on its roads by 2014. Minister of Industry Miguel Sebastian even went further, suggesting that most of the EV's will be made in Spain.
- Europe and the Middle East … Portugal, Prime Minister Jose Socrates is expected to agree to join the electric car infrastructure and rental program, joining Israel, Denmark and other cities throughout North America.

In addition to these government initiatives, major private sector initiatives have occurred in several companies including car builders, battery companies and related industries.

6. Canadian Resources

Electric Mobility Canada is a relatively new industry association with a mandate to promote all forms of electric vehicles from bicycles to trains. Its membership includes the vehicle industry (vehicles and components), utilities (provincial and locals), major fleets (end users) as well as research organizations and academics. With the support of Natural Resources Canada it recently completed a Directory of Electric Mobility Resources in Canada, which identifies over 160 Canadian organizations (industry, research centres and major demo sites) with a significant activity in electric mobility. This does not include major distributors of vehicles or products made in other countries. Most of the identified organizations are clustered in the Montreal, Toronto, Winnipeg and Vancouver regions.

7. Why do electric vehicles make sense in Canada?

Canada is one of only two countries in the world (the other is Norway) where the production of electricity is mostly from renewable resources (i.e. hydro). In addition, wind and solar energy is being captured in increasing amounts. There is the potential to produce all our electricity without pollution at the source if we include nuclear energy. **A key factor is that Canada does not control the price of fossil fuels. But Canada controls the costs of its electricity.** Canada now has the capacity to charge many vehicles during off peak periods and studies are also examining the potential for the electric grid to draw power from fully charged electric vehicles during peak periods, thus avoiding the need for additional generating capacity.

8. Electric Vehicle Technology Road Map for Canada

With the support of Natural Resources Canada and Transport Canada, Electric Mobility Canada is now leading the development of a technology road map for electric vehicles in Canada. The Technology Roadmap (TRM) concept is a consultative process that is designed to help industry, its supply-chain, academic and research groups, and governments come together to jointly identify and prioritize the technologies needed to support strategic R&D, marketing and investment decisions. These technologies will be of critical importance to the Canadian EV industry in the next five to ten years. Through consultation meetings across Canada, the road map is examining the key issues relating to:

- Battery/Energy Storage
- Electric Drive Components
- Vehicle Integration and Efficiency Optimization
- Grid Interface

The final road map report is expected in early 2009 and will be presented to the appropriate parliamentary committees at the federal level. It will also be presented to affected industry sectors, as well as provincial and local governments. The report is expected to contain recommendations aimed at:

- Research and development needs.
- Regulatory needs (safety, charging infrastructures, etc)
- Policy and other support needs from all orders of government
- Human resources implications in the related manufacturing and servicing industries.
- Education programs regarding Electric Vehicles and the need for a pending transport revolution.