

Opportunities for Adopting Electric Vehicles (EVs) in Municipal Fleets: A Primer



Sustainable Jersey Webinar
November 29, 2017



Webinar Speakers

- Nancy Quirk, Sustainable Jersey
- Matthew Goetz, Georgetown Climate Center
- Nick Nigro, Atlas Public Policy
- Mike Hornsby, NJ Board of Public Utilities



What is Sustainable Jersey?

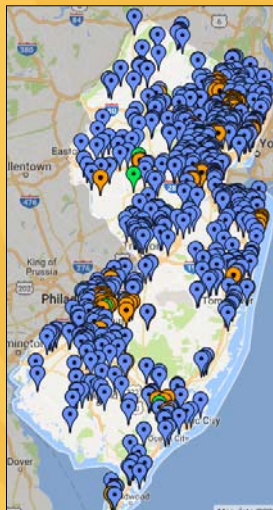
- Certification program for municipalities and schools
- We provide:
 - **Tools, resources, and guidance** to help municipalities and schools become more sustainable
 - **Grants and funding** for municipalities and schools
 - **Regional Hubs**



Program Participants



Municipal Program



Schools Program

Municipal Program

445 (79%) participating
 208 Certified
 - 160 Bronze
 - 48 Silver

Schools Program

281 Districts (46%)
 700 Schools (28%)
 - 11 Bronze
 - 13 Silver



Actions: Prosperity, Planet, People

PLANET	GREEN DESIGN		POINTS
	Green Building Policy/Resolution		
	Green Building Training		
	Green Design Commercial and Residential Buildings		
	Green Design Municipal Buildings		
PROSPERITY	ENERGY		POINTS
	Energy Tracking & Management*		
	Energy Efficiency for Municipal Facilities*		
	Buy Electricity from a Renewable Source		
	Municipal On-Site Solar System		
PEOPLE	Municipal Geothermal Energy System		POINTS
	Municipal Wind Energy System		
	Sustainable Energy Transition Plan		
	Renewable Government Energy Aggregation		
	Commercial Energy Efficiency Outreach		
PLANET	OPERATIONS AND MAINTENANCE		POINTS
	Fleet Inventory*		
	Driver Training		
	Meet Target for Green Fleets		
	Purchase Alternative Fuel Vehicles		

- Municipalities / Schools choose from menu of actions to accumulate points
- Actions created by issue-based Task Forces:
 - subject matter experts
 - local leaders
 - state / federal agencies
 - stakeholders



Operations and Management: Fleet Actions

- Fleet Inventory (10 points)
 - Evaluate current vehicle use
 - Fleet planning exercise
- Meet Target for Green Fleets (30 points)
 - Average fleet fuel efficiency of 35 mpg OR
 - Achieve 20% reduction in fuel use within 4 years
- Purchase Alternative Fuel Vehicles (10 points)
 - Hybrid
 - CNG
 - Propane (LPG)
 - Electric
 - Ethanol



<http://www.hyattsville.org/733/Electric-Police-Vehicles>

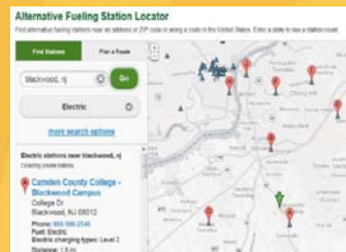
Make Your Town Electric Vehicle Friendly Action

- Required activities
 - Zoning ordinance -- EV charging stations as accessory use
 - Ordinance -- design standards for EVSE parking spaces
 - Training for local officials
- Outreach activities (must do ONE)
 - Incentive for pre-wiring for EV charging station
 - Awareness event
 - Commitment from 3 local partners for workplace chargers
 - Commitment from 3 local partners for multi-family chargers



Public EV Charging Infrastructure Action

- Required elements
 - Municipality instrumental in the project
 - Publicly available
 - Listed on “public directory”
 - Signage/Promotion of Charging Stations
- Charging station may be:
 - Located on private property
 - Owned and operated by a local nonprofit



Workplace EV Charging: *It Pays to Plug In*

- NJ DEP and NJ BPU grant program
- Workplace charging stations (public, private, educational, government)
 - Up to \$250 per Level 1 Charger
 - Up to \$5,000 per Level 2 Charger
- First come, first served
- Sustainable Jersey Actions
 - Public Charging Infrastructure
 - Make Your Town EV Friendly

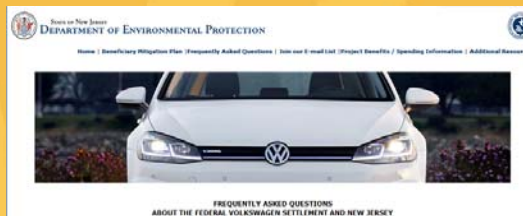


drivegreen.nj.gov/programs.html



VW Settlement: \$72M

- Proposals for projects invited -- NJDEP
 - <http://www.state.nj.us/dep/vw/faq.html>
- Due January 31, 2018
- Eligible categories include:
 - Class 4-8 School Bus, Shuttle Bus, Transit Bus
 - Class 4-7 Local Freight Trucks
 - EV charging equipment
 - Hydrogen fuel cell vehicle supply equipment





EV Smart Fleets

Making Electric Vehicles Affordable for Fleets
through a Multi-State Procurement



Sustainable Jersey
November 29, 2017

EV Smart Fleets



Agenda



- Overview of EV Smart Fleets
- Why EVs? The benefits of electrifying your fleet
- EV procurement opportunities and resources

EV Smart Fleets

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EV Smart Fleets

EV Smart Fleets Goals:

- Provide cost savings for fleets
- Increase access to a wider range of EV models
- Be replicable in future years
- Meet needs of state and local government fleets



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Project Partners



CALSTART
calstart.org



Ross Strategic
rossstrategic.com



**Northeast States for
Coordinated Air Use
Management**
nescaum.org



**California
Department of
General Services**
dgs.ca.gov



**Georgetown
Climate Center**
georgetownclimate.org



Atlas Public Policy
atlaspolicy.com

Greater New Haven Clean Cities Coalition
Ocean State Clean Cities Coalition
Sacramento Clean Cities
Western Washington Clean Cities



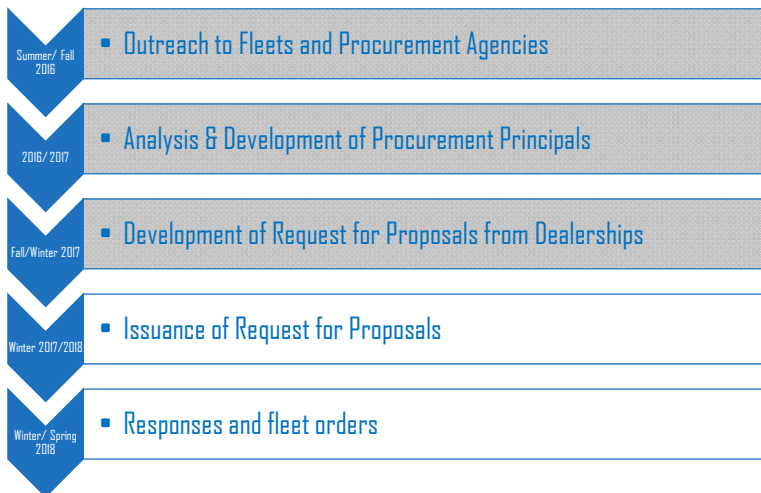
Columbia-Willamette Clean Cities Coalition
Denver Metropolitan Clean Cities Coalition
Granite State Clean Cities Coalition
Long Beach Clean Cities Coalition
New Jersey Clean Cities Coalition

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Project Timeline



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Four EV Technology Options

Battery electric vehicle (BEV)



Hydrogen fuel cell (FCEV)



Plug-in hybrid electric (PHEV)



BEVs + range extender (BEVx)



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Plug-in Hybrid Electric Vehicles

- Equipped with a battery and gasoline engine
- Can run on gasoline when battery range is exhausted and to boost power
- All-electric range currently over 50 miles



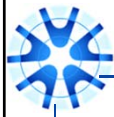
Chevy Volt



Ford Fusion Hybrid

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BEV + Range Extender

- Battery electric vehicle equipped with range-extending gasoline generator
- Range extender kicks in only if battery is low
- L.A.P.D. acquired 100 BMWi3s



BMW i3

80-mile all-electric range
150-mile extended range

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Battery Electric Vehicles

- Runs solely on battery power
- Zero tailpipe emissions
- Electric ranges of current mainstream consumer models up to 238 miles



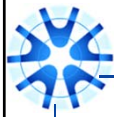
Nissan Leaf



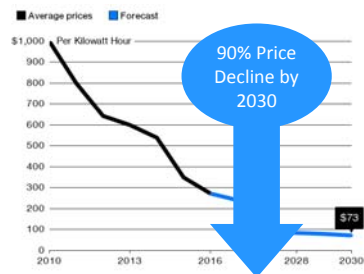
Chevy Bolt

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Battery Advances are Making Electric Vehicles Affordable



Source: [Bloomberg New Energy Finance \(June, 2017\)](#)

Vehicle cost per mile of battery range		Range in miles	MSRP
2017 Chevy Bolt	\$157	238	\$37,500
2017 Tesla Model 3	\$163	215	\$35,000
2016 Tesla Model S	\$307	259	\$79,500
2017 Nissan LEAF	\$345	84	\$29,010
2016 Tesla Model X	\$349	238	\$83,000
2017 BMW i3	\$382	114	\$43,600
2016 Ford Focus Electric	\$384	76	\$29,170
2011 Nissan LEAF	\$443	74	\$32,780
2014 BMW i3	\$510	81	\$41,350
2012 Ford Focus Electric	\$516	76	\$39,200

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Benefits of Fleet Electrification

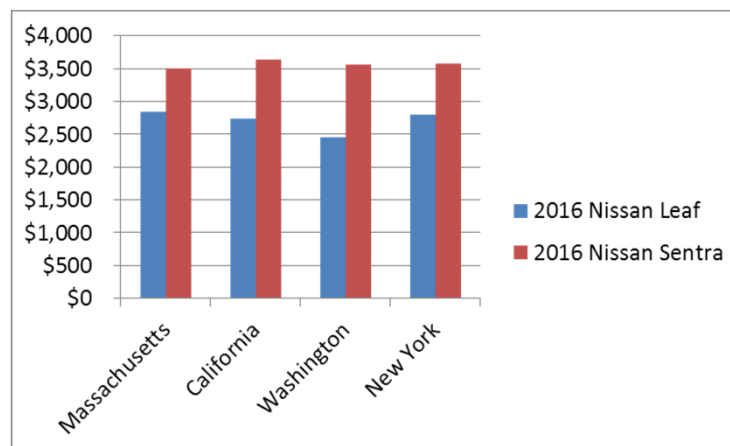
- Fuel cost and maintenance savings
- Air pollution and climate benefits
- State and municipal policy goals



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Lower Annual Operating Costs: Nissan Leaf vs. Sentra



Source: U.S. Dept. of Energy AFDC: <http://www.afdc.energy.gov/calc/>

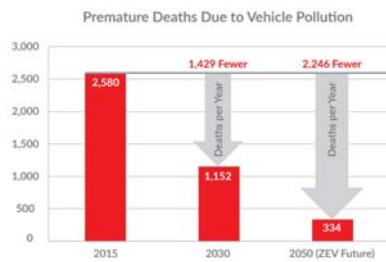
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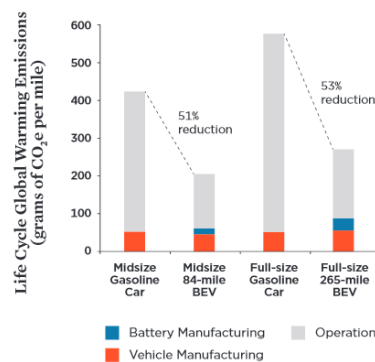
Reduction of Criteria Pollutants and GHG Emissions

Health benefits from reduction of particulate matter and NOx emissions



Source: American Lung Association

Greater than 50% reduction in GHG emissions (U.S. grid average)



Source: Union of Concerned Scientists

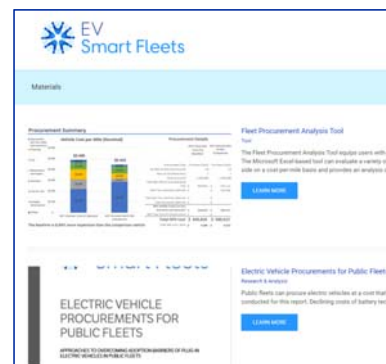
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Fleet Electrification Tools and Resources

- Fleet outreach survey
- Analysis of procurement strategies
 - EV Fleet Procurement Analysis Tool
 - Fleet Procurement Analysis Report
- Case studies of successful EV fleet procurements

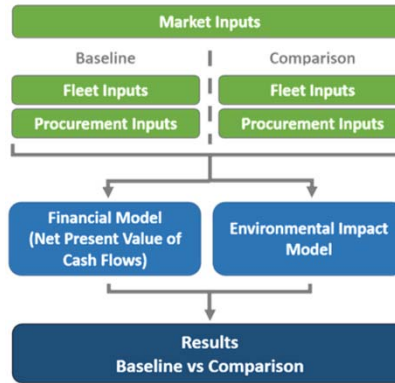


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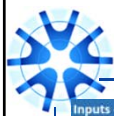
Fleet Procurement Analysis Tool

- Total cost of ownership (TCO) fleet procurement comparison
 - Evaluates several procurement structures
 - Compares two procurement scenarios side by side
 - Includes lifecycle environmental impacts analysis
 - Includes user-defined sensitivity analyses
- Easy to use, flexible, available to fleets
 - Microsoft Excel-based
 - Auto-populates default values based on location and vehicles
 - Presents summary dashboards and detailed financial tables



Free download at
www.evsmartfleets.com

EV Smart Fleets



EV Fleet Procurement Analysis Tool: Input Screen

Inputs - Fleet Procurement Analysis Tool

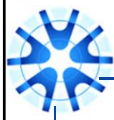
Market Inputs	
Market	U.S.
ZIP Code	09908
U.S. State	NJ
PADD Region	1b
eGRID Region	RFCE
Canadian Province	British Columbia
Gasoline Cost (\$/Gallon)	\$ 2.40
Electricity Cost (\$/kWh)	\$ 0.128
Inflation Rate (Excluding Fuel) (%/Year)	2.00%
Include Cost of Carbon?	No
Cost of Carbon (\$/Ton)	\$ 30.00

Vehicle Inputs	
Procurement 1 (Baseline)	
Vehicle Drivetrain Type	ICE
Vehicle Year	2017
Vehicle Make	Chevrolet
Vehicle Model	Cruze
Fuel Economy Gas City (MPG)	30.0
Fuel Economy Gas Hwy (MPG)	40.0
Fuel Economy Electric City (MPGe)	-
Fuel Economy Electric Hwy (MPGe)	-
Expected Years of Use/Ownership (Years)	7
Annual Vehicle Mileage (VMT/Year)	15,000
% of Annual Miles on Gasoline	100%
% of Annual Miles City Driving	55%
Cost to Insure (\$/Year)	\$ 1,178
Use Drivetrain Default Maintenance and Repair Costs?	Yes
Maintenance and Repair Cost - Years 1-5 (\$/Mile)	\$ 0.0300
Maintenance and Repair Cost - Years 5+ (\$/Mile)	\$ 0.1940
Recurring Taxes and Fees (\$/Year)	\$ 10
Vehicle details from fuel-economy.gov	
Procurement 2 (Comparison)	
Vehicle Drivetrain Type	BEV
Vehicle Year	2017
Vehicle Make	Chevrolet
Vehicle Model	Bolt EV
Fuel Economy Gas City (MPG)	-
Fuel Economy Gas Hwy (MPG)	-
Fuel Economy Electric City (MPGe)	128.0
Fuel Economy Electric Hwy (MPGe)	110.0
Expected Years of Use/Ownership (Years)	7
Annual Vehicle Mileage (VMT/Year)	15,000
% of Annual Miles on Gasoline	0%
% of Annual Miles City Driving	55%
Cost to Insure (\$/Year)	\$ 1,178
Use Drivetrain Default Maintenance and Repair Costs?	Yes
Maintenance and Repair Cost - Years 1-5 (\$/Mile)	\$ 0.0300
Maintenance and Repair Cost - Years 5+ (\$/Mile)	\$ 0.0520
Recurring Taxes and Fees (\$/Year)	\$ 10
Vehicle details from fuel-economy.gov	

Vehicle Procurement Inputs	
Procurement 1 (Baseline)	
Discount Rate for NPV Calculations (%)	0.00%
Number of Vehicles to Procure (N)	10
Procurement 2 (Comparison)	
Discount Rate for NPV Calculations (%)	0.00%
Number of Vehicles to Procure (N)	10

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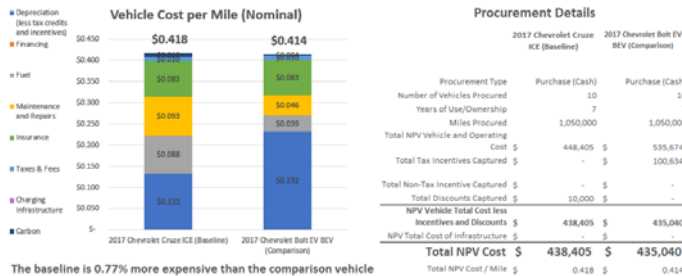


Fleet Procurement Analysis Tool: Output Dashboard

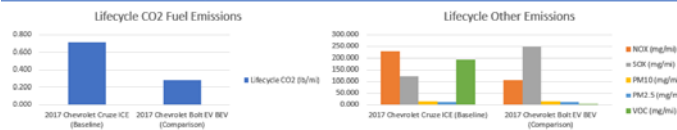
Results - Fleet Procurement Analysis Tool

Procurement Name: Demo Fleet Procurement

Procurement Summary

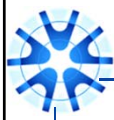


Societal Benefit Summary



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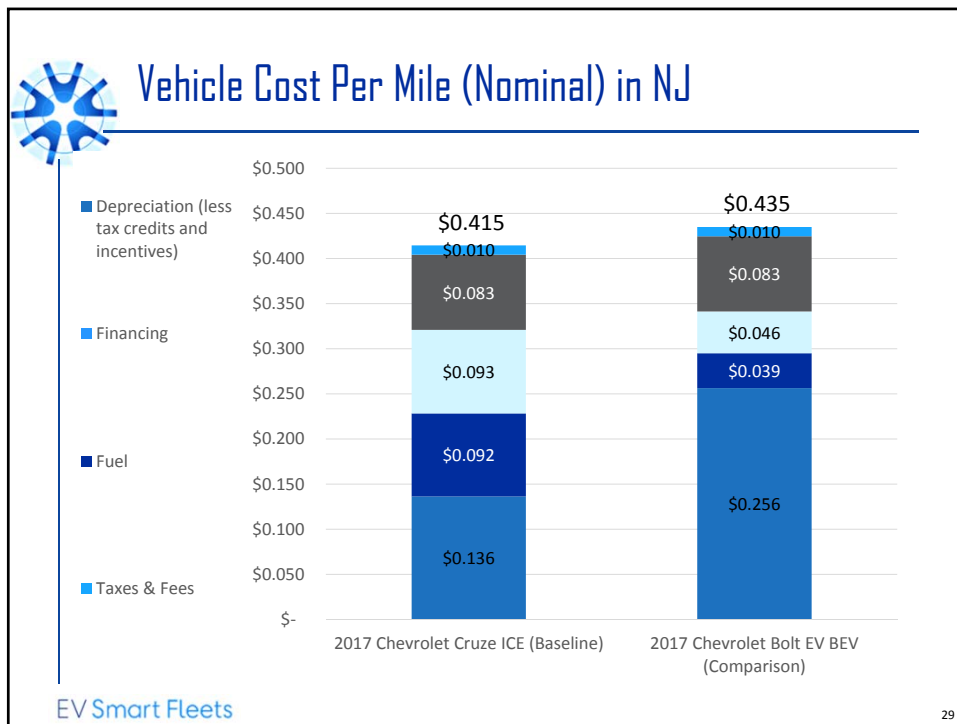


New Jersey Procurement Example

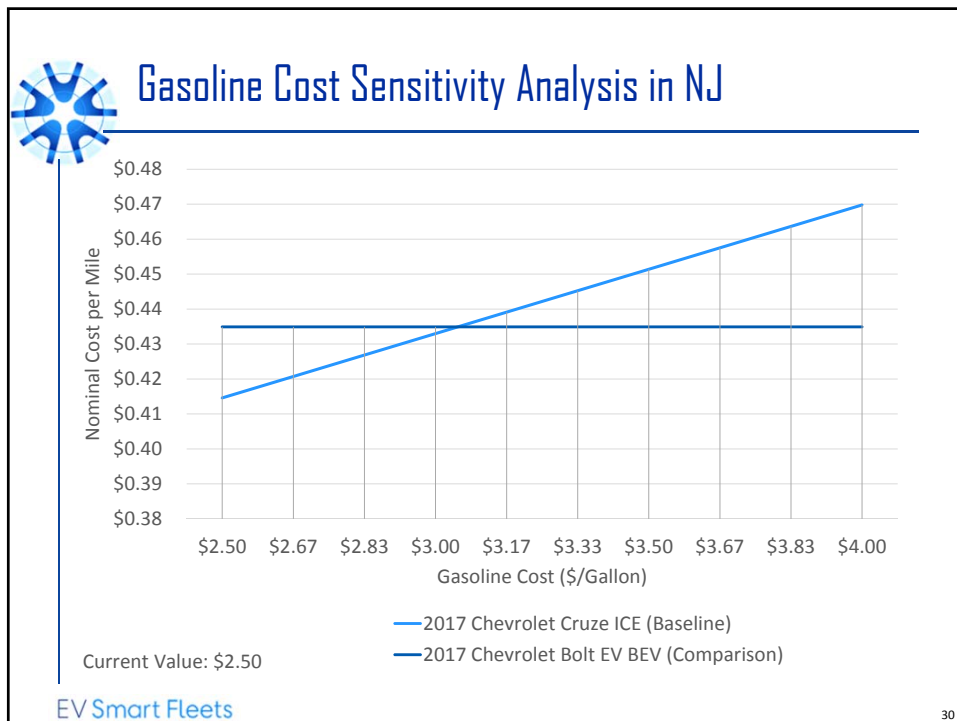
- “Apples-to-apples” comparison of public fleet purchase of Chevy Bolt EV & Chevy Cruze
 - 10 vehicles purchased with cash
 - Use MSRP for upfront price
- Total ownership cost of Bolt EV is < 5% more than Cruze
 - Federal incentive
 - 50% lower operating cost for Bolt EV
 - Bolt EV becomes cheaper around \$3/gal gasoline
- Bolt EV has considerably lower emissions
 - 60% drop in CO₂ emissions
 - >50% drop in NO_x emissions
 - 99% drop in VOC

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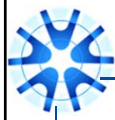
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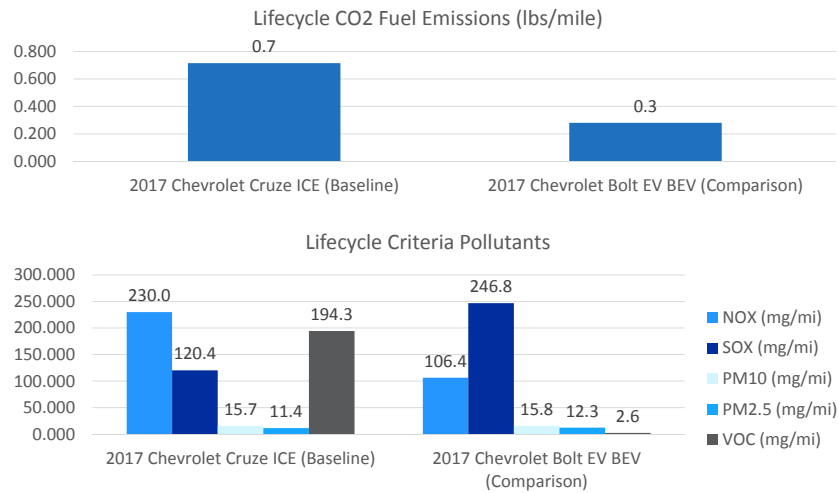
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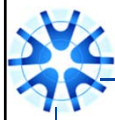


Lifecycle Environmental Analysis in NJ

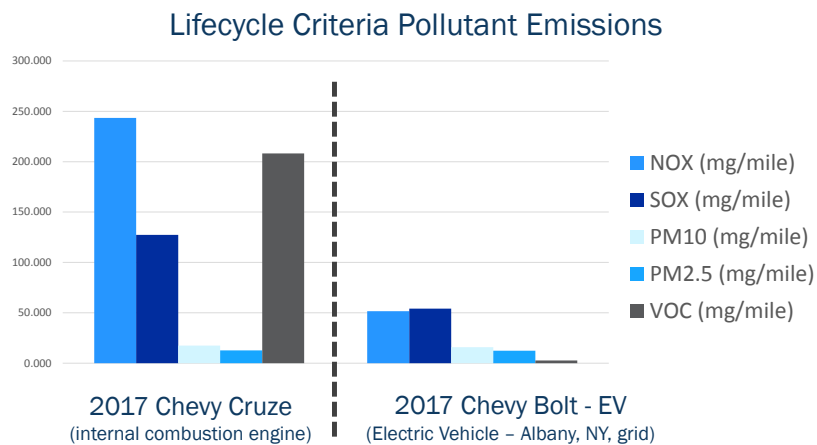


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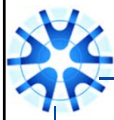


Benefits Improve with Cleaner Grid



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New Report: Electric Vehicle Procurements for Public Fleets

- Deep dive on EV procurements from EV Smart Fleets
- **Main Finding:** public fleets can procure EVs at a cost that is competitive with, or lower than, conventional vehicles under several conditions
- **Key Content**
 - Insights from stakeholder outreach
 - Evaluation of elements in a vehicle procurement
 - Scenario-based procurement analysis



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www.evsmartfleets.com/materials/electric-vehicle-procurements-for-public-fleets



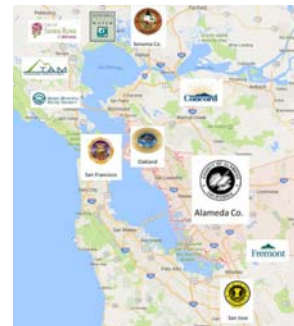
Public Fleet Procurement Case Studies

Key lessons learned:

- Opportunity to capture tax credit
- Employee acceptance
- Cost savings from reduced operating expenses




City of Seattle



Multi-county
aggregate purchase

EV Smart Fleets



EV Smart Fleets

Visit us at: <http://evsmartfleets.com>

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NEW JERSEY BOARD OF PUBLIC UTILITIES
(NJBPU)
ALTERNATIVE FUEL VEHICLE (AFV) PROGRAM



PRESENTED BY
MIKE HORNSBY
NJBPU
11/29/17



NJBPU Alternative Fuel Vehicle (AFV) Program



- The State of New Jersey encourages the use of AFVs.
- BPU's activities involve AFVs, AFV infrastructure development, and public education.
- For light duty vehicles (automobiles), BPU is primarily focused on Electric Vehicles (EVs) and EV charging infrastructure.
- For heavy duty vehicles, BPU is primarily focused on Compressed Natural Gas (CNG) vehicles and infrastructure.



NJBPU Alternative Fuel Vehicle (AFV) Program



BPU's goal is to accelerate the adoption of AFVs by:

- Leading a State AFV Work Group
- Informing and educating consumers and first responders about AFVs
- Demonstrating AFV benefits
- Recommending policies and incentives for AFV vehicles and infrastructure
- Accelerating AFV adoption in state and local government



NJBPU Alternative Fuel Vehicle (AFV) Program



Electric Vehicle (EV) Infrastructure Stakeholder Process

- BPU is presently conducting an EV infrastructure stakeholder process, and welcomes your input.
- All public comments for the stakeholder process have been posted here:
<http://www.bpu.state.nj.us/bpu/agenda/stakeholdercomments.html>.
- To submit comments or to be placed on the distribution list, please email evstakeholder.group@bpu.nj.gov



NJBPU CNG Vehicle Grant Program



- The program will help fund CNG powered vehicles Class 5 through 8
- Eligibility is limited
- Application window opens noon on November 20, 2017, and closes noon on December 20, 2017. Applications should be submitted to the email address: BPU.CNGVehicleGrant@BPU.NJ.Gov
- Details:
<http://www.nj.gov/bpu/commercial/cng.html>
- Submit applications or inquiries to:
BPU.CNGVehicleGrant@BPU.NJ.Gov



NJBPU Alternative Fuel Vehicle (AFV) Program



Electric Vehicles

If you are interested in further information or having a speaker speak about electric vehicles to your civic organization please contact:

evstakeholder.group@bpu.nj.gov

***~Battery Electric Vehicles
are exempt from state sales tax~***