The Transition to Clean Cars: A Positive Shock to the System

Local Energy Solutions Conference
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NH Department of Environmental Services
Overview

• Why Cars? (Chris Skoglund, NHDES)
  o Energy Use in New Hampshire
  o Drivers
  o Impacts
  o Air Pollution in New Hampshire

• Why “Clean Cars” (Chris Skoglund, NHDES)
  o The “Three-Legged Stool”
Overview

• Vehicle Technology (Steve Russell, MA DOER)

  What’s the Deal with Electric Vehicles?
  o Vehicle Type and Application
  o Charging Options
  o Battery Range

• Vehicle Procurement Deandra Perruccio (NH OEP)
  • Vehicle Financing

• Other Resources
This figure shows that the Transportation Sector has consistently consumed a larger share of primary energy than any other sector of the economy.
This figure shows how the Transportation sector compares, as a percent of the state’s total energy consumed per year, over time.
Population and Traffic Growth

Growth Rates - 1970 to 2014

Normalized Population
This figure shows how the vehicles mile travelled in the state has grown faster than the rate of population growth since 1970 indicating that average driver is travelling further each year until 2006. Fuel costs may have been a factor as VMTs are on the rise again.
This figure shows how energy use has grown faster than the population but not as fast as VMTs in NH indicating that vehicle technology (e.g., fuel efficiency) can mitigate some of impacts of vehicle travel.
NH Sources of Greenhouse Gas Emissions

This figure shows how the, like energy use, the Transportation Sector has represented the largest share of the state’s greenhouse gas emissions.
The Transportation Sector is also a source of ozone (smog) precursors, which have a direct affect on public health.
Both energy use and pollution emissions can be addressed by focusing on three interrelated pathways. Fuel selection can influence both GHGs and other air pollutants, while reducing transportation demand (i.e., reducing VMTs) and vehicle technology can reduce energy use and pollution emissions. The marriage of the three can have the biggest impact. The other presentations in the session focus on electric vehicles as they may be among the easiest solution to deploy in a state which is very rural.
Questions?

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Energy Source Options

Plug-in Hybrid and All Electric Vehicles

- Coal
- Oil
- Natural Gas
- Biomass
- Trash
- Nuclear
- Solar
- Wind
- Tidal
- Geothermal
Annual Vehicle Emissions Comparison
National Average

Compare Electricity Sources and Annual Vehicle Emissions
Enter a ZIP code to see a breakdown of the electricity sources used to charge EVs and PHEVs on a local grid and compare the annual emissions generated from vehicles using electricity from the grid, gasoline, or a combination of the two.

National Averages

Electricity Sources
- Coal: 38.64%
- Natural Gas: 27.52%
- Nuclear: 19.47%
- Hydro: 6.19%
- Wind: 4.44%
- Biomass: 1.56%
- Oil: 0.74%
- Solar: 0.67%

Annual Emissions per Vehicle

Source: Alternative Fuels Data Center -
http://www.afdc.energy.gov/vehicles/electric_emissions.php
Annual Vehicle Emissions Comparison

New Hampshire / ISO-NE

Source: Alternative Fuels Data Center -
http://www.afdc.energy.gov/vehicles/electric_emissions.php
The Market is Growing Fast!

Annual sales of plug-in electric vehicles in the United States and California - (2010-2015)

- California PEV sales
- U.S. PEV sales

<table>
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<tr>
<th>Year</th>
<th>California</th>
<th>U.S.</th>
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<tr>
<td>2010</td>
<td>397,345</td>
<td>340,870</td>
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<td>2011</td>
<td>6,964</td>
<td>38,721</td>
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<td>2012</td>
<td>17,821</td>
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<td>2013</td>
<td>20,093</td>
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<td>2014</td>
<td>42,545</td>
<td>123,347</td>
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<td>2015</td>
<td>62,166</td>
<td>114,064</td>
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EV Charging in New England
NH Policies Relative to EVs

- 2009 NH Climate Action Plan
- New England Governors/Eastern Canadian Premiers
  - 2001 Climate Action Plan
  - 2013 Transportation Air Quality Action Plan
  - 2015 Climate Resolution 39-1
- IR 15-510 – PUC docket - Investigation into Resale of Electricity by Electric Vehicle Charging Stations
- 2015 Under 2 MOU
- 2016 Governor’s Accord for a New Energy Future
Strategies to Reduce Mobile Source Emissions

• Make vehicles more efficient and utilize tailpipe controls

• Use cleaner fuels (which can enable tailpipe controls)

• Reduce the miles driven
Electric and Plug-in Hybrid Vehicles

• 12.D: Streamline local permitting for small scale solar PV

• 14A: Create a plan for charging infrastructure development

• 14B: Support development of EV charging infrastructure

• 14B: Increase Consumer Access to LEVs and ZEVs
Vehicle Acronyms

- EV – Electric Vehicle
- BEV – Battery Electric Vehicle
- PEV – Plug-in Electric Vehicle
- HEV – Hybrid Electric Vehicle
- PHEV – Plug-in Hybrid Electric Vehicle