



National Electric Drive Transportation Initiative

PHEV 2009
September 29, 2009
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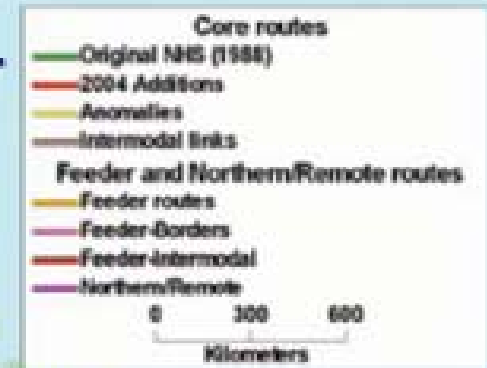
Outline

- Context of transportation in Canada
- What is sustainable transportation
- History of electric vehicles
- Advantages and challenges
- National Electric Drive Transportation Initiative
 - Innovation and R&D
 - Regulation and standards development
 - Outreach
- Moving forward

THE CANADIAN TRANSPORTATION CONTEXT

Basic Facts

- ✓ Large Territory - $10E^6$ km²
- ✓ Extensive Transport Infrastructure Spread Over Large Territory
- ✓ Inexpensive Transportation is Key to Canadian Economy
- ✓ Primary reliance on fossil fuels
- ✓ High North is Problematic





Environmental Impacts on Transportation

- The transportation sector poses significant environmental concerns
 - Greenhouse gas emissions
 - Criteria air contaminant emissions
 - Noise
 - Land use and ground water contamination
- Transportation relies primarily on petroleum-derived fuels



SUSTAINABLE TRANSPORTATION

Social

- safety
- security
- health
- mobility/access
- noise
- equity
- availability

Economic

- employment
- trade/tourism
- competitiveness
- affordability
- subsidies
- congestion

Environmental

- air quality
- climate change
- urban sprawl/land use
- water pollution
- spills



Policy Drivers

Advantage Canada

Four key principles

- Focusing Government on what it does best
- Creating new opportunities and choices for people
- Investing for sustainable growth
- Freeing businesses to grow and succeed

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Building a Strong Economy
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2007
Canada

Advantage Canada

- Tax advantage
- Fiscal advantage
- Entrepreneurial advantage
- Knowledge advantage
- Infrastructure advantage

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CANADA'S NEW GOVERNMENT

**MOBILIZING
SCIENCE AND
TECHNOLOGY**
to Canada's Advantage

SUMMARY

2007

Canada

- Sustainable development strategies of individual departments and agencies
- Etc...

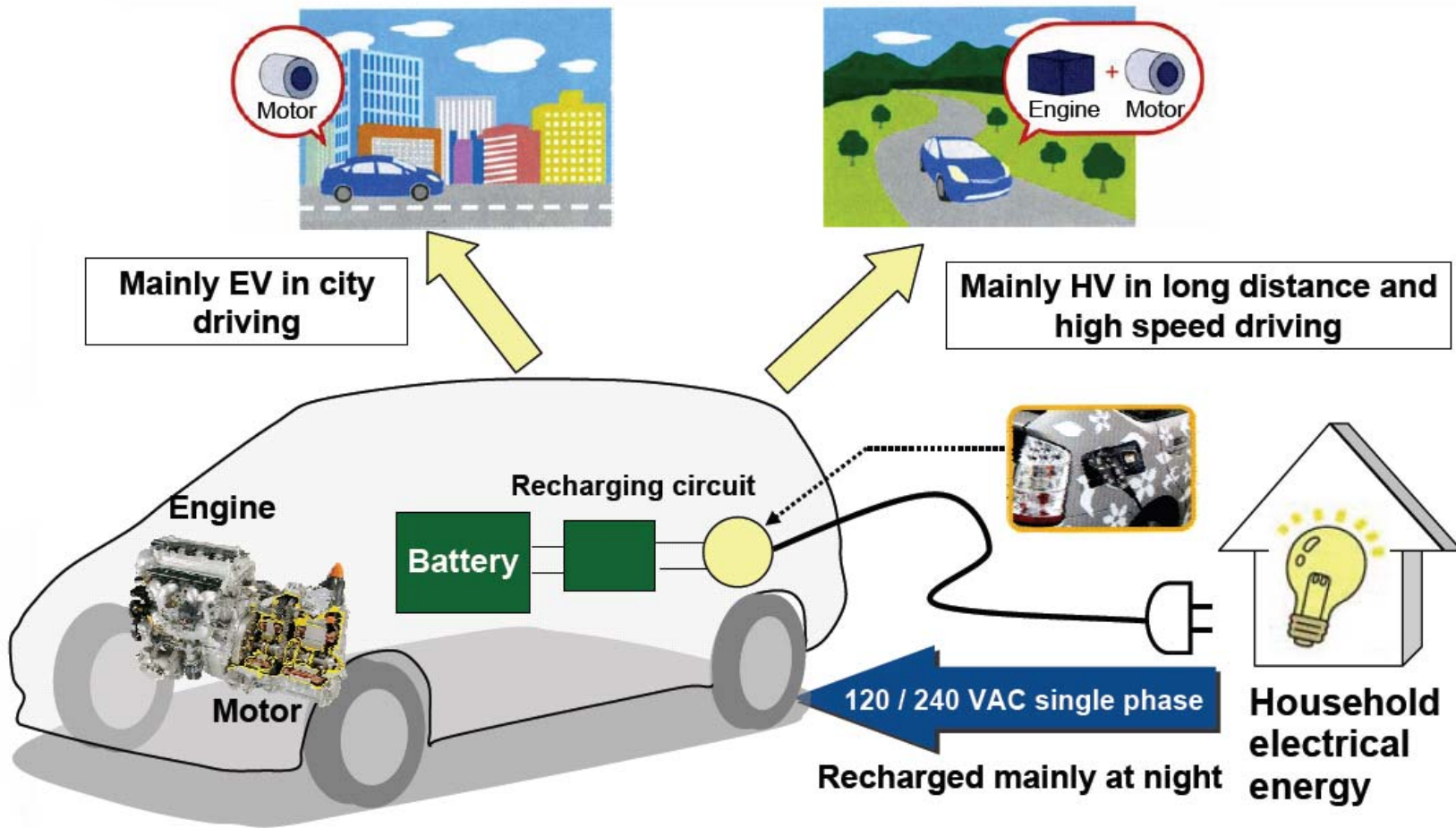


Regulatory Drivers

- Emerging climate change/energy security approach in the U.S.
 - Seek to establish cap-and-trade program to reduce GHG emissions 17% from 2005 levels by 2020
 - Complementary measures in the transportation sector would include financial assistance to auto manufacturers for plug-in electric vehicles and for States to develop appropriate infrastructure plans
- Canada's domestic climate change regulatory and policy framework under review as a result policy shift in the United States as well as current economic situation
- Regulatory action to address transportation sector emissions still proceeding – aligned with the US where possible



Sustainable Transportation





Electric Drive Transportation



Definition:

- The use of electrical power as the energy that propels transportation vehicles



History

- 1900s: Electric vehicles (EVs) were common, even outselling gas powered cars
- 1910s: EVs unable to compete due to technical and market challenges
- 1970s: Oil crisis sounded alarm for sustainability of petroleum resources
- 1996-2002: Battery EVs were leased for a limited time in California to meet the state's Zero Emissions Vehicle mandate
- 1999: Honda introduced the Insight, a production parallel hybrid vehicle
- 2001: Toyota introduced the Prius, a production series-parallel hybrid



Advantages

- More efficient powertrain
- Diversification of transportation energy
- Reduced or zero tailpipe emissions compared to conventional vehicles
- Most infrastructure in place
- Better vehicle performance
- New economic opportunities

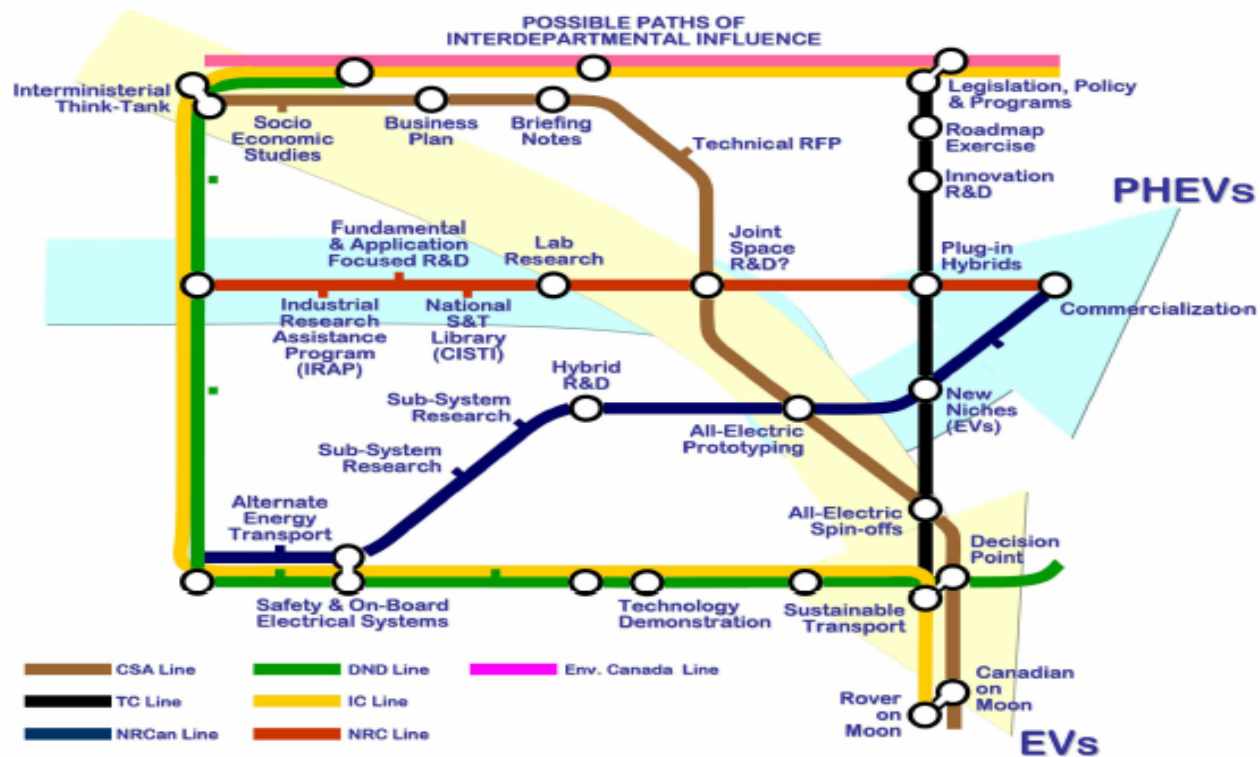


Challenges

- Improved all-electric range
- Faster recharging times
- More affordable technology
- Safety performance
- Adequate grid capacity



National Electric Drive Transportation Initiative



- Innovation and R&D, regulation and standards, outreach



Innovation and R&D

- In summer 2006, NRCan's Office of Energy R&D commissioned NRC to conduct an environmental scan and expert workshop to identify priorities for an R&D program with focus on plug-in hybrids (PHEVs)



Electric Mobility R&D Program

- \$2M/year (2008-12) - funded by NRCan's Program of Energy Research and Development (PERD)
- conducts R&D in four main areas:
 - energy storage
 - electric drive components
 - powertrain optimization
 - regulations for emissions and fuel efficiency



Smart Grid R&D Program

- \$0.5M/yr (2009-2011) - funded by NRCan's Program of Energy Research and Development (PERD)
- integrated technology area focused on R&D in the following areas related to electric mobility:
 - Renewable and distributed energy resource integration
 - Architecture and communications infrastructure
 - Grid operations and control
 - Customer system



Regulations and Standards

- Emissions and fuel efficiency (Environment Canada)
 - Develop suitable emissions and fuel economy measurement methods and models for evaluating PHEVs
 - Coordinate testing method and model development with U.S. and international efforts to harmonize hybrid vehicle test methods
- Vehicle safety and transportation of dangerous goods (Transport Canada)
 - Examine safety of electric vehicle technology



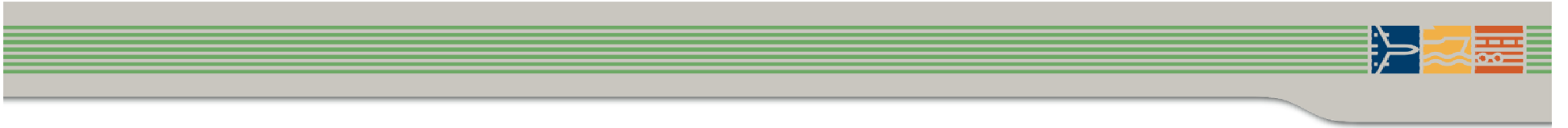
Outreach

- National directory of electric drive transportation organizations completed fall 2008
- Electric vehicle technology roadmap launched June 28, 2008
- Participation in International Energy Agency working groups
- Participation in events such as PHEV 2007 and PHEV2009



Moving Forward

- Government of Canada is committed to a safe, secure, efficient and environmentally responsible transportation system for all Canadians
- Electrically powered vehicle technology represents a potential solution
- A goal of the interdepartmental working group is to develop an enhanced R&D base in Canada



Questions or Comments