Vermont Energy Investment Corporation

- Nonprofit with 25 years experience reducing economic, environmental costs of energy
- Comprehensive focus and results
  - Energy efficiency – Renewable energy – Transportation
- National & international consulting & implementation
  - Program design, planning, & evaluation – policy & advocacy – research
- Clients are government agencies, regulators, utilities, foundations, advocates
- Operate 3 Energy Efficiency Utilities
To target and remedy obstacles to alternative fuel vehicle (AFV) adoption and use in regional, statewide sectors and niche markets.
Webinar Scope

1. Transportation TRM
2. Opportunities to partner

• Characterize efficiency
• Facilitate Least Cost Planning

Transportation TRM Users
• State Energy Offices
• Public Utility Commissions
• Utilities
• Transportation Planning Agencies
States with Transportation Objectives in their Energy Plans
Transportation Efficiency Measures

- All electric vehicle
- EV charging equipment
Measuring Cost-effectiveness

Societal Costs
• GHG emissions
• Health impacts

Utility Costs
• Impact on total demand
• Impact on peak load

Consumer Costs
• Incremental cost of efficiency measure
• Operation & maintenance
Definition of baseline and efficient equipment

Deemed annual energy savings

Other savings - water, GHG, health impacts

Operation and Maintenance

Measure Lifetime

Spillover and Free ridership

Baseline

Efficient Product

O&M

Deemed savings
$100 / ton CO₂ eq.
$0.06 / mile tailpipe emissions
$0.07 / kWh electricity

Externalities and Non-energy Benefits
Factors considered

Prices of gasoline, electricity
Avoided electricity costs
Gasoline GHG emissions per gallon
Electricity GHG emissions per kWh
Societal cost of GHG emissions per ton
Health impacts of vehicle emissions
Health impacts of electricity generation
Annual vehicle miles traveled
Cost of Level 1 Electric vehicle supply equipment (EVSE)
Cost of Level 2 EVSE
Cost of ‘smart’ Level 2 EVSE

FUEL SWITCHING
GHG emissions from electricity generation

Lbs CO2/MWh electricity generation:
- <500 lbs
- 500 - 1,000 lbs
- 1,001 lbs - 1,500 lbs
- 1,501 - 2,000 lbs
- 2,001 lbs+
Efficiency measure: all electric vehicle

Total savings over 8 year lifetime @ 9,000 miles per year
Baseline: conventional vehicle
Efficient product: all electric vehicle
Energy savings: 273.6 MMBtu
GHG savings: 14.32 tons CO\textsubscript{2} / $1,432 **
Operation & Maintenance savings: $8,780
Avoided Health Impacts: $2,808**
Efficiency measure: all electric vehicle

Monetized savings over 8 year lifetime @ 9,000 miles per year

GHG ($1,400)
Operation & Maintenance ($8,780)
Avoided Health Impacts ($2,808)

Total savings = $12,988
Incremental cost of an all electric vehicle = $8,639
Net savings = $4,349
Efficiency Measure: EV Charging Equipment

Level 1 charging
120V

Level 2 charging
208/240V

DC fast charging
480V
Efficiency measure: Level 2 EV charging

- All charge events
- Short charge events
- Charge events > 70°F
- Charge events < 50°F

% Energy drawn from the grid taken up by vehicle battery

Level 1
Level 2

Using a Technical Reference Manual in the Transportation Sector
Clean Cities Webinar July 8, 2014
Efficiency measure: Level 2 EV charging

10 Year Lifetime Savings of Commercial L2 EVSE
(Level 2 Electric Vehicle Supply Equipment)
Baseline: Level 1 EVSE
Efficient product: Level 2 EVSE
Energy savings: 4,030 kWh - 8,000 kWh (variable with use)
GHG savings: 2.6 - 5.2 tons CO₂ eq./ $260 - $520**
Operation & Maintenance savings: $480 - $960
Avoided Health Impacts: $282 - $564**
Efficiency measure:  Level 2 EV charging

Monetized Lifetime Savings of Commercial L2 EVSE

GHG ($260 - $520)**
Operation & Maintenance ($480 - $960)
Avoided Health Impacts ($282 - $564)**

Total savings = $1,022 - $2,084
Incremental cost of L2 EVSE = $2,600**
Net savings = -$1,578 to -$516

‘Smart’ Level 2 EVSE > $20,000
Seeking partners:
- SEO
- PUC
- Utilities
- Transportation Planning entities

Develop customized measures
Thank You

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