

All Things Electric Vehicles

June 24, 2022 Hogan Dwyer, Sustainable Jersey



Today's Presentation

Jersey City's Electric Vehicle Projects

Drew Banghart, Jersey City

Belleville Electric School Buses Case Study

Matthew J. Paladino, Belleville Public Schools

EV Incentives and Resources

Cathleen Lewis, NJ Board of Public Utilities

Municipal Energy Actions

	Energy Efficiency	Renewable Energy	Alternative Fuel Vehicles
Municipal Operations	 Energy Efficiency for Municipal Facilities Energy Tracking and Management 	 On-Site Geothermal On-Site Solar +10 pt storage/resilience + 5 pt solar thermal On-Site Wind Buy Renewable Energy 	 Fleet Inventory Purchase Alternative Fuel Vehicles Meet Green Fleet Targets
Community Energy Use	 Energy Assistance Outreach Commercial Energy Efficiency Outreach Residential Energy Efficiency Outreach 	 Make Your Town Solar Friendly Municipally Supported Community Solar Solar Outreach Renewable Government Energy Aggregation (R-GEA) 	 Make Your Town Electric Vehicle (EV) Friendly Public EV Chargers Electric Vehicle Community Outreach

SJS Energy Actions

Energy Efficiency

Carbon Footprint *

- Energy Tracking and Management
- Energy Efficiency for School Facilities *

Renewable Energy

- On-Site Solar+10 ptsstorage/resilience
 - + 5 pts solar thermal
- On-Site Geothermal
- Buy Renewable Energy

Alternative Fuel Vehicles

Sustainable Fleets

Student Engagement

Facilities and

Operations

* priority actions

Student Engagement and Community Outreach Actions

- Behavior-Based Energy Conservation
- Civie & Stewardship Volunteer Initiatives
- Community Education and Outreach *
- Education for Sustainability
- Enrichment Programs through Partnership
- Green Challenges
- Professional Development for Sustainability *

Total Cost of Ownership

- EVs have a higher upfront cost (sticker price)
- Lower fuel and maintenance costs often result in lower total cost of ownership

Argonne National Laboratory. 2021.

Comprehensive Total Cost of Ownership Quantification for Vehicles with Different Size Classes and Powertrains.
https://publications.anl.gov/anlpubs/2021/05/167399.pdf

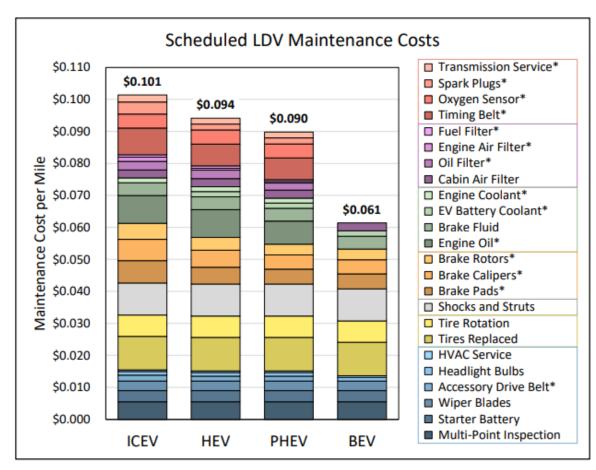
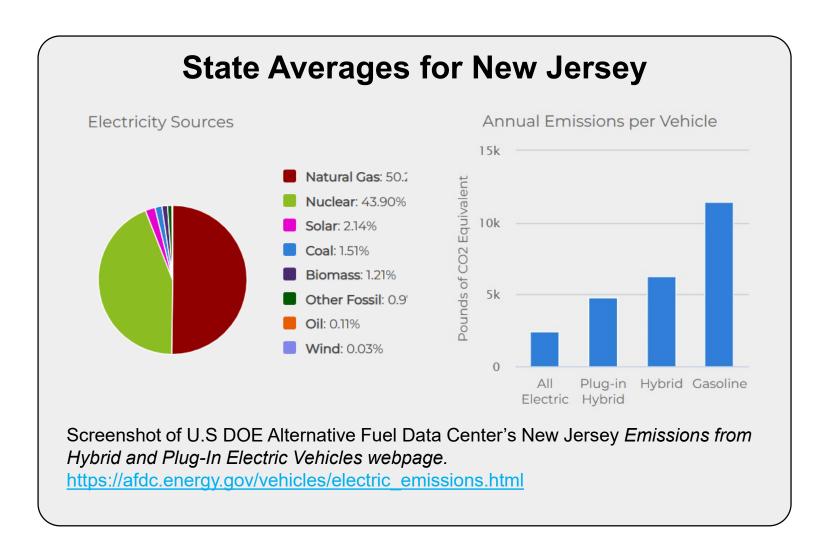


FIGURE ES-4 Per-mile maintenance costs by powertrain (*Service intervals that vary by powertrain)

EVs Have Lower Emissions

EVs charging in NJ generates less than 1/4th emissions of gasoline vehicles.



Fleet Inventory

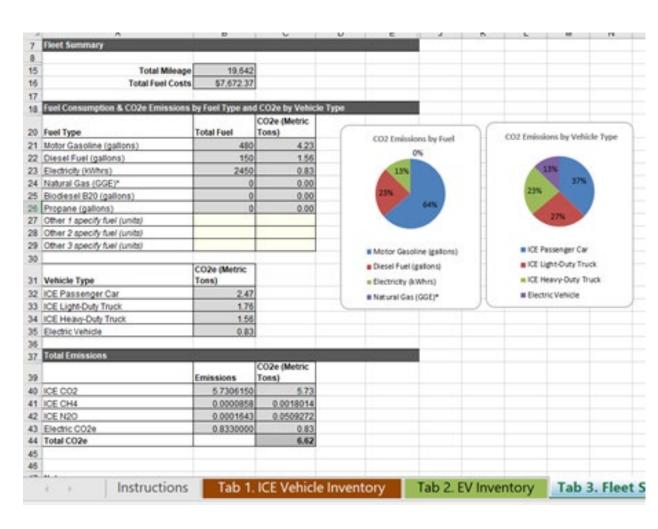
- Evaluate current vehicle use
- Fleet planning exercise
- Automatically calculate fleet emissions

Fleet Analysis

Atlas Public Planning (DRVE) Tool

Dashboard for Rapid Vehicle Electrification

- Free fleet analysis tool
- Prioritized order of electrification
- Provides information about comparable EVs



Sustainable Jersey Fleet Inventory Spreadsheet

www.sustainablejersey.com/fileadmin/media/Action s_and_Certification/Actions/Energy/SJ_Fleet_Inventory_Spreadsheet_2022.xlsx

Purchase Alternative Clase note that incentive to date information. **Fuel Vehicles**

- Awards points for purchase of electric and other alternative fuel fleet vehicles
- Sustainable Jersey Alternative Fuel Vehicle Procurement Guide
 - Guidance for capturing tax credits
 - Procurement options

www.sustainablejersey.com/fileadmin/media/Actions and Certification/Actions/E nergy/Sustainable Jersey Alternative Fuel Vehicle Procurement Guide.pdf

Alternative Fuel Vehicle Procurement Guide

Funding and Incentives

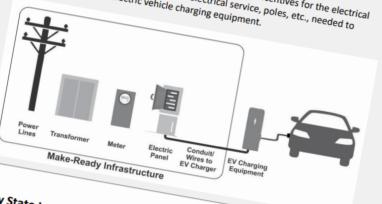
ase note that incentives may change or may no longer be available. Check the websites for the most

Note about Electric Vehicle Infrastructure Incentives

There are two main types of incentives for electric vehicle infrastructure.

Incentives for electric vehicle service equipment. These are incentives for equipment that is used to transfer electricity to the vehicle, such as level 1, level 2, DC fast charging

Incentives for Make-Ready infrastructure. These are the incentives for the electrical infrastructure, such as installation of new electrical service, poles, etc., needed to



New Jersey State Incentives

New Jersey Board of Public Utilities

For details on current funding opportunities, please view the NJ Clean Energy Program website:

Incentives for light-duty electric vehicles and at-home EV charging infrastructure. Clean Fleet Electric Vehicle Incentive Program

Grants for local and state government entities for \$4,000 toward the purchase of battery electric vehicles and \$1,500 for dual-port Level 2 EV charging stations. Number of vehicles and

Sustainable Fleets, SJS

- Awards points for adding electric vehicles to school fleets
- Benefits of electric school buses
 - Up to 50% reduction of Greenhouse Gas Emissions
 - Improved air quality for students
 - Quieter
 - Less expensive O&M



USPIRG. 2018. Paying for Electric Buses.

https://uspirg.org/sites/pirg/files/reports/National%20-%20Paying%20for%20Electric%20Buses.pdf

Make Your Town EV Friendly

- Adopt Model Statewide EVSE Ordinance
 - Must comply with SJ guidance on "reasonable standards"
- Update land use code
- First Responder training
- Choose one of three options
 - Info about EVSE permitting on municipal website
 - Info about EVSE inspection on municipal website
 - Amend master plan to incorporate EVs



AN ORDINANCE

AUTHORIZING AND ENCOURAGING

ELECTRIC VEHICLE

SUPPLY/SERVICE EQUIPMENT (EVSE) & MAKE-READY PARKING SPACES

[Note: Pursuant to P.L. 2021, c.171, all sections of this model ordinance become effective in each municipality upon its publication on the Department of Community Affairs' Internet website. Municipalities may make changes to the reasonable standards in the model ordinance as noted below through the normal ordinance amendment process. However, municipalities may not make changes to the legislatively mandated requirements in Sections

This Ordinance sets forth procedures for the installation of Electric Vehicle Supply/Service Equipment (EVSE) and Make-Ready parking spaces and establishes associated regulations and

other standards within the {name of municipality}	of {name of county}
WHEREAS, supporting the transition to electric vehicles or's commitment to sustainability and is i and	
WHEREAS, installation of EVSE and Make-Ready parking s adoption; and	paces encourages electric vehicle
WHEREAS, the {name of municipality} EVSE and Make Ready parking spaces; and	encourages increased installation of

WHEREAS, adoption of this ordinance supports the State of New Jersey's goals to reduce air pollutants and greenhouse gas emissions from the transportation sector as outlined and supported by various programs related to NJ's 2019 Energy Master Plan, Global Warming Response Act (P.L.2007, c.112 (C.26:2C-37 et al.)), and EV Law (P.L. 2019, c. 362); and

WHEREAS, P.L. 2021, c.171, which Governor Murphy signed into law on July 9, 2021, requires EVSE and Make-Ready parking spaces be designated as a permitted accessory use in all zoning or use districts and establishes associated installation and parking requirements; and

WHEREAS, adoption of this ordinance will support the Master Plan of *{name of municipality}*_____adopted in concurrence with P.L. 1975 c. 291, s. 1 eff. Aug. 1, 1976, and is
consistent with goals *{list #s or names}*______of the Master Plan as well as the land

1

DCA Model Statewide EVSE Ordinance www.nj.gov/dca/dlps/home/modelEVordinance.shtml

Public EV Charging Infrastructure

- Awards points for installation of public EV charging stations
- Clear municipal role
- EV infrastructure resources
 - Charger types
 - Site design

NJDEP. Charge Up Your Town: Best Management Practices for Ensuring Your Town is EV-Ready. 2021. nj.gov/dep/drivegreen/pdf/chargeupyourtown.pdf



	AC Level 1	AC Level 2	DC Fast Charger	
Voltage	120V 1-Phase AC	208V or 240V 1-Phase AC	480V 3-Phase AC	
Suitable for Installation	Single-family Multi-family	Single-family Multi-family Commercial Municipal/Private Fleet	Municipal/Private Fleet Public Metro Areas	
Amps	12-16 Amps	12-90 Amps (typical 32 Amps)	<125 Amps (typical 60 Amps)	
Charging loads	1.4 - 1.9 kW	2.5 - 19.2 kW (typical 7 kW)	<90 kW (typical 50 kW)	
Charge time for vehicle	3-5 miles of range per hour	10-20 miles of range per hour	80% charge in 20-30 minutes	
Best for	6+ hour or overnight charge	2-6 hour dwell times	High turn over	
Station hardware cost	\$500 - \$1,000 per port	\$600 - \$5,000 per port	\$7,000 - \$50,000 per port	
	Adapted from NVSERDA			

Adapted from NYSERDA

EV Community Outreach

For 10 points

- Select two audience types to target
 - Residents
- Commercial fleets
 Commercial properties
- Multifamily
- WorkplacesAuto dealerships



Maywood's June 2021 EV awareness event

- For each selected audience, complete two "Outreach Tasks"
 - Materials informational webpage, social media posts, brochure, video
 - Events webinar, in-person training, tabling

For additional 5 points

 2-3 Letters of Certification from target audience members verifying that they are installing EVSE, purchasing an EV, or training staff in EV sales (dealerships)







Jersey City's Climate Commitments







City-Owned EV Chargers

- · 2020: first City-owned EV chargers installed
- 2022: 20 EV charging stations installed for municipal and public use across the city
- Level 2, dual-port ChargePoint stations
- NJDEP It Pay\$ to Plug In: grant program for the purchase and installation of electric vehicle charging stations
- Late 2022: 8 new public and 10 new fleet chargers









Public EV Chargers

- 10 public charging stations
- Worked with City Council and neighborhood/park associations to identify sites
- Hourly rate of \$1.60, which covers the cost of electricity to the City
- 8 new public charging locations
 planned for late 2022 completion









Fleet EV Chargers

- 10 fleet chargers in total
- Chargers installed at 3 municipal buildings
 - City Hall
 - Municipal Services Complex DPW
 - City Hall Annex
- Charging Time: flat to fully charged in about 8 hours (2019 Nissan LEAF)
- 10 new fleet charging locations planned for late 2022 completion (Municipal Courthouse, City Hall Annex, Annex parking deck)







Employee Car Sharing Pilot

2019-2020

- 2019: City's first car-sharing program optimizes the size and efficiency of all fleet vehicle operations eliminating underused vehicles to drastically reduce greenhouse gas emissions.
- 2020: Replaced eight older, less efficient gas-powered vehicles with four Nissan LEAFs.
- Due to the COVID-19 pandemic, the electric vehicles were assigned to the Quality of Life Task Force. Currently, there are eight electric fleet vehicles.









Employee Car Sharing Pilot

2019-2020

- The City piloted a car sharing program using a web based car booking system that integrated with hardware.
- RFID vehicle tags (hardware) were installed in each vehicle.
- City staff (users) booked vehicles in advance. Staff were assigned RFID cards that unlock the vehicle at their booking time.
- Car sharing technology allows each individual vehicle to get more use and provides access to fleet vehicles to more users.

Key Reminders

During the time of your booking, the NFC (near field communication) card you have been issued will be your key for the vehicle to unlock and lock it. The actual key fob for the vehicle is tethered inside the vehicle near the steering column. Please only use your card to lock and unlock the vehicle. NEVER use the key fob to lock or unlock the vehicle.

To unlock the vehicle, simply hold the NFC card up to the reader located in the bottom corner of the windshield on the driver's side.

To lock the vehicle, please repeat the same process, holding the card up to the reader.



*Please note: your vehicle cannot be accessed prior to the booking time or after the booking time expires so allow extra time between each booking.

LEETSHARE MANUAL

Page 3

How to Charge your LEAF Continued



 Connect the charge connector to the charge port. If it is connected normally, a beep will sound once.



Remove the charge connector, making sure to close the charge port correctly before starting the vehicle.



Where to Charge your EV

Please charge the electric vehicle at one of the designated EV spots at City Hall.

What is the LEAF's Range?

The Nissan LEAF range is 150 miles and takes about 8 hours at 220/240 Volts in a fully charged vehicle Remember to leave the vehicle charging at the end of your booking so it is fully charged for the next user.





Electric Garbage Trucks

- Jersey City awarded \$2 million by the NJDEP (VW Environmental Mitigation funds)
- Jersey City has taken delivery of five battery electric refuse trucks
- Electric trucks will replace five diesel garbage trucks







Electric Garbage Trucks

2022

- Two BYD 8R refuse trucks that have a 25-cubic-yard compactor body
- Three BYD 6R refuse trucks that have a 10-cubic-yard compactor body
- Trucks connect seamlessly into our charging infrastructure at our public works facility, which is powered by the 1.23-megawatt solar array on top of the building.









Jersey City Municipal Services Complex Microgrid

2022-2023

- Goal is to make the JCMSC fully functional during a power outage "islanding"
- Energy Savings Improvement Program (ESIP)
 project with Schneider Electric
- On site power generation via the existing1.23megawatt solar array to charge a battery backup
- EV resiliency and less reliance on the diesel generator
- 1-2 weeks of uninterrupted function











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WWW.JERSEYCITYNJ.GOV





Jersey City



Matthew J. Paladino, Business Administrator/Board Secretary Electric Buses



- 1. Decision to pursue electric buses
- 2. Information about funding
- 3. Specifications of the buses
- 4. Information on Charging Stations

Why district decided to pursue electric buses

- VW Grant opportunity
 - 2 Free buses
- Ability to help the environment
- Had old out dated buses to salvage

Information about funding

- VW Grant through NJDEP
 - VW settled with the US government that they violated the Clean Air Act by selling 590,000 vehicles that weren't energy efficient
 - VW will provide \$2.7 billion for the 2.0 liter violating vehicles and \$225 million for the 3.0 liter violating vehicles to an Environmental Mitigation Trust. Funds from the trust will be used to fully remediate the excess NOx emissions from the illegal vehicles.

Specifications on buses

- Old buses
 - -(2) 2004 International C 180 HP
- New buses (Climate Mayors EV Cooperative)
 - -(2) 2021 Lion C AA3_No_AC
 - -Range 125 miles
 - Capacity 54 passenger seat
 - -\$372,602 per bus

Like for like exchange



Information on charging stations

- (2) Clipper Creek CS 100 80A charging stations
 - \$2500/each
 - Requires dedicated 208?240V AC 50/60Hz single phase circuit
 - Contains Personnel Protection circuit so no GFCI breaker is necessary
 - Only 3 wires are needed to wire the charging stations
 - Dimensions
 - Height 12 in
 - Width 18 in
 - Depth 8 in
 - Weight 36lbs



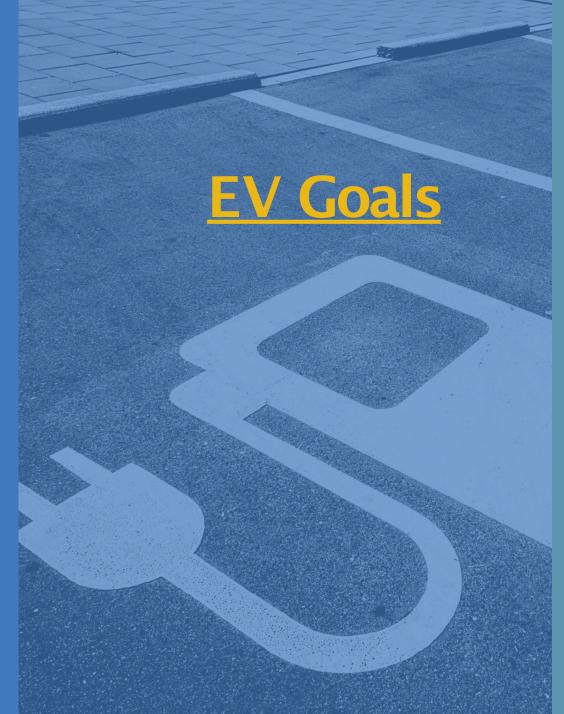


NJ BPU:

Driving EV Adoption

May 25, 2022 Public Works Conference

- At least 330,000 registered light -duty EV by December 2025;
- At least 2 million registered lightduty EVs by December 2035;
- At least 85 percent of all new light-duty vehicles sold or leased in the State shall be plug-in EVs by December 2040;
- At least 25 percent of Stateowned non-emergency lightduty vehicles shall be EVs by December 2025;
- 100 percent of State-owned non- emergency light duty vehicles shall be plug-in EVs by December 2035



EV Charging Goals

- At least 400 DC Fast Chargers shall be available for public use at no fewer than 200 charging locations in the State by December 2025
- At least 1,000 Level Two chargers shall be available for public use across the State by December 2025
- At least 15 percent of all multi-family residential properties in the State shall be equipped with EVSE for the routine charging of plug-in electric vehicles by December 2025.
- At least 20 percent of all franchised overnight lodging establishments shall be equipped with EVSE for routine electric vehicle charging by guests of the establishment by providing Level Two EVSE by December 2025.



Federal Tools you can use

www.energy.gov/eere/femp/electric-vehicles-federal-fleets

PHASE	GOAL		ACTION	
PI		Train Team	☐ Review EV knowledge & training materials	
PLAN	Identify ZEV & EVSE Opportunities	☐Complete <u>ZPAC tool</u> to identify priority ZEVs and EVSE sites		
		☐ Complete DOE EVSE Planning Form to inform collaboration, site design, and project management. FEMP Fleet's EVSE Tiger Team can offer support.		
DESIGN	Meet with Key Stakeholders & Design EVSE	☐ Engage with priority site staff, including energy manager, fleet manager, site leadership, and facility owner (PBS if GSA-owned)		
			☐ Call local electric utility	
		& Design EVSE	☐Work with leadership to secure funding and leverage other projects (e.g., <u>ESPCs</u>)	
		\square Determine installer (in-house or contractor)		
ЕХЕСИТЕ	Acquire EVs & Install EVSE	☐ Acquire EVSE from GSA's <u>EVSE BPA</u> or <u>GSA</u> <u>Advantage</u>		
		EVs &	☐ Lease or purchase ZEVs from GSA AFV Guide	
		☐Install EVSE & set up accounts		
		\square Support drivers as EVs begin operation		

Utility Charging Programs



Utility Filings Make Ready Incentives

- Public
- Workplace
- MUD



Fast Charging

- PSEG 1200
- ACE 100



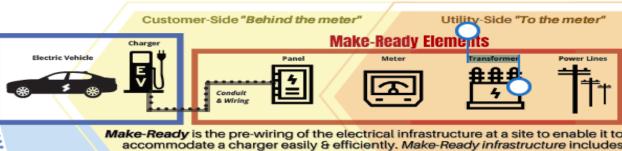
Level 2

- PSEG 3500
- ACE 1500+

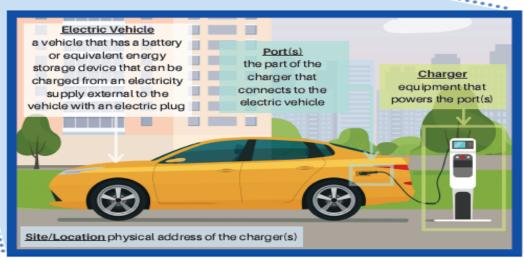
Make Ready

The infrastructure required to power an EV charger is called the Make-Ready work. By the end of 2022 all 4 electric utilities will provide programs to incentivize those costs.





Make-Ready is the pre-wiring of the electrical infrastructure at a site to enable it to accommodate a charger easily & efficiently. Make-Ready infrastructure includes service panels, junction boxes, transformers, meters, conduit, wiring, etc. Make-Ready does not include activation, hook-up or price of charger(s).



New Jersey Department of Environmental Protection • Bureau of Mobile Sources July 2021







Clean Fleet Program

- Electric vehicles are now included on the State Purchasing Contract under Award T0099
- Clean Fleet Electric Vehicle Incentive Program
 - Designed to encourage local and state government entities to add EVs to their fleet
 - Grants awarded on rolling basis until funding expended
- Questions? <u>EV.programs@bpu.nj.gov</u>



Clean Fleet EV Incentive

Award Caps

Local governments, entities, schools	EVs	Charging stations
serving populations < 20,000	2	1
serving populations > 20,000	5	2
serving populations > 50,000	7	4
Local governments		
serving populations > 100,000	10	4
State agencies, boards, commissions, universities, and counties	10	4

www.NJCleanEnergy.com/EV

Clean Fleet Incentive Amounts

- \$4,000 for a Battery Electric Vehicle
- \$2,000 for a public L2 charger
- \$1,500 for a fleet L2 charger
- 50% (up to \$5,000) for the Make-Ready for an
 L2 charger
- 50% (up to \$75,000) for the Make-Ready and charger for a Fast Charger

CLOSED FOR FY22

EVSE Requirements

All BPU EV Charging Programs have similar basic requirements

- Dual Port Chargers
- Networked Chargers
- Data Sharing

- Stacking Incentives
- Utility Programs are required to verify that the combination of federal, state and utility funds may not exceed 90% of the total costs. If they do, the utility program will reduce the incentive to 90% of the cost.
- Most NJBPU programs may not stack with It Pay\$ to Plug In.

* check specific program rules for details

All applications can be found at njcleanenergy.com/ev





Chevy Bolt EUV









VW id4

Ford MachE

Nissan Leaf

Volvo XC40



Ford F-150 Lightening



K200 ONA

Hyundai Kona

Tesla Model 3

It Pay\$ to Plug In

DEP's Grant Program for EV Charging Stations

- Level 2 chargers
 - Up to \$4,000 per port for Level 2 chargers at public places, multi-family homes and workplaces (including fleets).
 - First-come first-served. We are accepting applications now for the waiting list.
 - Fast Chargers
 - Up to \$200,000 per location for public fast chargers.
 - Competitive solicitation.
 - Currently open for community charging locations
 - Deadline is May 13, 2022.

www.drivegreen.nj.gov/plugin.html



MHDV Charging

Straw Proposal for the Medium Heavy Duty EV EcoSystem was released on June 30, 2021. Six stakeholder meetings were scheduled and comments were due on October 5, 2021.

The Straw Proposal looks at:

- What will charging look like?
 - Public charging
 - On-site charging
- How do we encourage EV adoption for fleets
 - Light duty
 - Medium duty
 - Heavy Duty
- What role will energy storage and renewable energy play?

Updated MHD Straw proposal coming 2022

EV Tourism



- Targets tourism destinations across the state
- Provides incentives for chargers:
 - \$2000 per L2 charger
 - 50% of make ready, up to \$5,000 per L2 charger
 - 50% of DCFC (charger and make ready), up to \$75,000 per charger
- Sites are eligible for up to 6
 L2 chargers and 2 DCFC.
- CLOSED FOR FY22

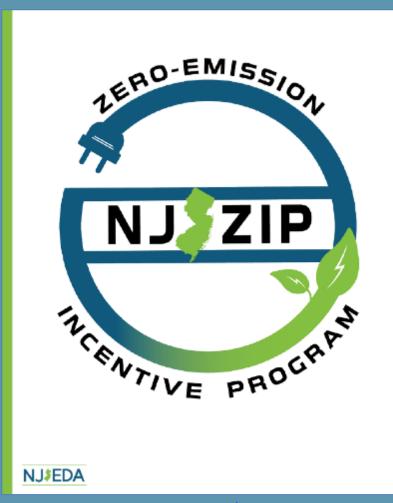
MUD EV Charger Incentive

- For owners and property managers of Multi-Unit Dwellings (MUDs)
- MUDs apartments, condos and townhouses with 5 or more units and dedicated off-street parking.
- Sites are eligible for up to 6 L2 chargers



- Provides incentives for chargers:
 - \$1500 per L2 charger (\$2000 for Overburdened Municipalities)
 - 50% of make ready, up to \$5,000 per L2 charger (75%, up to \$7,500 for Overburdened Municipalities)
 - CLOSED FOR FY22

NJEDA's Zero Emission Incentive Program



Voucher program for zero-emission medium duty vehicles in the greater Camden, greater Newark and greater New Brunswick, and shore areas

Vehicles Class 2b - Class 6 (8,501 lbs - 26,000 lbs GVWR)

For businesses and institutions (including local governments and schools)

\$25,000 - \$100,000 voucher

Info and application: www.njeda.com/njzip

Image from www.njeda.com/njzip

More Information

Cathleen Lewis

E-Mobility Programs Manager Cathleen.Lewis@nj.bpu.gov

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atlantic city SUSTAINABLE COMMUNITIES GRANT PROGRAM



Applications Due: Thursday, June 30, 2022

Environmental Stewardship Grants

- •Six (6) \$5,000 grants
- •Ten (10) \$2,000 grants

Resiliency Grants

- •Two (2) \$10,000 grants
- •One (1) \$5,000 grant

https://www.sustainablejersey.com/grants/sustainable-communities-cycle/





Sustainable Jersey Energy Technical Assistance

Sustainable Jersey Staff can help your municipality or school district with:

- Energy Tracking and Management
- Applying for Local Government Energy Audits (LGEAs)
- Applying for State and utility energy efficiency incentives
- Applying for NJCEP's Energy Savings Improvement Program

to learn about current technical assistance options open to your school or municipality.

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