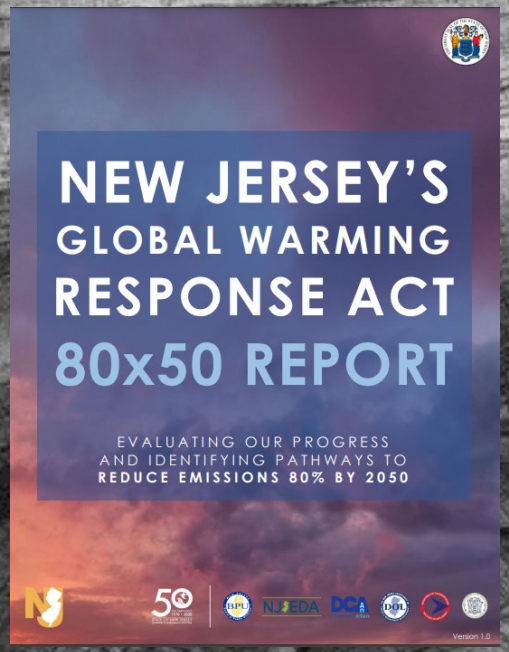
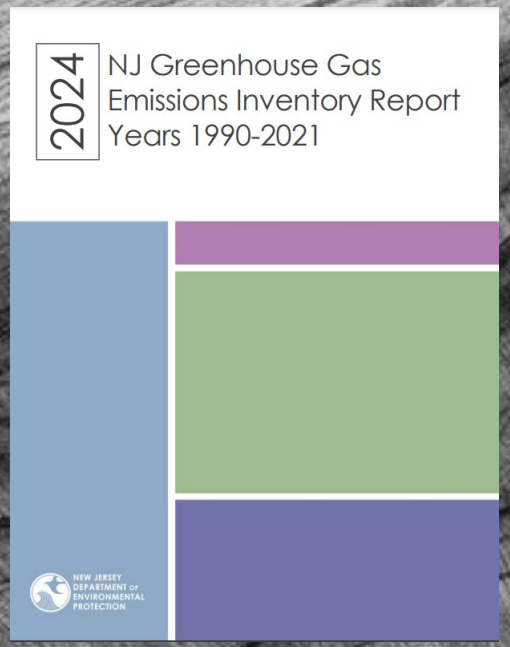
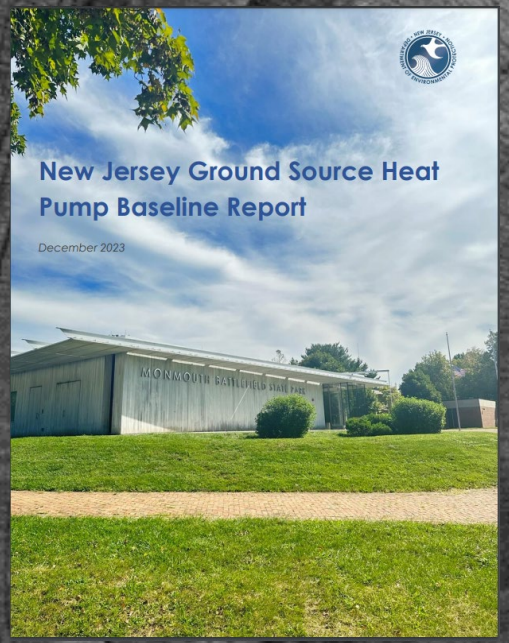
DEP'S CLIMATE MITIGATION LEAD BY EXAMPLE INITIATIVE AND EMISSIONS INVENTORY REPORT

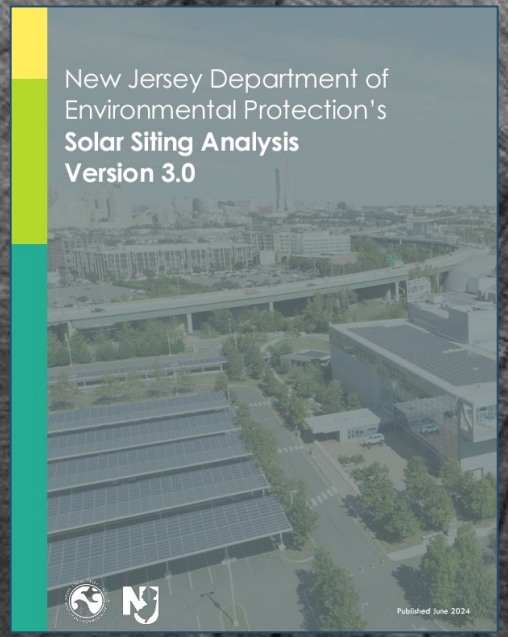
Bureau of Climate Change and Clean Energy

January 2025









Background Information

- Global Warming Response Act 80x50 Recommendations report (2020)
- Statewide greenhouse gas inventories
- Statewide Ground Source Heat Pump Baseline Study
- Statewide Solar Siting Analysis 3.0

July 2023 Administrative Order No. 2023-13

Established DEP's Climate Mitigation "Lead By Example" Initiative

Goals

Global Warming Response Act (2007)

Clean Energy Act (2018)




Objectives

Establish DEP-wide LBE Steering Committee

Identify assets with energy or water demand

Develop a greenhouse gas inventory

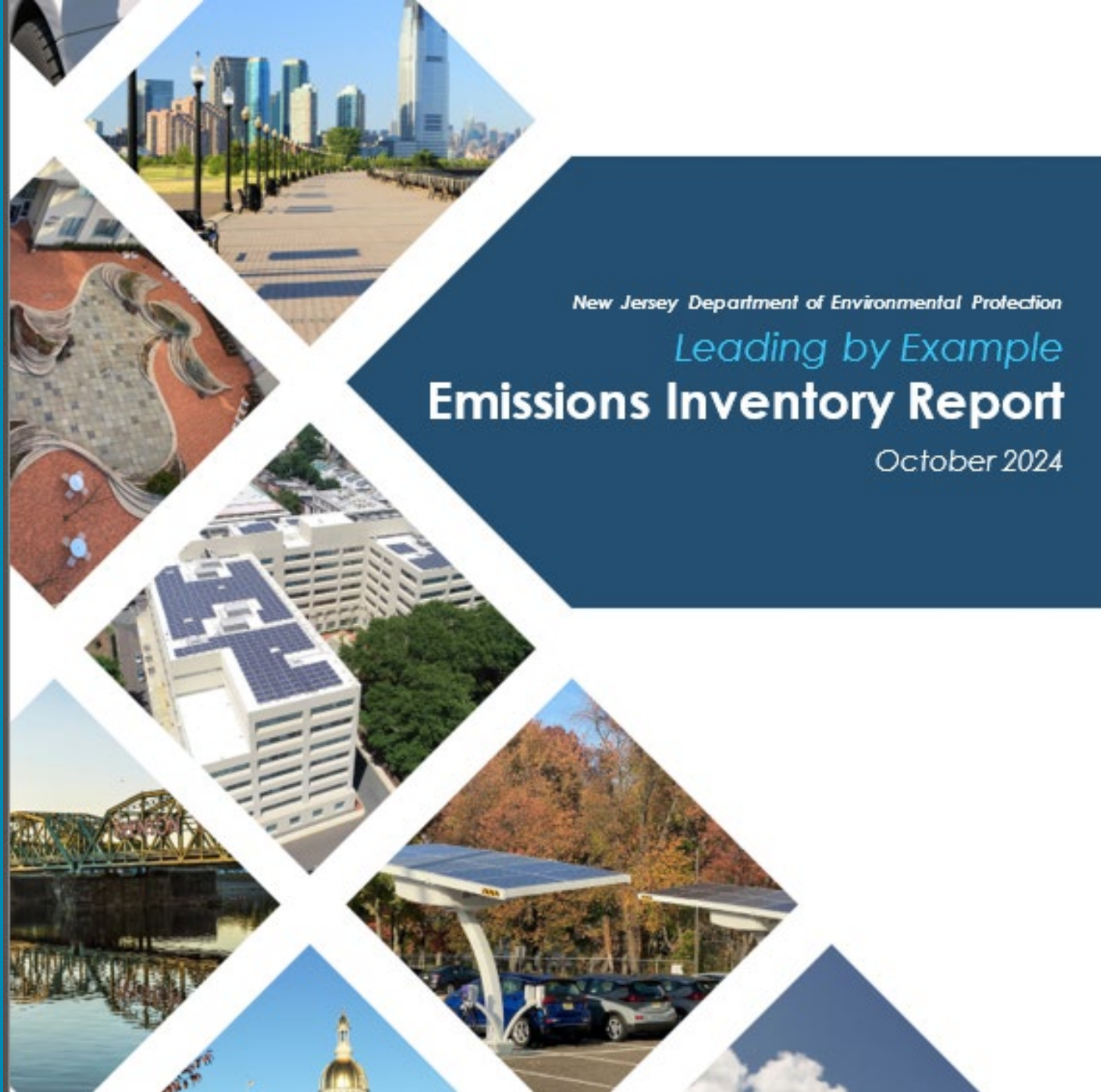
Apply for Energy Audits

Implement Energy Conservation Measures

Integrate Solar PV

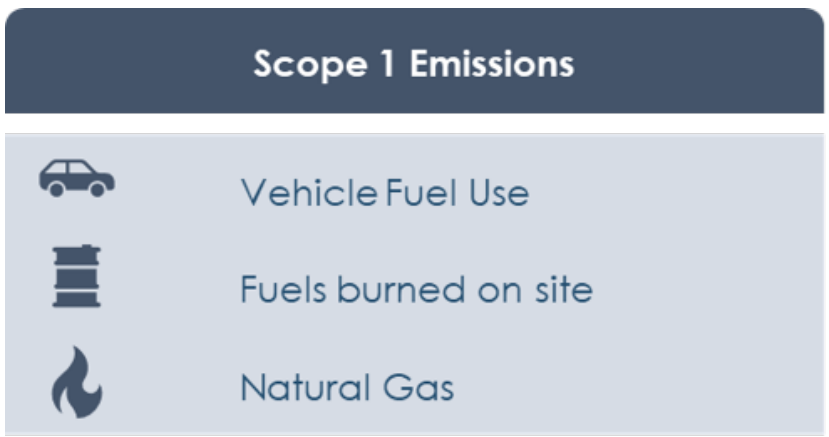
Develop Strategic Energy Management Plan

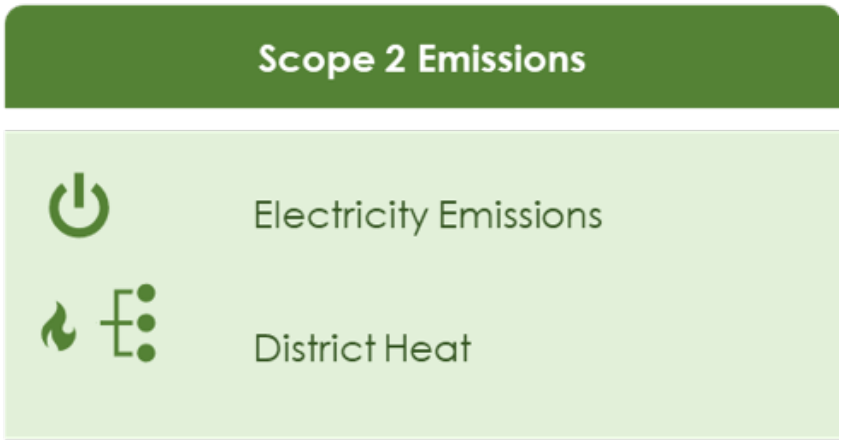
Lead By Example Emissions Inventory Report



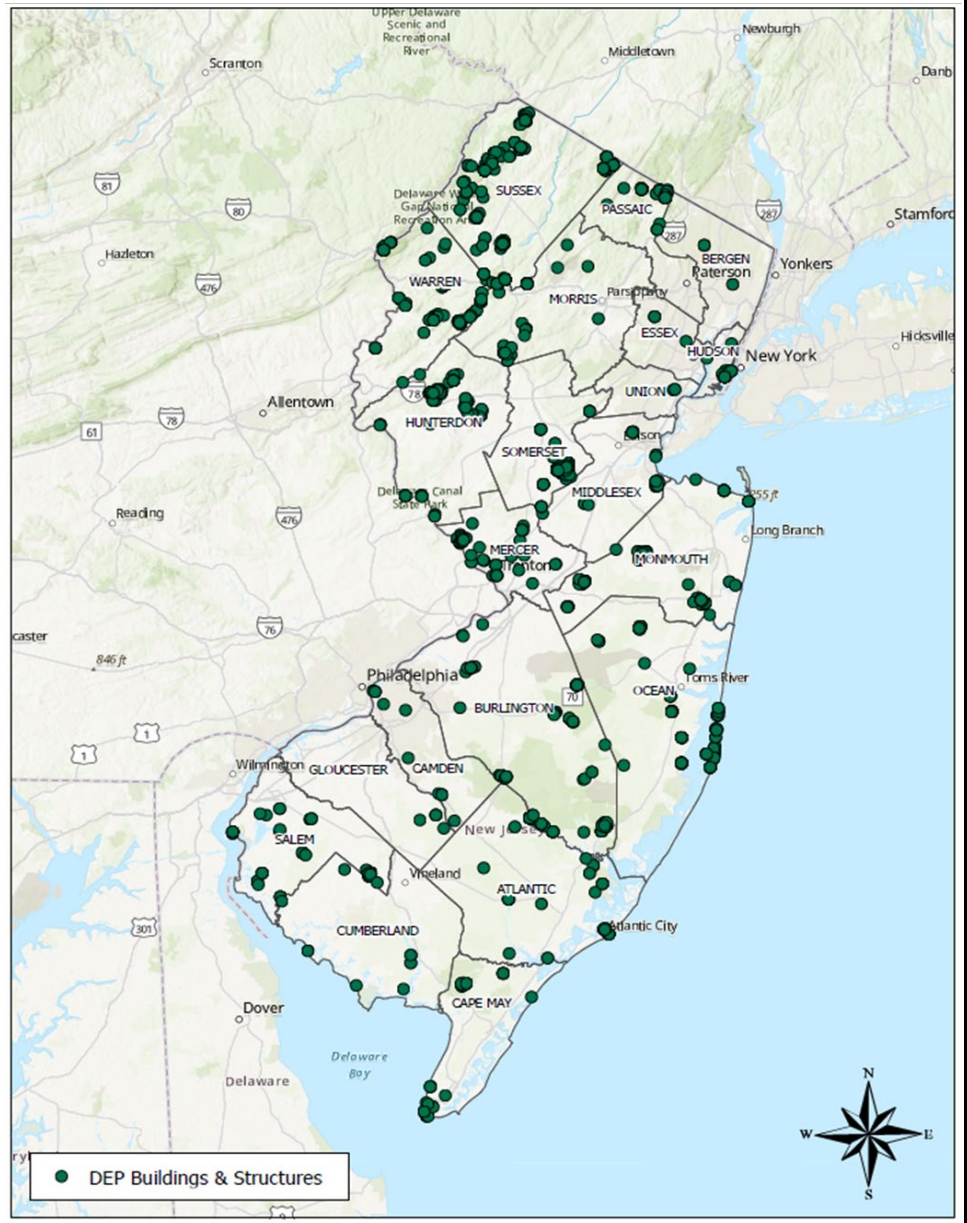
Quantify the Department's emissions

- From 2018-2022
- From the building and vehicle sectors, and program specific areas
  - Scope 3 emissions quantification are on the horizon





DEP Lead by Example Emissions Inventory Report



2022 DEP Statistics

- Approximately 2,700 full-time employees and 1,300 hourly employees across the State
- About 90 facilities and 1,400 vehicles across the DEP portfolio

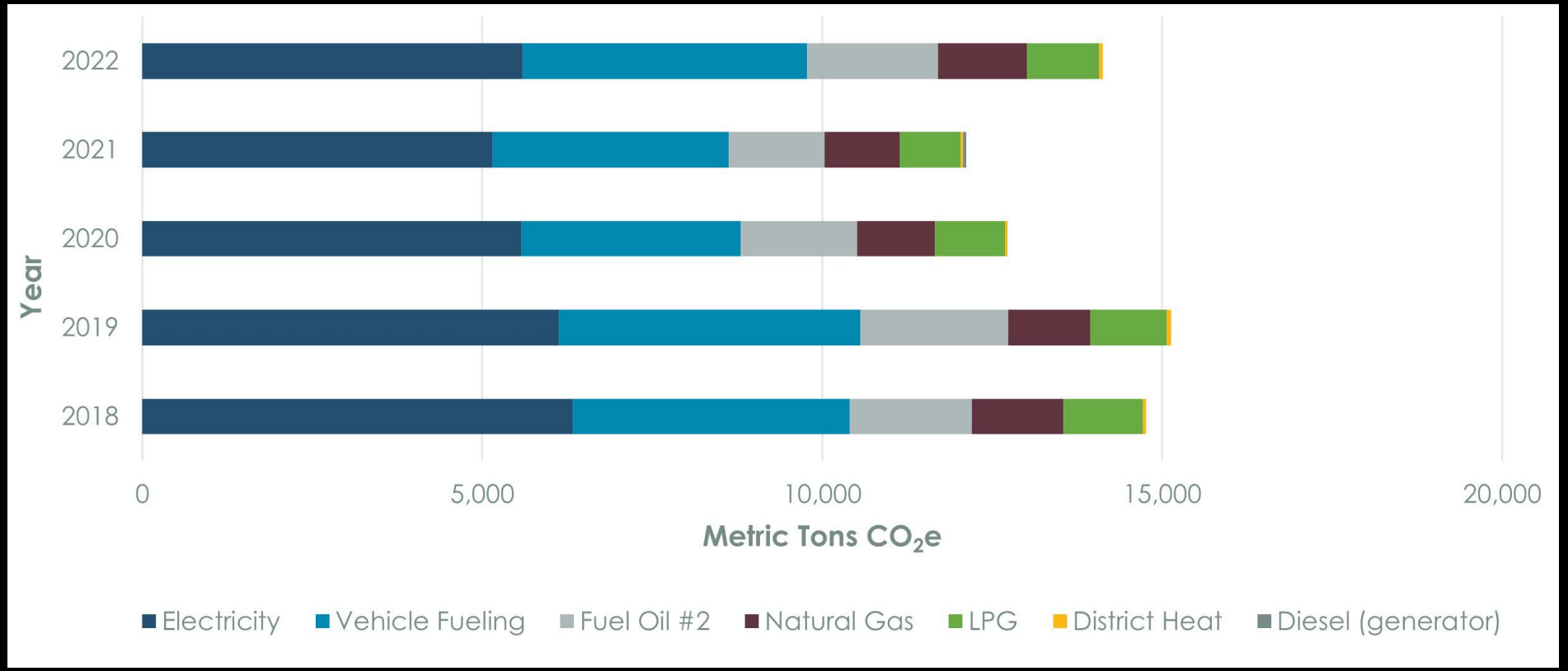
4,000 Employees

14,125 Metric Tons CO_2e

3.5 Metric Tons CO_2e per Employee

**CO_2e in GWP_{100} throughout unless otherwise noted*

Trends

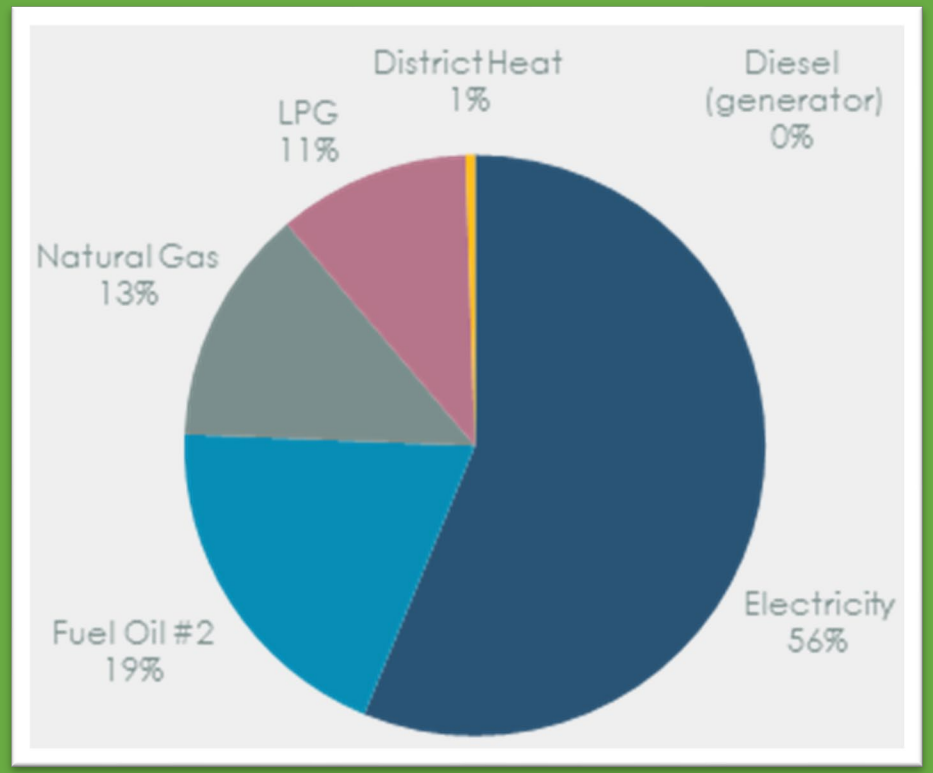


- 2018 emissions are equivalent to the typical annual CO_2 emissions from providing about 2,900 homes with electricity or driving a car about 38 million miles

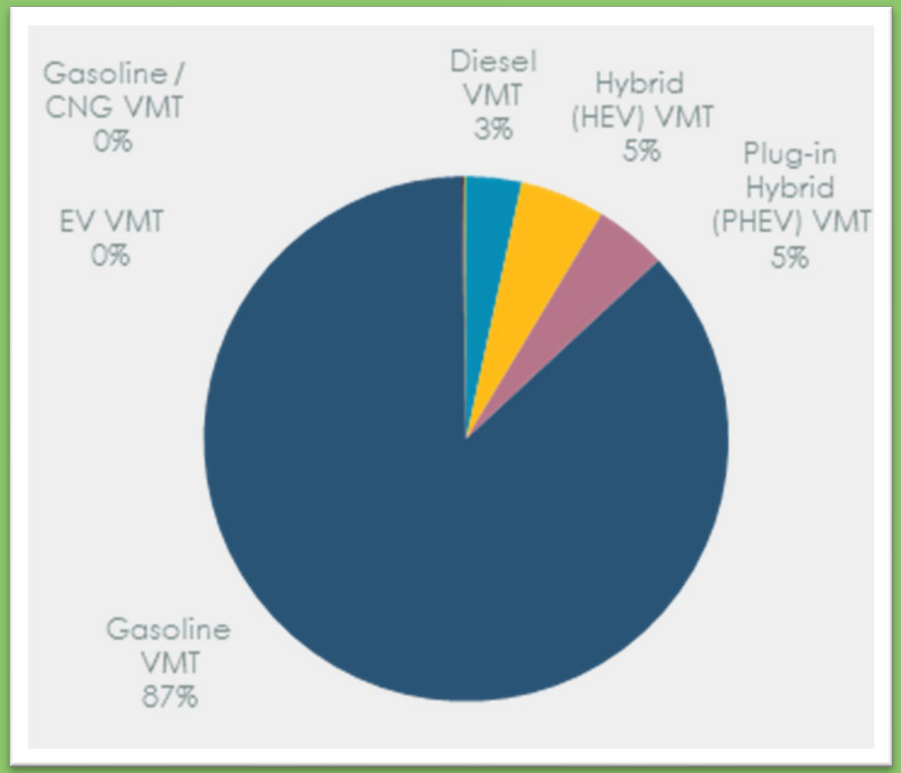
2022 DEP Emissions

Building emissions are about 70% (40% electricity) of total DEP emissions, vehicle emissions roughly 30%

Building Emissions

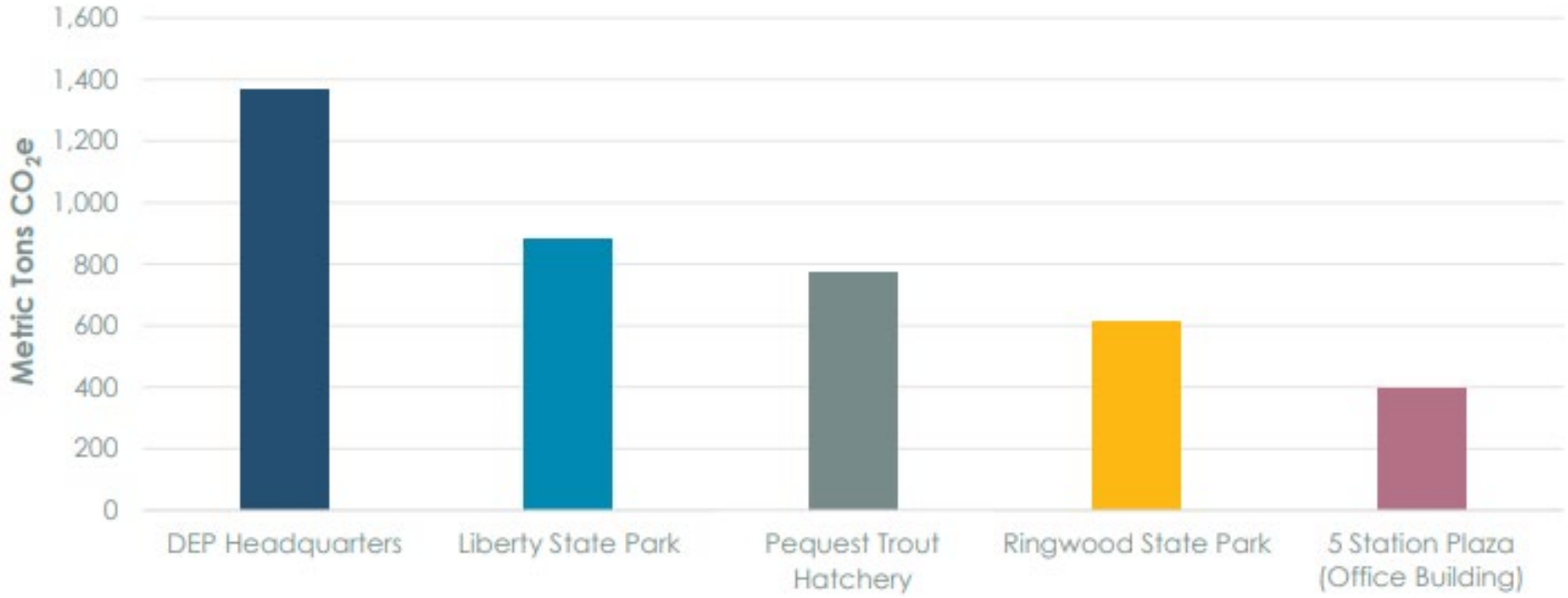


Vehicle Emissions



Top 5 Emitting Facilities in 2022

These are representative of the diverse range of facilities owned, managed, used, and leased by DEP.



DEP Vehicles

- Annual mileage ranges from <100 to >20,000
- Oldest vehicles are from 1970s, which include specialty equipment
- Fleet includes:
- patrol vehicles, field inspector vehicles, and a range of emergency response vehicles (forest fire, spill response, nuclear response)

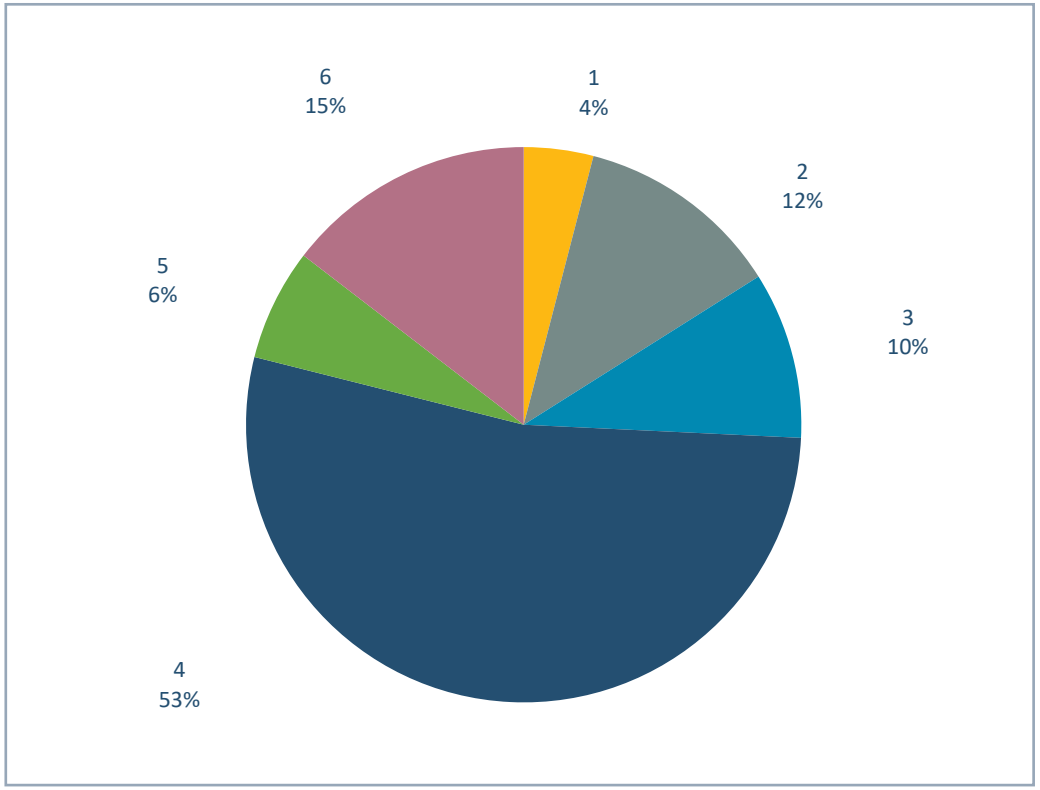
Vehicle Types in Fleet

(*As of May 2023; updated on later slides)

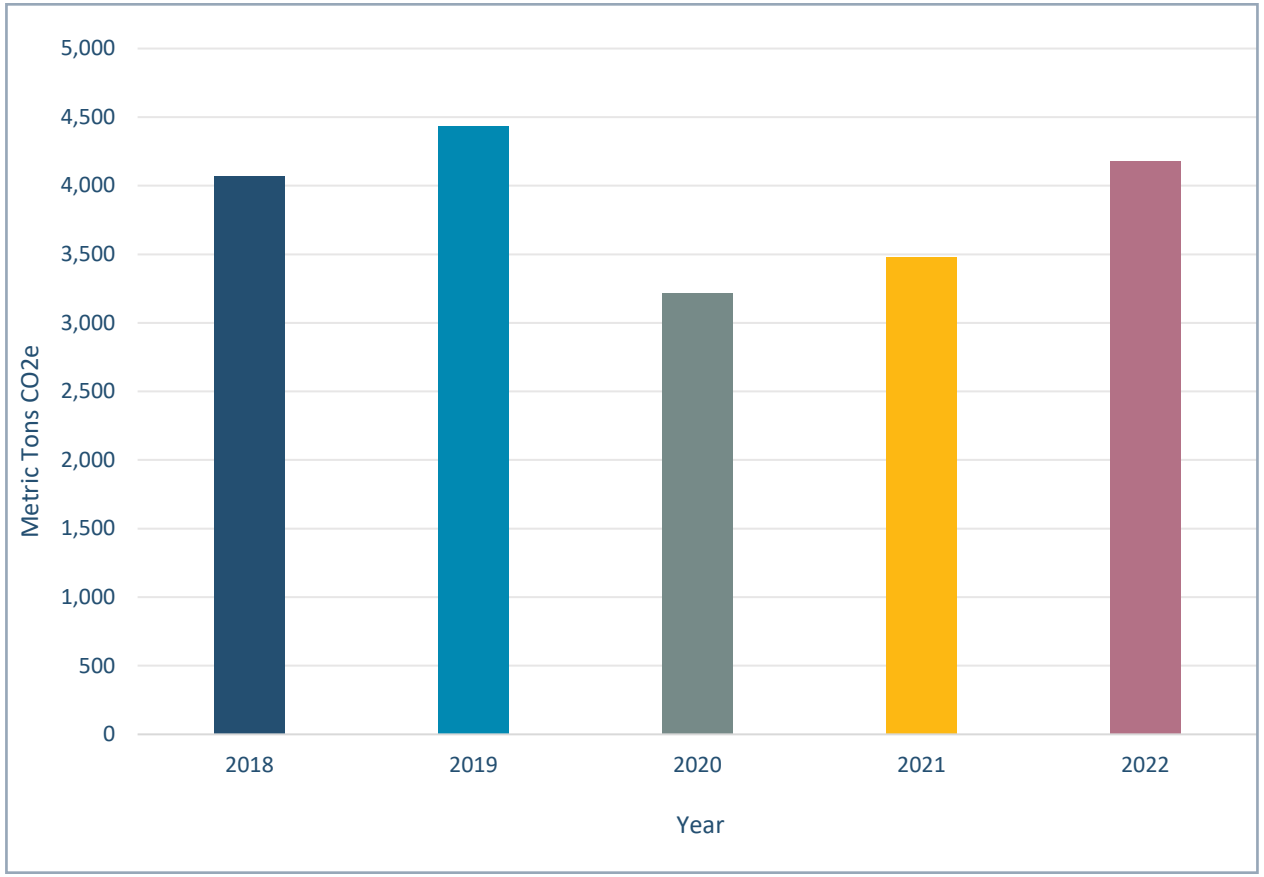
Fleet Type	# of Vehicles
Diesel	139
Electric	8
Gasoline	1,148
Gasoline/CNG	4
Hybrid Electric Vehicle (HEV)	62
Plug-In Hybrid Electric Vehicle(PHEV)	63

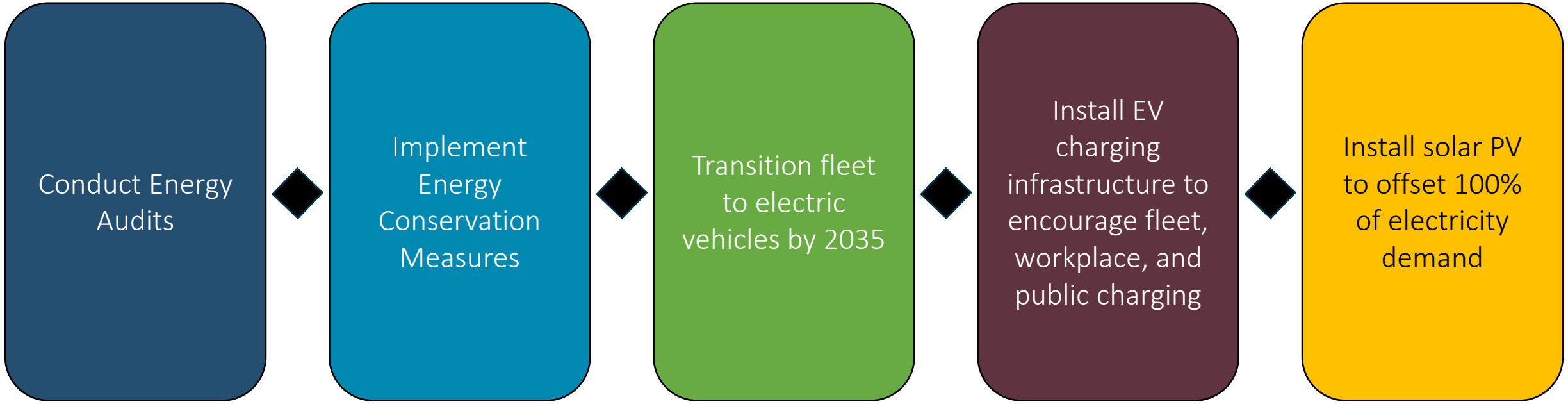
Vehicle Emissions

2022 Emissions for all Vehicle Types



Total Vehicle Emissions (2018-2022)





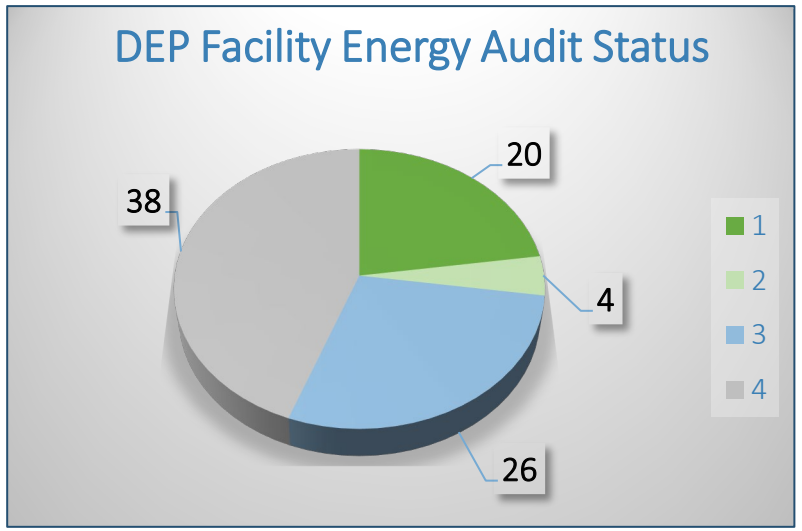
Emissions Reductions Strategy

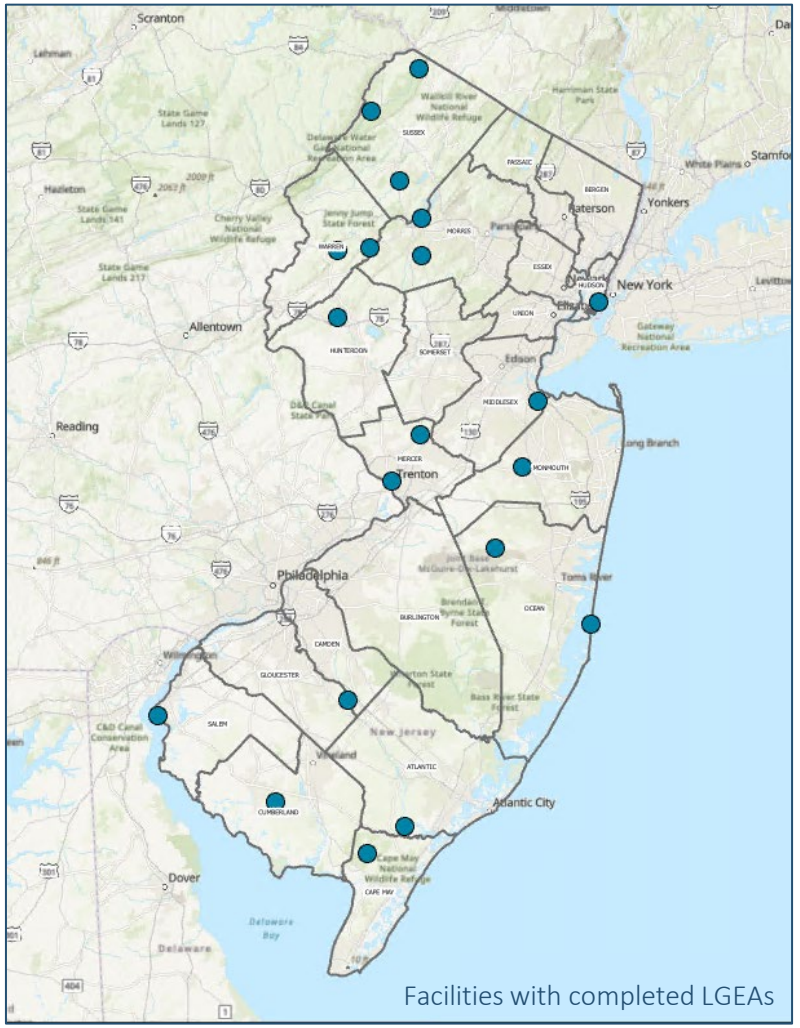
Conduct Energy Audits → Implement Energy Conservation Measures → Transition fleet to electric vehicles by 2035 → Install EV charging infrastructure → Install solar PV to offset 100% of electricity demand

Energy Audit Scope:

- Historic Energy Consumption and cost
- List of Energy Consuming Equipment
- Energy Conservation Measure (ECM) Recommendations
  - Opportunities for on-site solar PV, EV chargers, and combined heat and power
- Financial Incentives for ECM Implementation

As of 1/2025





Conduct Energy Audits → **Implement Energy Conservation Measures** → Transition fleet to electric vehicles by 2035 → Install EV charging infrastructure → Install solar PV to offset 100% of electricity demand

#	Energy Conservation Measure	Cost Effective?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings ($)	Estimated M&L Cost ($)	Estimated Incentive ($)*	Estimated Net M&L Cost ($)	Simple Payback Period (yrs)**	CO_2e Emissions Reduction (lbs)
Lighting Upgrades			**668,923**	**236.9**	**-139**	**$80,214**	**$279,821**	**$75,507**	**$204,314**	**2.5**	**657,318**
ECM 1	Install LED Fixtures	Yes	7,126	0.8	-1	$885	$3,903	$400	$3,503	4.0	7,096
ECM 2	Retrofit Fluorescent Fixtures with LED Lamps and Drivers	Yes	335	0.6	0	$40	$863	$95	$768	19.1	330
ECM 3	Retrofit Fixtures with LED Lamps	Yes	661,462	235.5	-138	$79,290	$275,055	$75,012	$200,043	2.5	649,893
Lighting Control Measures			**182,734**	**64.2**	**-38**	**$21,904**	**$160,814**	**$29,340**	**$131,474**	**6.0**	**179,538**
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	174,083	61.9	-36	$20,867	$144,614	$18,835	$125,779	6.0	171,038
ECM 5	Install High/Low Lighting Controls	Yes	8,652	2.3	-2	$1,037	$16,200	$10,505	$5,695	5.5	8,501
Variable Frequency Drive (VFD) Measures			**200,146**	**68.9**	**0**	**$25,569**	**$151,421**	**$30,900**	**$120,521**	**4.7**	**201,545**
ECM 6	Install VFDs on Constant Volume (CV) Fans	Yes	198,352	68.5	0	$25,340	$144,899	$30,700	$114,199	4.5	199,739
ECM 7	Install VFDs on Heating Water Pumps	No	1,794	0.4	0	$229	$6,522	$200	$6,322	27.6	1,806
Unitary HVAC Measures			**94,336**	**81.4**	**0**	**$12,052**	**$547,937**	**$44,083**	**$503,853**	**41.8**	**94,996**
ECM 8	Install High Efficiency Air Conditioning Units	No	94,336	81.4	0	$12,052	$547,937	$44,083	$503,853	41.8	94,996
HVAC System Improvements			**14,900**	**0.0**	**0**	**$1,904**	**$1,039**	**$360**	**$679**	**0.4**	**15,004**
ECM 9	Install Pipe Insulation	Yes	14,900	0.0	0	$1,904	$1,039	$360	$679	0.4	15,004
Domestic Water Heating Upgrade			**5,561**	**0.0**	**0**	**$710**	**$143**	**$72**	**$72**	**0.1**	**5,600**
ECM 10	Install Low-Flow DHW Devices	Yes	5,561	0.0	0	$710	$143	$72	$72	0.1	5,600
Food Service & Refrigeration Measures			**6,044**	**0.7**	**0**	**$772**	**$920**	**$200**	**$720**	**0.9**	**6,087**
ECM 11	Vending Machine Control	Yes	6,044	0.7	0	$772	$920	$200	$720	0.9	6,087
Custom Measures			**406,992**	**0.0**	**117**	**$56,400**	**$3,111,492**	**$0**	**$3,111,492**	**55.2**	**423,513**
ECM 12	Installation of an Energy Management System	No	315,828	0.0	117	$44,751	$3,082,950	$0	$3,082,950	68.9	331,711
ECM 13	Install Heat Pump Water Heater	Yes	91,164	0.0	0	$11,649	$28,542	$0	$28,542	2.5	91,801
TOTALS (COST EFFECTIVE MEASURES)			**1,167,679**	**370.3**	**-177**	**$142,494**	**$616,179**	**$136,179**	**$480,000**	**3.4**	**1,155,088**
TOTALS (ALL MEASURES)			**1,579,637**	**452.1**	**-60**	**$199,526**	**$4,253,588**	**$180,462**	**$4,073,126**	**20.4**	**1,583,601**

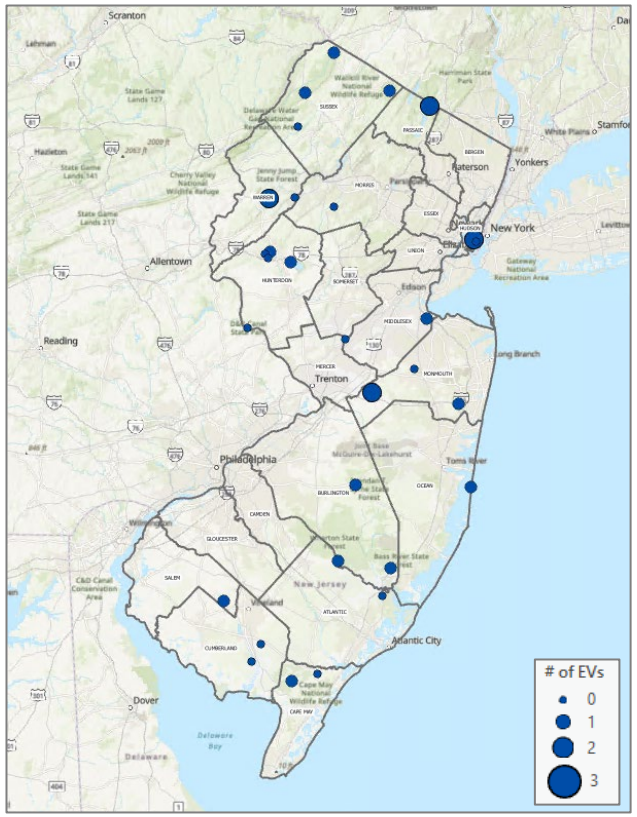
* - All incentives presented in this table are included as placeholders for planning purposes and are based on previously run state rebate programs. Contact your utility provider for details on current programs.

** - Simple Payback Period is based on net measure costs (i.e. after incentives).

Conduct Energy Audits → Implement Energy Conservation Measures → **Transition fleet to electric vehicles by 2035** → Install EV charging infrastructure → Install solar PV to offset 100% of electricity demand

- <u>NJ EV Law (P.L. 2019 c.362, 2020)</u>
  - 25% EVs by Dec. 31, 2025
  - 100% EVs by Dec. 31, 2035

- <u>DEP Fleet Status:</u>
  - 1400 Vehicles
    - 490 Light-Duty Non-Emergency Vehicles
      - 76 battery electric or plug-in hybrid vehicles
      - 50 EVs on order
      - Fulfills 25% commitment by end 2025



2025 EV acquisition locations and quantities

Conduct Energy Audits → Implement Energy Conservation Measures → Transition fleet to electric vehicles by 2035 → **Install EV charging infrastructure** → Install solar PV to offset 100% of electricity demand

Employee EV Chargers:

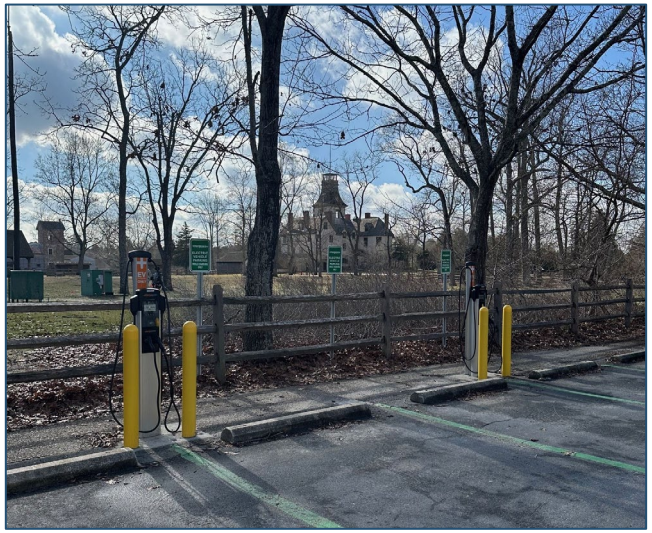
- Trenton:
  - 8 solar powered Level 1 Chargers
  - 7 Level 2 EV Chargers

Fleet EV Chargers:

- Trenton, Ewing & Liberty State Park
  - 11 Level 2 EV Chargers
  - 1 DC Fast Charger at DEP HQ

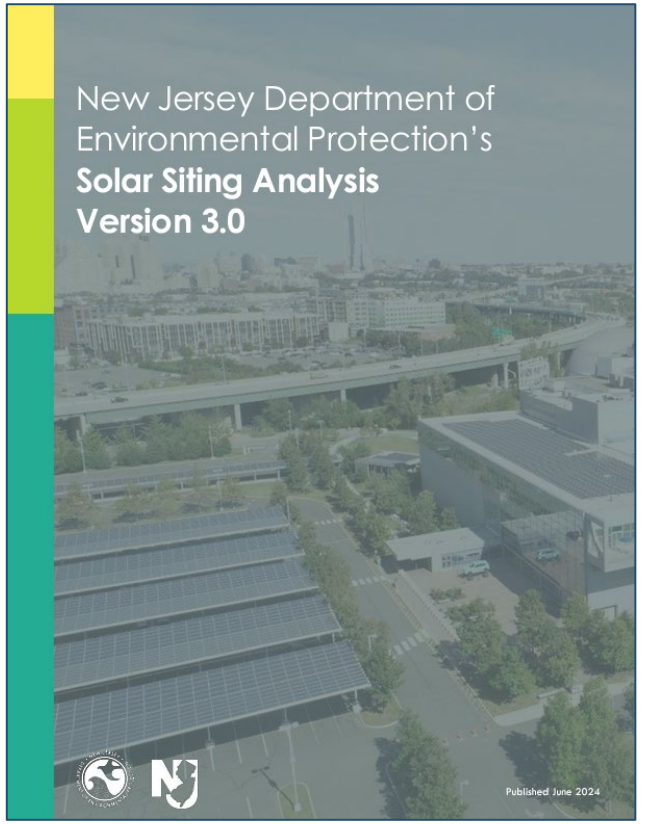
Public/Destination EV Chargers:

- 10 Level 2 EV Chargers
  - Cheesequake State Park
  - High Point State Park
  - Round Valley Recreational Area
  - Wawayanda State Park
  - Batsto Historic Village



Conduct Energy Audits → Implement Energy Conservation Measures → Transition fleet to electric vehicles by 2035 → Install EV charging infrastructure → Install solar PV to offset 100% of electricity demand

- Existing 184 kw solar array on DEP HQ building (installed in 2012)
- Analyzing electric demand at building level and EDC level.
- Leveraging our SSA v3.0 to analyze sites for solar potential
  - Prioritizing elevated carports over parking lots at DEP facilities



Status of Administrative Order Action Items

Completed

Identified ECMs already implemented

Developed GHG Inventory Report

In Progress

Identifying utility meters serving each building

Conducting energy audits at DEP facilities

Develop list of buildings with energy/water demand

Conduct analysis of renewable energy opportunities

Develop Strategic Energy Management Plan

Thank you!

Visit our website and read our Leading by Example Emissions Inventory Report