
EVS-24: Learnings & Lessons

Overview of Key Initiatives in Canada Session 7

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Overview

- EV Technology Road Map (EVTRM) for Canada
- EVS-24
- Opportunities for Canada's EV Sector
- Lessons Learned

EV Growth Predictions and Projections

- “The electric car is here” and “The auto industry’s e-car push will turbocharge innovation, employment and profits and everyone from the laid-off factory worker in Michigan to Al Gore will approve.” [Eric Reguly, G&M 20090921, pp B1](#)
- “electric car is at the starting line . . . Automakers must prove that the technology, and the market, are ready . . . Some automobile makers believe the electric vehicle is about to become more than a science experiment” [Carter Dougherty, National Post 20090917, pp FP14](#)
- “within 10 years, close to 30% of the car market will be made up with purely electric vehicles, with hybrid and internal combustion engines sharing the rest” [Diarmuid O-Connell, Tesla Motors, G&M 20090921, pp B4](#)
- “In 10 years, electric will not be a mass product” [Klaus Berning, Porsche, G&M, 20090921, pp B4](#)
- E-cars 0.6% of global industry production by 2020, with hybrids another 0.7% [HIS Global Insight per G&M200909, pp B4](#)
- “one-third of the cars made in 2025 will be electrically powered in one way or the other” [IDTechEX per The Economist, 20090905, pp 75](#)

EV Technology Roadmap for Canada



- Submitted to Government of Canada July 2009
- “Strategic vision for highway-capable battery-electric, plug-in and other hybrid-electric vehicles
- Focus on personal and commercial applications which rely exclusively or primarily on electric traction
- “EVTRM” envisions at least 500,000 EVs on Canadian roads by 2018, **plus** what may be a larger number of hybrid ICE-electric vehicles
 - **with MORE Canadian content than vehicles in 2008**
 - **did NOT consider FC-based, 2- or 3-wheeled, low-speed and off-road, military or grid-powered trolley bus types**

EVTRM for Canada: Overview

- Canada's potential strength for EV production and use is the sophistication of the grid and the electrical generation that feeds it, and high percentage is from renewable sources: would result in large reductions in carbon emissions
- Several provincially- and local-owned utilities have a strong interest in electric traction
- Energy storage is the most important topic considered
 - Progress toward widespread use of EVs depends primarily upon "increasing the amount of electrical energy that can be stored in a given volume or weight on board a vehicle, thereby extending electric traction's range"

EVTRM for Canada: Recommendations

- Implementation (reconstituted Steering Committee)
- Investment (timely and substantial) in development and manufacture of EVs and energy storage devices
- Mechanisms to promote
 - Development
 - Public acceptance
 - Procurement (personal and commercial)
 - Installation of charging infrastructure

EVTRM for Canada: Strategic Initiatives

- Technology
 - **Improve energy storage** - manufacturing techniques, density, management and control electronics, and system packaging
 - **Reduce cost** by a factor two or three
 - **Test charging infrastructure** options, including impact on power quality
 - **EV demonstrations** in real-world operation for reliability and durability
- Codes, standards, regulations and infrastructure readiness
 - Regulations to **support development w/o compromising safety**
 - **Harmonization**, including charger interfaces and used vehicle conversions
 - **Building codes** and regulations amendment to **accommodate charging EVs**
- Studies and assessments
 - R&D, use, impact, social and economic benefits, policy, etc.
- Education and outreach
 - Resource requirements for training, education and certification
 - Educational and public relations programs to increase awareness

EVS-24: What is it?

- 24th annual event
 - Rotates between Americas and Asia and Europe
 - AVERE (European Association for Battery, Hybrid and Fuel Cell Electric Vehicles)
 - WEVA (World Electric Vehicle Association)
- International Battery, Hybrid and Fuel Cell Electric Vehicle Symposium & Exhibition
- Stavanger Norway
- **Towards Zero Emission: Nations-Cities-Vehicles**
- www.evs24.org

EVS-24: Stats-n-Facts

- 45 countries represented
- Total registrations: 2958
 - Public Exhibition: 1,320
 - **Delegates: 1,069**
 - 67% from Europe
 - 32 individuals from Canada
 - Exhibition staff: 446
 - **Press: 120**
- EVS Viking Rally: both Hydrogen and Electric
- Ride & Drive



EVS-24: Stats-n-Facts

- Presentations: 370
 - Canada: 9
 - United States: 63
- Topics
 - Vehicles (81)
 - Batteries (64)
 - Drive systems (56)
 - Energy & environment (50)
 - Simulation (47)
 - Market issues (31)
 - Policy issues (26)
 - Fuel cells (15)



EVS-24: Stats-n-Facts

■ Exhibition

- Over 5,000 m²
- 100+ organizations
- 70 booths
- 40 countries represented
- ~450 exhibition staff

■ Canadian Presence

- Advanced Lithium Power (energy management and battery technology)
- Electrovaya (battery technology)
- TM4 (high-performance electrodynamic conversion and power control systems)
- Electric Mobility Canada (showcase for Canadian organizations)



EVS-24: Stats-n-Facts

■ Electric Mobility Canada

- Cantec (PQ)
- Delaware Power Solutions (BC)
- Delta Q (BC)
- Electrocraft (ON)
- Isaac Instruments (PQ)
- Motive Industries (AB)
- Plastik M.P. (PQ)
- National Research Council Canada's Industrial Research Assistance Program
- Red River College (MB)
- Smart e Bikes (ON)
- Thumbprint Solutions (ON)
- TM4 (QC)
- Westward Industries (MB)



EVS-24: Learnings

- Contrasts: North America vs rest of World
 - All purpose versus speciality/dedicated applications
 - Grid capacity is not an issue
 - Fleet (versus individual) focus, at least initially
 - Need to increase federal electric vehicles incentives
 - And in Canada's case, also w.r.t. the USA
 - Charging infrastructure is not well-developed - yet
 - And will be impacted by whatever standards are finally adopted

EVS-24: Opportunities

- Improving energy density of battery technology will be essential to success in North America
 - Reducing cost
 - Reducing size, weight and volume
 - Increasing reliability and life
 - Maintaining and increasing performance
- However, numerous opportunities beyond battery technology

EVS-24: Opportunities

- Light weighting
 - Lighter components will reduce vehicle weight, increasing range
- Vehicle components from composite materials
 - Biomass (ag and forestry wastes) as an input
- Testing for Canadian climatic conditions and extremes
 - Fuel consumption, performance, safety, use/misuse, integration
 - Training programs for vehicle/component maintenance/service
- RD³ - Research, Development, Demonstration and Deployment
 - Cost reduction can be addressed by increasing volume, but leasing and financing incentives and awareness initiatives help
- Standards and homologation/harmonization
 - Industry involvement to advance knowledge and identify needs

EVS-24: Opportunities

- Software
 - Battery management, monitoring and control, operator displays
- Repurposing automotive batteries/technologies
 - Stationary applications (backup power supplies)
- Charging infrastructure (especially urban areas)
 - Wired and wireless, will be standards-driven
- Upsizing - to be more than just commuter vehicles
- Efficient low carbon transportation technology
 - Vehicle electrification, scale-up and customization for Canada
- Vehicle-to-grid integration (planning and utilization)
 - Generation/distribution, residential impact, bi-directional flow

EVS-24 Lessons Learned

- Significant contrasts exist between North America and rest of the world
- Rate of growth of EV use is contradictory
 - Demand and awareness (at least "buzz") is increasing
 - Battery technology (energy density) is the most significant limiting factor to widespread use (and growth)
 - Need to reduce size, weight, volume and cost; while increasing reliability, life and performance
- Charging infrastructure cannot be overlooked
- Policy and program incentives will drive adoption and use
- RD³ is necessary
- For North America, an EV needs to be capable of being a household's primary vehicle
- Numerous opportunities exist for Canadian organizations

Acknowledgments



Thank You!

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