The Value of Incentives to Promote Electric Vehicles

Dan Welch
The Need for AFVS

- Transportation emissions are now the largest source of CO2 emissions in the U.S.

- EVs are a market-ready, low-carbon technology that can meet driver needs
Market Update

• Total sales exceed 500,000 vehicles on U.S. roads
• Recent sales were best in history of U.S. EV market
• EV market share reached high of 1.39 percent in 12/16

EV share of new vehicles by month, 1/13 – 10/16
(Auto Alliance)
Market share is concentrated by state and around population centers.

Value of incentives shows some connection to deployment.

EV share of new 2015 vehicle registrations by metropolitan area (ICCT).

EV share of new vehicles and available consumer incentives by city (ICCT).
Improved battery performance is bringing about a “next generation” of low-cost, long-range all-electric vehicle models.
Speaker Overview

• New York State Energy Research & Development Authority
  • Adam Ruder, Manager of Clean Transportation

• Colorado Energy Office
  • Maria Eisemann, Transportation Policy Analyst
  • Wes Maurer, Transportation Program Manager

• National Association of State Energy Offices
  • Cassie Powers, Senior Program Director of Transportation

• Fores (Forum for Reforms, Entrepreneurship, & Sustainability)
  • Mattias Goldmann, Chief Executive Officer
• C2ES Guide on Charging Infrastructure Finance

• ICCT Report on Sustaining U.S. EV Market Growth
  • http://www.theicct.org/leading-us-city-electric-vehicle-2016

• VW Settlement Brief

• PEV Clips
  • Email welchd@c2es.org for subscription request
EV Incentive Best Practices

Adam Ruder
NYSERDA
New York State: Progress To Date

• Over 16,000 EVs and PHEVs registered in NYS
• Approximately 1,600 Charging Stations in NYS
• Over a decade of research on EVs and Charging Stations
• Continued work on breaking down regulatory barriers
NYS EV Programs

- EV Rebate (upcoming)
- EV Truck Voucher Program
- Charging Station Tax Credit
- Municipal Charging Station & EV Rebates
- Additional Charging Station Incentives (upcoming)
- Aggregate EV Purchasing for Public Fleets
- EV Consumer Outreach and Education
- EV-related R&D Grants
Types of EV Incentives in NYS

• Financial
  – EV rebate (upcoming)
  – Charging Station tax credits, grants, rebates

• Convenience
  – HOV lane access
  – Reduced tolls
  – Preferred parking (select communities)

• Informational
  – Charging data
  – Best practice guides
Financial Incentive Best Practices

• Talk to stakeholders in advance
• Regular program review
• Cost sharing
• Balance ‘motivating’ and ‘too generous’
• Be clear on conditions for phase-out early
Convenience Incentive Best Practices

• Make sure benefits are clear and well defined
  – Duration – perpetual or limited?
  – Eligibility – original owners or any?
• Coordinate across jurisdictions if possible
• Regular program review
Informational Incentives – Examples

- Quarterly data from all EV charging stations NYSERDA has supported
  - Analyzed by region of state, location type, etc.
- Best practice guides for charging station hosts, municipalities, installers
  - Easy go-to resources for stakeholders with questions about how to get involved with EVs
Informational Incentive Best Practices

• Make data available in as useful a form as possible
• Tie EV data to other existing databases, such as data on travel patterns, solar PV installations, or general Census data
• Share best practice guides with other states, MPOs, municipalities
Best Practice Guides
For More Information

Adam Ruder
Clean Transportation Program Manager
adam.ruder@nyserda.ny.gov
(518) 862-1090 x3411

nyserda.ny.gov/chargeny
What Makes an EV Incentive Program a Success?

Presented by Wes Maurer & Maria Eisemann
Colorado Energy Office
Presentation Overview

- Setting a Baseline for Program Development
- Colorado’s Electric Vehicle Programs
- Colorado’s Supporting Policy Framework
- Concluding Remarks
Setting a Baseline for Program Development
Colorado EV Market Implementation Study

Colorado EV Market grew from 20 vehicles in 2011 to 4,163 by the end of 2014

High Adoption Scenario: 937,000 EVs on the road by 2030

Low Adoption Scenario: 38,000 EVs on the road by 2030

Download full report at: https://www.colorado.gov/pacific/energyoffice/reports
Advancing Colorado’s Electric Vehicle Market

Incremental Vehicle Cost
- Tax Credits
- State grants to non-tax paying groups
- Increased vehicle production

Range Anxiety
- Charge Ahead Colorado: State grants for charging stations
- Identification of EV corridors with Colorado Dept. of Transportation

Information
- Refuel Fleet Coaches
- www.RefuelColorado.com
Colorado’s Electric Vehicle Programs
The program also funds 80% of the cost differential between an EV and its conventional fuel equivalent up to $8,260 per vehicle for fleets.
Refuel Colorado Energy Coaching Program

Alternative Fuel Experts
• Understand EVSE
• Work with local stakeholders
• Resource for Wired Workplaces

Source: RefuelColorado.com/refuel-colorado-fleets
**Public Information: RefuelColorado.com**

**EVs can reduce fuel costs by over $1,000/year**

| Avg. annual gas cost: $1,310 | Avg. annual electric cost: $221 |

**Light-duty EVs can reduce CO2 emissions by 37%**

**Colorado EVs are displacing 45,000 barrels of crude oil in 2013**

### Alternative Fuel Cost Savings

**Fuel Costs**

- How much do you pay for gasoline or diesel to fuel your vehicle? 2.60 dollars/gallon
- How much would you pay for an alternative fuel? (e.g. electricity, CNG, propane, etc.) 1.10 dollars/gallon (see fuel pricing)

**Miles Driven**

- How many miles do you drive in a year? 15000 miles
- What's the average fuel mileage on your current gasoline or diesel vehicle? 23 mpg
- What's the fuel mileage equivalent on the all-fuel vehicle you would like to purchase? 28 mpg
- How long do you plan on owning the all-fuel vehicle? 10 years

**Estimated Savings**

- This is how much you could save in fuel costs every year driving on alternative fuel: $1,106.37
- This is how much you could save over the life of owning an alternative fuel vehicle: $11,063.66

Fuel costs vary by location and market conditions. This calculator is for illustrative purposes only. Colorado tax credits vary by year, type of vehicle, and other factors. Please consult a tax professional and the Colorado Department of Revenue for actual figures.

Source: refuelcolorado.com/calculator
EV Wired Workplace Recognition

Plaque
• Signed by Governor Hickenlooper

National Recognition
• U.S. Department of Energy

Press
• Template for Press Release

Recognition Event
• Ribbon-Cutting Ceremony or Ride-and-Drive
Colorado’s Supporting Policy Framework
Alternative Fuel Resale Legislation

• Supporting Agency - Colorado Dept. of Revenue

• HB 1258, enacted April 2012

• Resale of electricity is allowed for alternative fuel vehicles (e.g. charging stations) without provider being regulated as a public utility.
EV Market Study

Assess the Advantages
- Economic
- Environmental
- Energy Security

Analyze EV Adoption
- Current Adoption
- Locational Data
- Growth Forecasts

Identify Barriers
- Practical Solutions
- Optimize State Efforts
EV Market Study

• Key Findings
  • EV market in CO already having a net positive effect
  • Benefits of an EV in Colorado compared to a typical automobile:
    • Reduce fuel costs by more than $1000 per year
    • Reduce CO2 emissions by 37 percent on average

• Key Recommendations
  • Provide higher levels of funding in the Charge Ahead Colorado program for Level III Fast Chargers
  • Simplify existing tax credits
Simplified Tax Credits

• Effective January 2017

• Changes credit from a complicated calculation to:
  • Fixed, flat tax credit of $5,000 per sale and $2,500 per lease
  • Assignable to lending entities (optional)
CO State Fleet Opportunity Assessment

Inform state on meeting goals
- Petroleum reduction
- Air quality

Assess Fleet
- Emission reductions
- Fuel savings
- Cost reductions

Identify Opportunities
- Near Term
- Optimize State Efforts

Download full study at:
https://www.colorado.gov/pacific/energyoffice/reports
CO State Fleet Opportunity Assessment

- High Efficiency or Alternative Fuel Vehicles (AFVs)
- Efficiency Improvement and Emission Reduction Technologies
- Informational or Telematics Devices
- Other: Financial options, new business models, fleet optimization techniques
Greening Government Executive Order

- State Agency fleet EV adoption
  - Identify optimal locations for EVs and Charging stations
  - Identify optimal use of BEV and PHEVs

- Workplace Charging
  - Agency wide survey
  - Targeted outreach
Contact Information:

Wes Maurer  
Email: Wes.Maurer@state.co.us  
Phone: 303.866.2064

Maria Eisemann  
Email: Maria.Eisemann@state.co.us  
Phone: 303.866.2204
Innovative State Policies and Programs

Cassie Powers
National Association of State Energy Officials
About NASEO

- Formed by the states 1986
- Membership includes the 56 Governor-designated energy officials from each state and territory, as well as private sector affiliates
- Facilitates peer learning across states to improve the effectiveness of energy programs and policies
- Serves as a resource for and about State and Territory Energy Offices
- Advocates on behalf of the State Energy Offices (SEO) with Congress, federal agencies, and private-sector organizations
- Organized through regional and committee structure
EV Market – Sales are Climbing

U.S. EV Sales by Quarter

Photo courtesy of Securing America’s Future Energy: The Fuse
States Support EV Adoption

- EVs help states meet goals
  - Greenhouse gas reduction
  - Air quality
  - Economic development
  - Energy security

- Various state-level programs
  - Offer purchase incentive programs
  - Provide publicly available infrastructure
  - Align policies and regulations
  - Leverage public and private funding

Photo courtesy of Rhode Island Office of Energy Resources
Bring Down Cost of Vehicles

- Provide rebates, tax credits, and sales tax exemptions

- **Delaware’s Clean Transportation Incentive Program**
  - $3,500 rebate toward purchase/lease of EV
  - $1,500 toward purchase/lease of PHEV

### Summary of Clean Vehicle Rebate Structures

<table>
<thead>
<tr>
<th>Type of Vehicle/Vehicle Technology</th>
<th>Rebate Amount per Vehicle</th>
</tr>
</thead>
<tbody>
<tr>
<td>Battery Electric Vehicles</td>
<td>$3,500</td>
</tr>
<tr>
<td>Plug-in Hybrid Electric Vehicles (including gasoline range extenders)</td>
<td>$1,500</td>
</tr>
<tr>
<td>Retrofitted Battery Electric and Plug-in Hybrid Electric Vehicles</td>
<td>$1,500</td>
</tr>
<tr>
<td>Battery Electric or Plug-in Hybrid Vehicles with MSRP &gt;$60,000</td>
<td>$1,000</td>
</tr>
<tr>
<td>Dedicated Propane or Natural Gas Vehicles</td>
<td>$1,500</td>
</tr>
<tr>
<td>Bi-Fuel Propane or Natural Gas Vehicles</td>
<td>$1,350</td>
</tr>
<tr>
<td>Heavy-Duty dedicated Natural Gas Trucks (class 7 and 8)</td>
<td>$20,000</td>
</tr>
</tbody>
</table>

Table courtesy of DNREC Division of Energy and Climate
Expand Infrastructure

- Support workplace charging initiatives
- Invest in chargers in select areas
- Coordinate with neighboring states
- **Washington and Oregon DOT collaborated on the West Coast Electric Highway – installed DC fast chargers along I-5**

Photo courtesy of Washington Department of Transportation
Align Policies and Regulations

- Use federally-approved signage
- Explore opportunities for coordinated branding
- Share guidance with municipalities
- Explore “other” incentives
  - E.g., HOV lane access
Leverage Funding

- States use CMAQ, TIGER, and other funding sources to support EV programs
  - Connecticut’s Clean Fuel Program – supported largely by CMAQ – provides funding to government entities to help purchase EVs
  - Oregon received two TIGER grants to install 33 fast chargers around the state

Photo courtesy of Federal Highway Administration
### Market Impact – Incentives Make a Difference

Top 10 EV Markets Offer Combinations of Incentives

<table>
<thead>
<tr>
<th>Market</th>
<th>Electric vehicle uptake</th>
<th>Incentive design principles</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sales</td>
<td>Share</td>
</tr>
<tr>
<td>California</td>
<td>0</td>
<td>50,000</td>
</tr>
<tr>
<td>Japan</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Norway</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Netherlands</td>
<td></td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>France</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Beijing</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Washington</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Denmark</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*NOTES: “X” denotes principle is generally met; “/” denotes principle partially met*

Image courtesy of International Council on Clean Transportation
National Initiatives – Clean Cities

- 100 coalitions nationwide
- Local EV and AFV experts provide:
  - Information and education
  - Competitively awarded financial assistance
  - Technical and problem solving assistance
  - Local and national partnerships

Clean Cities Coalitions

Image courtesy of U.S Department of Energy Clean Cities Program
National Initiatives – FAST Act
Alternative Fuel Vehicle Corridors

FAST Act’s AFV Corridors – Map of Designated EV Corridors

Image courtesy of Federal Highway Administration
Volkswagen Settlement

- Volkswagen agreed to spend up to $14.7 billion to settle allegations of cheating emissions. Settlement funds will be used to buyback and/or modify vehicles, and to support national- and state-level projects to reduce NOx emissions.

Settlement Breakdown

- $10 Billion
  - Vehicle buyback and modification (consumers)
  - Zero Emission Vehicle investment (national and CA)
  - Environmental Mitigation Trust (states)

- $2 Billion
- $2.7 Billion
Volkswagen Settlement – EV Investment Opportunities

- VW will spend $2 billion over 10 years on actions that will support increased use of zero emission vehicle (ZEV) technology in the U.S.
  - $1.2 billion will be used in areas of the U.S. other than California
  - $800 million will be used in California
- An additional $2.7 billion will be placed in an Environmental Mitigation Trust, and will be allocated to beneficiaries (states, tribes, and certain territories) based on the number of impacted VW vehicles in their jurisdictions
  - Beneficiaries may use up to 15% of its allocation of Trust Funds on the costs to acquire, install, operate and maintain new light duty ZEV supply equipment.
Thank You & Additional Resources

- Clean Cities Program: https://cleancities.energy.gov/
- Alternative Fuels Data Center: http://www.afdc.energy.gov/
- Volkswagen Settlement Additional Information: http://www.naseo.org/volkswagen-settlement

Please contact Cassie Powers with any questions: cpowers@naseo.org
Fossil Independent Transport Sector 2030
The Swedish coalition of the willing
It’s getting hot…

Temperature and CO$_2$ concentration in the atmosphere over the past 400,000 years (from the Vostok ice core)

CO$_2$ concentration, ppmv

Temperature change from present, °C

Note the difference

Temperature and CO₂ concentration in the atmosphere over the past 400 000 years (from the Vostok ice core)

CO₂ concentration, ppmv

Temperature change from present, °C

Sweden & transport: Top of mind

VOLVO NOT TOP SELLER IN SWEDEN FOR 1ST TIME IN HALF CENTURY

For the first time in more than 50 years, the top selling car in Sweden is not a Volvo model. Bertil Molder, Volvo's spokesperson for Swedish cars, said:...
How can we be relevant?
Fossil independent transport sector
What does it really mean?

"One of the world’s first fossil free welfare states"
The score: Seven out of Eight
How are we doing?

Våra index visar hur långt vi kommit på vår väg att nå målen.

- 15% Vägtrafiken som helhet
- 30% Nya personbilar
- 23% Nya tunga lastbilar
- 1,6% Kollektiva resor

Nationella indikatorer
Följ utvecklingen i riket som helhet

Kommunala indikatorer
Följ utvecklingen i din kommun

Mer om indikatorerna
Läs om hur vi tagit fram indikatorerna
Reducing fossil fuels 80%
Fossil independent cars
Fossil independent buses
Economic incentives
No cost incentives
Demands & restrictions
The way forward
SAVE THE EARTH, ITS THE ONLY PLANET WITH CHOCOLATE