

CITY OF PLAINFIELD COMMUNITY ENERGY PLAN

PREPARED BY DMR ARCHITECTS
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EXECUTIVE SUMMARY

This Community Energy Plan is prepared for the City of Plainfield through a grant provided by the New Jersey Board of Public Utilities, with technical assistance provided by Sustainable Jersey. Consistent with the Community Energy Planning Grant Goals, the purpose of this document is to serve as an action plan for the City to promote and adopt cleaner and less expensive energy sources and advance the objectives of the State of New Jersey 2019-adopted Energy Master Plan, which aims to generate 100% of the State's energy through renewable sources and reduce greenhouse-gas emissions to 80% of 2006 levels by 2050.

The Community Energy Plan lays out 23 initiatives that the City intends to pursue over the next three to five years to reduce energy consumption and dependence upon carbon based energy sources by both City government buildings and fleet vehicles as well as those of the City's residents and businesses. The initiatives to reduce energy usage and promote renewable energy generation include regulatory actions, public outreach to encourage action by private citizens, businesses, and organization, and direct City expenditures on public buildings and infrastructure.

The initiatives identified in this Plan include, but are not limited to:

- ▶ Support the use of electric vehicles by increasing the presence of charging stations and electrifying the City's vehicle fleet;
- ▶ Zoning to permit private solar installations and community solar projects, as well as battery energy storage systems;
- ▶ Installing on-site renewable energy generation systems and battery energy storage systems on municipal properties;
- ▶ Improving energy efficiency of municipal buildings;
- ▶ Working with the State and utilities providers to reduce cost barriers to residential and commercial energy efficiency improvements and renewable energy generation;
- ▶ Committing to green building practices and encouraging developers to adopt green building practices;
- ▶ Educating and engaging the public in a collective effort to reduce energy consumption and switch to renewable energy sources;
- ▶ Ensuring that low- and moderate-income households are not excluded from the benefits of the City's initiatives; and
- ▶ Exploring emerging technologies and systems like microgrids and energy storage.

This Community Energy Plan is being written at a time when both the State and Federal governments are providing financial incentives for governments, businesses, and households to improve energy efficiency and adopt renewable energy generation and electric or alternative fuel vehicles, making clean energy more affordable than it has ever been.

Plainfield is considered an overburdened community, with 18.1% of the population living at or below the poverty level in 2020 and the City receiving a municipal revitalization index rating of 56 out of 100 from the New Jersey Department of Community Affairs. Plainfield is a mixed-use community, with residential properties having between 1 and 4 units comprising the majority of land area and assessed property value. Additionally, the majority of housing units (57%) in the City are renter-occupied.

These economic conditions constitute obstacles to the City and its constituents taking actions needed to reduce carbon-based energy use in the absence of the above referenced incentives. The future of these incentives - whether they will be renewed or eliminated in the coming years - is unknown. Adopting an energy plan and strategically prioritizing the initiatives the City will pursue over the next few years is crucial to ensure that the current opportunity is not missed.

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GLOSSARY OF TERMS AND ABBREVIATIONS

To save space in this document, the following terms and abbreviations are used to reference certain technical or scientific language, policies or laws, State or Federal government agencies and departments, technology, vehicle types, and the like.

Alternative Fuel: Vehicle propulsion fuels other than diesel or gasoline and having a lesser net environmental impact than those traditional fuels.

BESS: Battery Energy Storage System

BEV: Battery Electric Vehicle - A vehicle that is powered entirely by an electric battery instead of a combustible fuel. These are also referred to as PEVs - Plug-in Electric Vehicles.

CO₂: Carbon dioxide

Community Solar: One or more solar installations providing energy to buildings and uses on other properties, typically through a subscription service.

Complete Streets: A transportation planning and urban design principle favoring street and road design that accommodates multiple modes of travel rather than prioritizing single-occupancy vehicles.

DPW: The City of Plainfield's Department of Public Works

EMP or NJ EMP: 2019 New Jersey Energy Master Plan

EPA: The United States Environmental Protection Agency

EV: Electric Vehicle - Generic term for a vehicle that is propelled partially or entirely by an electric powered motor in lieu of or in addition to an engine powered by gasoline or another combustible fuel.

EVSE: Electric Vehicle Service Equipment - This is another way of saying EV charging equipment.

GHG or Greenhouse Gases: Gases emitted through both natural and anthropogenic processes which contribute to the greenhouse effect in the Earth's atmosphere, most commonly in reference to CO₂ and methane

HEV: Hybrid Electric Vehicle - A vehicle that is primarily propelled by a combustible fuel but which can be propelled to a limited extent by an electric battery that is typically charged by the act of braking.

ICE: Internal combustion engine - a vehicular engine which uses a combustible fuel like gasoline for propulsion. Typically does not include HEVs.

LEED: Leadership in Energy Efficient Design - a program hosted by the United States Green Building Council (USGBC) which grants certification to buildings, neighborhood developments, and cities that meet the minimum standards for one of four levels of efficient design, and which offers a credential program to professionals interested in demonstrating proficiency in green building design and operation.

LMI Household: Low- and/or Moderate-Income Households, as defined by U.S. Department of Housing and Urban Development (HUD).

Microgeneration: Any small-scale production of heat or electricity through a low- or no-carbon source, including solar photo-voltaic systems, small wind turbines, and other on-site systems typically powering a single property.

NJ DCA or DCA: New Jersey Department of Community Affairs

NJ DEP or DEP: New Jersey Department of Environmental Protection

NJ DOT: New Jersey Department of Transportation

NJ Transit: New Jersey Transit

PHEV: Plug-In Hybrid Electric Vehicle - A vehicle that can be propelled by an electric battery for a greater distance than an HEV and propelled by a combustible fuel when the battery is drained. Unlike an HEV, the electric battery of a PHEV can be charged by EVSE.

Private Solar: Any form of solar installation intended to provide energy to the buildings or uses located on the same property as the installation.

US DOE or DOE: The United States Department of Energy

VMT: Vehicle miles traveled - a measure of the number of miles traveled by one or more vehicles over a specified period of time.

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INTRODUCTION & PURPOSE

This Community Energy Plan (CEP) has been prepared for the City of Plainfield in Union County, New Jersey, and is funded through the 2022 Community Energy Plan Grant program administered by the New Jersey Board of Public Utilities in partnership with Sustainable Jersey. The goal of the program and of the Community Energy Plan is to advance the purposes and objectives of the 2019 New Jersey Energy Master Plan, which include, by the year 2050:

- ▶ Generating 100% of the State's electricity through carbon-neutral methods, which includes balancing carbon emissions with equal rates of carbon removal; and
- ▶ Reducing greenhouse gas emissions to 80% of 2006 levels.

The City of Plainfield desires to not only contribute to the State's pursuit of its energy goals, but also to take actions to reduce the energy usage and greenhouse impact from services it provides to its residents and businesses and to help its residents and businesses reduce their own energy and carbon footprints as well as their energy costs.

The CEP Grant program requires grant recipients to select from 38 initiatives to reduce local energy usage, including initiatives related to clean vehicles, solar energy, energy efficiency of buildings, green building practices, accessibility of clean energy for low- and moderate-income communities, and energy storage. This CEP for Plainfield identifies 23 initiatives that the City is pursuing or desires to pursue over the next for the next three to five years, or beyond, to reduce the City's climate impact, energy consumption, and energy costs. Those initiatives are:

Strategy 1. Reduce Energy Consumption and Emissions from the Transportation Sector

- ▶ 1.1 Adopt Supportive Zoning/Regulations for EV Charging Infrastructure
- ▶ 1.2 Train First Responders on EVs / EV Charging Infrastructure
- ▶ 1.3 Train Non-Emergency Staff on EVs / EV Charging Infrastructure
- ▶ 1.4 Purchase Alternative Fuel Vehicles
- ▶ 1.5 Improve Municipal Fleet Efficiency
- ▶ 1.6 Install Public EV Charging Infrastructure
- ▶ 1.7 Encourage Non-Municipal Fleets to Improve Efficiency
- ▶ 1.8 Encourage Workplace EV Charging Infrastructure

Strategy 2: Accelerate Deployment of Renewable Energy and Distributed Energy Resources

- ▶ 2.1 Adopt Supportive Zoning and Permitting for Private Solar
- ▶ 2.2 Post Solar Permitting Checklist
- ▶ 2.3 Adopt Zoning and Permitting for Community Solar
- ▶ 2.4 Train First Responders on Solar



Figure 1. NJ Energy Master Plan Cover Page

- ▶ 2.6 Install On-site Municipal Renewable Generation

Strategy 3: Maximize Energy Efficiency and Conservation and Reduce Peak Demand

- ▶ 3.1 Upgrade Energy Efficiency in Municipal Facilities
- ▶ 3.3 Commercial Energy Efficiency Outreach Campaign

Strategy 4: Reduce Energy Consumption and Emissions from the Building Sector

- ▶ 4.1 Construct New Municipal Buildings as Model Green Buildings
- ▶ 4.3 Require Developers to Complete Green Development Checklist

Strategy 6: Support Community Energy Planning and Action with Emphasis on Encouraging and Supporting Participation by Low- and Moderate-Income/Environmental Justice Communities

- ▶ 6.1 Make Community Energy Planning Inclusive
- ▶ 6.2 Conduct Energy Efficiency Outreach to Low- and Moderate-Income Residents
- ▶ 6.3 Support Shared Mobility Programs

Strategy 7: Expand the Clean Energy Innovation Economy

- ▶ 7.1 Adopt Energy Storage Policies
- ▶ 7.2 Install an Energy Storage Project
- ▶ 7.3 Develop Local Microgrid

Each action described in this Plan has the potential to improve quality of life and reduce energy costs and emissions in the City by educating the public about opportunities and practices that can reduce their energy costs and environmental footprints, directly reducing the City's energy usage, and creating opportunities for new and existing buildings to be more efficient.

COMMUNITY PROFILE

DEMOGRAPHICS

The City of Plainfield is a urban municipality with a population of 54,358 people (per 2022 American Community Survey data) located in Union County at its border with Middlesex and Somerset Counties. The City is racially and ethnically diverse, with Black residents comprising 38.2% of residents and “other” groups (not Black, White, or Asian / pacific islander / Hawaiian) making up 48.8% of the population. More than half of residents identify as having Hispanic or Latino origin.

According to the U.S. Census Bureau's Longitudinal Employer – Household Data (LEHD) On the Map data tool, the top five destinations of employment for those workers residing in Plainfield in 2021 were Manhattan Borough (New York City)(9.7%), Plainfield (7.6%), South Plainfield (4.1%), and Newark (3.6%), with most of the other major work destinations scattered around Somerset, Union, and Middlesex Counties. According to the LEHD data, 45.7% of commutes from Plainfield are shorter than 10 miles (one-way). While 18,098 workers leave Plainfield for their primary jobs each day, 5,348 enter Plainfield each day for their primary jobs.

The U.S. Census Bureau's 2022 American Community Survey found that passenger cars made up 68.7% of residents' commutes compared to 4.8% using public transit, even with the city being served by rail and bus. It should be noted that the ACS “mode of transportation” data only reflects the first leg of the trip, meaning that anyone who drives to a train station is counted among residents that drive to work. Also included in the percentage of people who commuted by car is 7.1% of workers who carpooled compared to 7.8% statewide. Based on journey to work data (13.3% of working-age residents working in Newark and New York City), the percentage of residents that commute by transit for some leg of the trip may exceed what is reported by the Census Bureau.

The City is a low- to moderate-income community compared to the rest of New Jersey, with a median household income of \$70,712 in 2022 and 18.6% of the population at or below the poverty level (compared to \$97,126 and 9.7%, respectively, statewide). For additional context, based on affordable housing regional income limits for 2023 in Union County, a household earning \$70,712 and consisting of 3 people or fewer would qualify as moderate income.

HOUSING AND LAND USE PATTERNS

Only 44% of occupied housing units in the City are owner-occupied, compared to 64% statewide. Renters, occupying 56% of housing units, have fewer options than homeowners to make energy-saving changes to their living spaces or adopt green energy; for example, they cannot unilaterally install solar panels on their homes or electric vehicle charging equipment, nor are they often able to replace older, less efficient large appliances with newer, more efficient ones.

Based on 2022 property tax data, more than 63% of the City's land area is devoted to properties occupied by one-to-four-family dwellings (for comparison, the 2021 American Community survey identified 1-family dwellings as the predominant housing type, with 2-family dwellings in second place, and 3/4 family dwellings in 3rd). Public and tax-exempt properties made up the next largest land area at 22%.

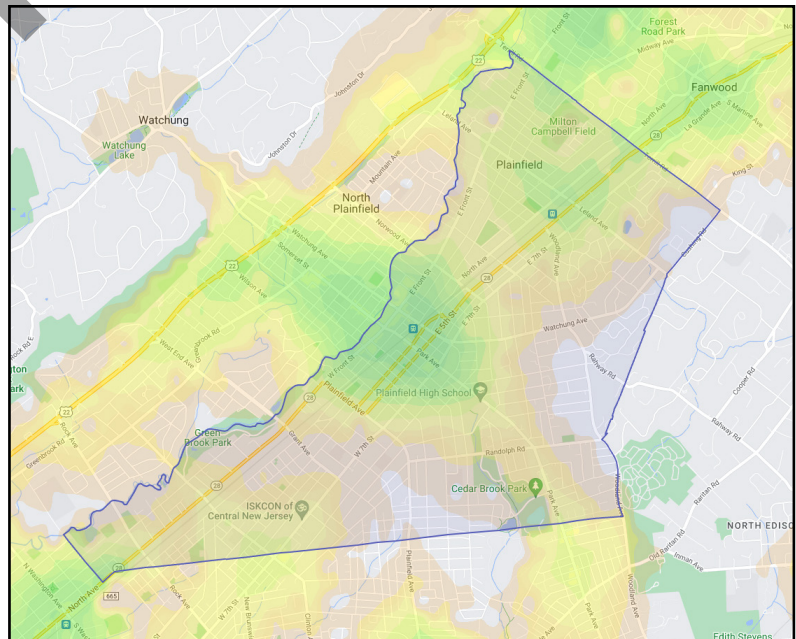
According to Walkscore.com in 2023, the City's Walk Score is 73, meaning "most errands can be accomplished on foot." It's Transit Score is 44, meaning that there are "A few nearby public transportation options", and its Bike Score is 51, meaning that there is "Some bike infrastructure."

ENERGY AND VEHICLE USAGE PATTERNS

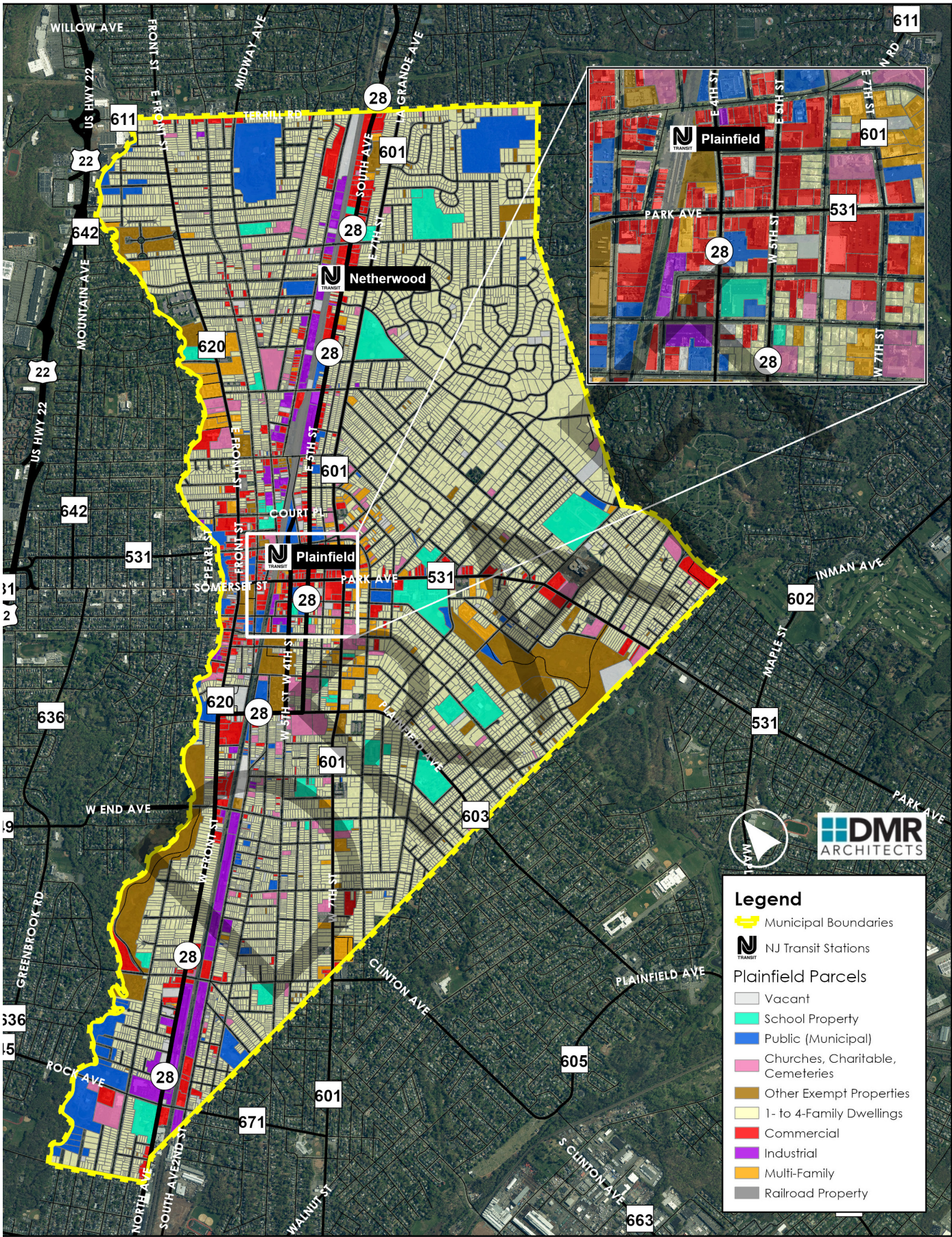
Consistent with the heavily low-density residential character of the City, its largest source of greenhouse gas emissions in 2020 was on-road vehicles, predominantly passenger cars. According to 2019 data from the North Jersey Transportation Planning Authority, passenger cars attributed to Plainfield drove more than 171 million miles in that year, making up 71% of vehicle-miles traveled (VMT) associated with the City that year.

North Jersey Transportation Planning Authority data from 2017 and 2019 indicate that the City saw an approximately 28% increase in vehicle miles traveled attributed to the City, resulting from increased travel across vehicle categories. It is not clear if this is reflective of an emerging trend or a blip in the data. It should be noted that while VMT associated with passenger cars increased by less than 16%, GHG emissions associated with passenger cars increased by 50%. For comparison, VMT associated with "combination" long-haul trucks were more than eight (8) times as high in 2019 as it was in 2017, whereas their emissions were less than four (4) times as much.

In 2021, residents, businesses, and government facilities purchased 203 million kWh from PSE&G, roughly the same as they have purchased each year since 2015 (See Figure 7 on page 19). Similarly, users across the City purchased 3% less natural gas in 2021 than they did in 2015 (See Figure 8 on page 19). Unlike many other communities in the State, Plainfield did not see a significant change in usage in 2020, when the COVID-19 pandemic caused people to spend more time at home and less time at work or in stores. This may be due, in part, to the 2020 winter months being warmer than those in 2015, resulting



Map 1. WalkScore Walkability Map. Green is most walkable, red less walkable, gray not walkable. Source: Walkscore.com



Map 2. Land Use Map

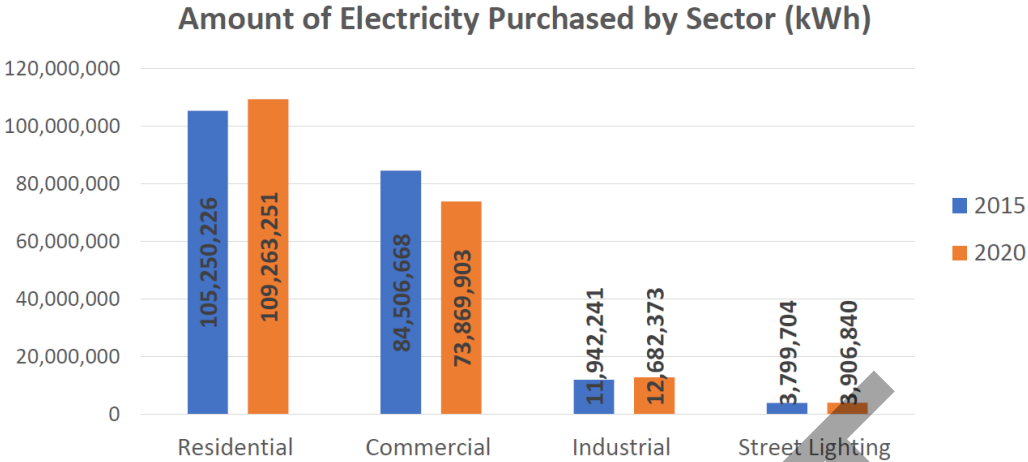


Figure 2. Electricity purchased by sector in Plainfield, 2015 vs 2020

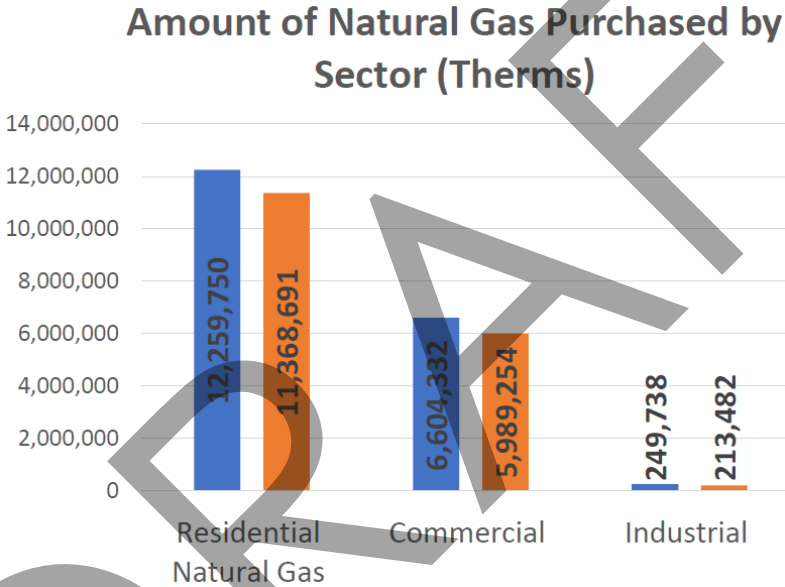


Figure 3. Natural gas purchased by sector in Plainfield, 2015 vs 2020

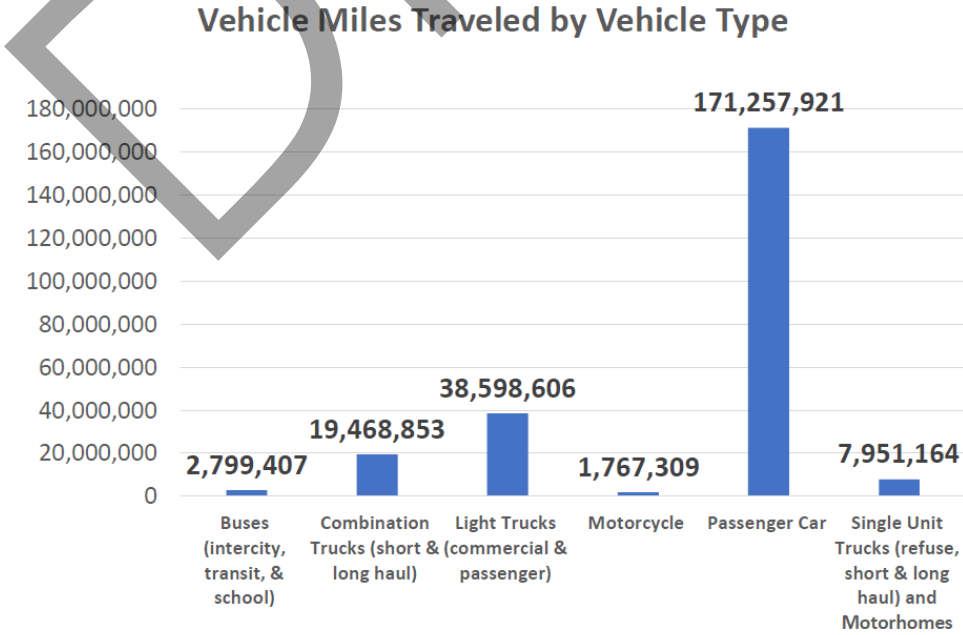


Figure 4. Plainfield Vehicle Miles Traveled, 2019

in less natural gas consumption despite more presence at home.

Electricity, heating, street lighting, and vehicle usage in Plainfield generated more 292 thousand metric tons of carbon dioxide equivalent (MTCO_{2e}), the standard measure of greenhouse gas emissions, up 15% from 2015. While emissions from electricity and natural gas usage decreased across the board, emissions associated with vehicle usage increased by more than 63% (57 thousand metric tons).

In 2020, vehicles made up more than half of the City's emissions. Another third (31.59%) come from residential and commercial natural gas consumption. The 2020 per-capita emissions rate was 13.4 MTCO_{2e} Statewide, compared to 5.8 in Plainfield, making Plainfield the 51st lowest emitting municipality in the State on a per-resident basis and putting its residents in the lowest 10th percentile of emitters.

ACTIONS TO DATE, AND POTENTIAL OPPORTUNITIES AND OBSTACLES

ACTIONS TO DATE

- ▶ Plainfield recently adopted an Electric Vehicle (EV) charging ordinance implementing the Model Ordinance published by the NJ DCA in 2022.
- ▶ The City is in the process of electrifying its vehicle fleet, with 21 plug-in vehicles in its inventory at the time of this writing.
- ▶ The City is pursuing options to negotiate transit connector shuttle services or contribution to such service from redevelopers.
- ▶ Several school buildings are equipped with rooftop solar.
- ▶ Four direct-install projects were completed in 2012.
- ▶ As of March 2021, 2,938 housing units participated in a residential energy efficiency incentive program, representing 22.52% of residential units in 1- to 4-family dwellings.
- ▶ The City briefly partnered with a bike-sharing program.
- ▶ As of 2020 there were a total of 378 solar installations in the City with a size of 6,225.87 kW.
- ▶ The City is in the process of planning a pedestrian mall adjacent to the Plainfield NJ Transit Passenger Rail station, which will improve pedestrian safety and promote transit oriented commerce and development.

OPPORTUNITIES FOR ENERGY IMPACT

- ▶ **Vehicle Usage:** Vehicles, and especially passenger vehicles, are the largest energy consumer and producer of greenhouse gases associated with Plainfield. Reducing VMT and/or advancing the adoption of electric vehicles will be the most effective ways to reduce energy consumption and greenhouse gas emissions.
 - ▶ **Access to Public Transit:** The City is well served by rail and bus. Increasing access to public transit will help reduce VMT. This can be achieved through high-density, mixed-use zoning around train stations, micro-transportation (e.g. bike-shares) and last-mile transit service with connections to train stations, improvements in bike and pedestrian safe routes to transit, and numerous other programs and policies that reduce physical, economic, and psychological barriers to transit usage.
 - ▶ **Electric Vehicle Adoption:** The City can reduce its energy and carbon footprint by electrifying its fleet and encouraging EV adoption by large employers and fleet services.
 - ▶ **Electric Vehicle Support:** The City can increase local EV adoption by reducing “range anxiety” (aversion to EV adoption due to limited availability of charging opportunities) by increasing the availability of charging equipment where people live, shop, and work, as well as major transit

2020 Community-Scale Energy-Related GHG Emissions by Sector and Energy Type (MT CO₂e)

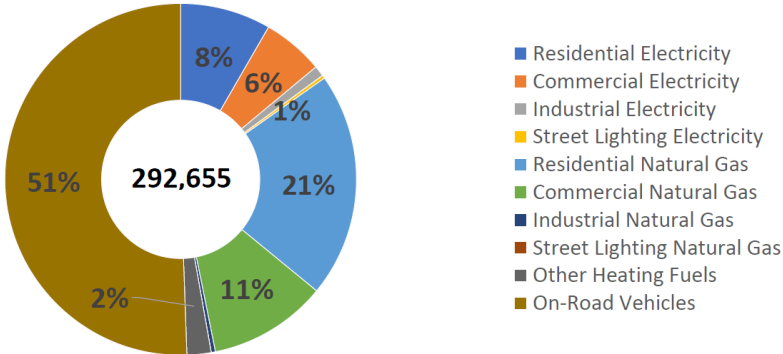


Figure 5. Community Scale Energy Related GHG Emissions, 2020

Means of Transportation to Work (2020)

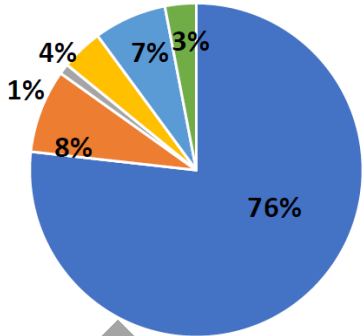


Figure 6. Commuting modality for Plainfield residents, 2020

Amount of Electricity Purchased by Sector (kWh) 2015 to 2021

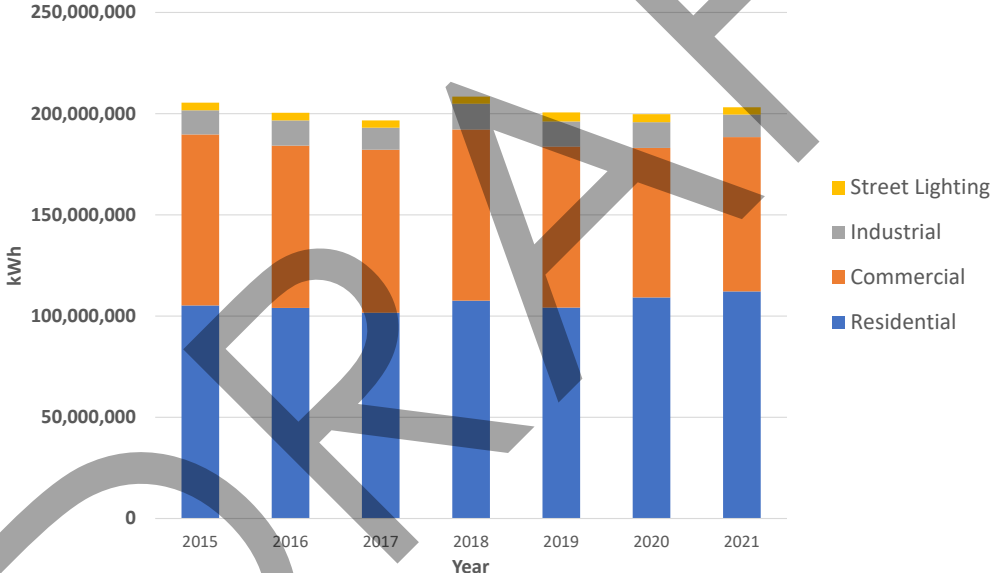


Figure 7. Electricity Purchased by Sector and Year in Plainfield

Amount of Natural Gas Purchased by Sector (Therms) 2015 to 2021

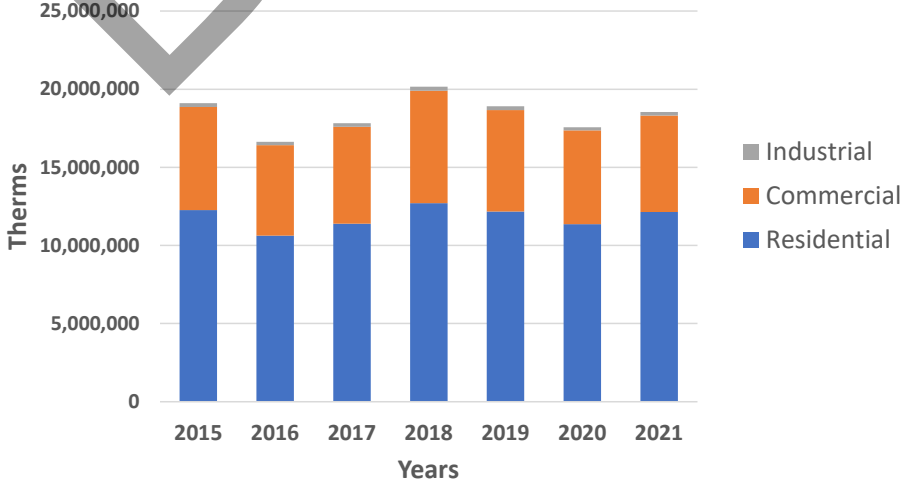


Figure 8. Natural Gas Purchased by Sector and Year in Plainfield

stops.

- ▶ Resident and Business Outreach: The City can reduce energy usage from private buildings by educating the public about incentive programs and opportunities to improve energy efficiency. While the majority of households are renters, there are enough homeowners in the City to make a difference in Plainfield's energy profile by participating in these programs.
- ▶ Rooftop Solar: According to a City-wide analysis from Google's Sunroof program, 6.3 thousand roofs, representing 59% of roofs in the City with 5.4 million square feet, can accommodate solar installations with a combined 76 MW DC capacity and generate over 86.5 thousand MWh of electricity (AC) per year, or 79% of the electricity used by residential consumers in 2020. The median roof can fit a 352 square-foot installation that can generate 5.8 thousand kWh per year. Two-hundred (200) roofs in the City could accommodate systems with a capacity of 50k to 300k kW. Installing solar on all 6.3 thousand roofs could, over their lifetime, reduce emissions equal to one year of emissions from 12.3 thousand cars. (<https://sunroof.withgoogle.com/data-explorer/place/ChIJ5fwnzfm5w4kRN7sWzWrnYio/>). See Map 3 on page 20.

CONSTRAINTS TO ENERGY IMPACT

- ▶ Housing Tenure: With 57% of housing units in the City being rentals, outreach must include landlords and building managers who may be more difficult to reach than homeowners.
- ▶ Housing Age: More than half of the housing units in the City are in buildings that were constructed before 1948. These buildings are typically less energy efficient and require significant rehabilitation to improve efficiency.
- ▶ Resident Income: With nearly one out of five households in poverty and a low city-wide median income, residents may not have the same resources available to switch to electric or alternative fuel vehicles, purchase newer, energy efficient appliances, or invest in weather-proofing their homes.



Map 3. Google Project Sunroof Data for Plainfield City - Yellow roofs have more sunlight exposure, browner roofs have less; Screenshot taken December 13, 2023.

FIRST ACTION - ESTABLISHING A GREEN TEAM

The first action the City will take toward implementing its Community Energy Plan will be to establish a Green Team to lead sustainability activities throughout the City including several identified in the Plan. Sustainable Jersey recommends that the Team should be composed of stakeholders from the governing body, municipal departments, advisory and decision making boards and committees, and (if appropriate) representatives from local non-profits and community organizations.

A Green Team is not required to implement the CEP, but it helps the City to plan and implement its Community Energy Plan in an inclusive, open, and strategic manner. It is also beneficial if the Green Team is or works in close collaboration with a non-profit organization whose mission is to achieve for the City a specific level of sustainability, such as Sustainable Jersey Bronze or Silver Certification, or LEED Certified Cities, and which can take active action to promote local sustainability independently (such as outreach actions) and in collaboration with other City agencies. The powers and responsibilities of the Green Team can be determined by the City.

SUSTAINABLE JERSEY CERTIFICATION

Many of the initiatives described in this CEP, including the adoption of the CEP itself, correspond with one or more "Actions" that earn the City points toward certification through Sustainable Jersey as a Bronze or Silver community. The Action information sheets on the Sustainable Jersey website provide guidelines for implementing these actions in greater detail than this CEP. Completion of actions towards Sustainable Jersey certification have a number of benefits beyond just the benefits from sustainability, including increasing eligibility for grants from Sustainable Jersey and other agencies.

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STRATEGY 1: REDUCE ENERGY CONSUMPTION AND EMISSIONS FROM THE TRANSPORTATION SECTOR

This strategy is focused on increasing adoption of electric vehicles - not only passenger vehicles, but fleet vehicles as well - and taking other actions that can reduce transportation related energy use and greenhouse gas emissions. Transportation makes up 42% of emissions in New Jersey (per the NJ EMP) and 9% of an average household's budget based on 2019 Bureau of Labor Statistics data. Transportation costs also factor into the budgets of governments and businesses.

According to the U.S. Department of Energy's Alternative Fuels Data Center, the average annual emissions from driving a BEV 11,579 miles in New Jersey is just 1,636 pounds of CO₂ equivalent (lbs CO₂e) compared to 12,594 lbs CO₂e from a gasoline powered car ("Figure 9. CO₂e emissions by vehicle fuel type in New Jersey and Nationally" on page 22). New Jersey's EV CO₂e emissions are significantly lower than the national average due to New Jersey's cleaner electric fuel portfolio. ICE vehicles and HEVs have the same emissions in every state, as gasoline is chemically the same across the United States.

While they tend to have a somewhat higher up-front price tag and higher insurance costs, electric vehicles have lower fueling and maintenance costs than ICE vehicles, often resulting in a payback period of about five years for vehicles averaging above 15,000 miles per year when compared to comparable gasoline vehicles (meaning that it takes about 5 years for the savings on fueling and maintenance costs to meet or surpass the excess up front cost of purchasing an EV). In New Jersey, the up-front costs of

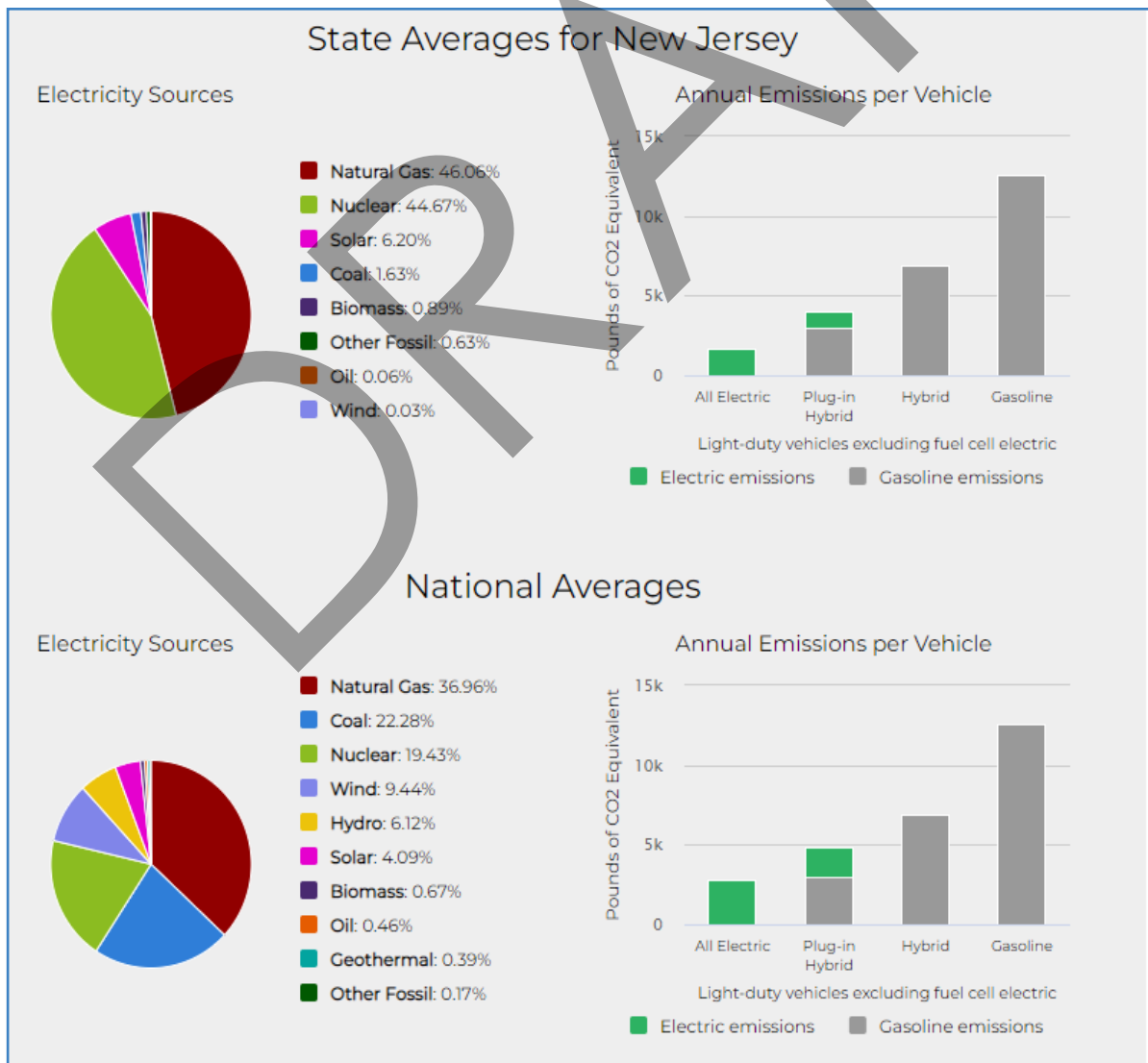


Figure 9. CO₂e emissions by vehicle fuel type in New Jersey and Nationally

purchasing some plug-in EVs may be closer to that of their gas-powered or hybrid alternatives, as the State offers rebates and exempts EVs from certain taxes and fees.

Municipalities can reduce GHG emissions from the transportation sector by electrifying municipal fleets, supporting the adoption of electric and alternative fuel vehicles for residential and non-residential use, and taking actions to increase the availability of electric vehicle charging infrastructure.

Plainfield plans to explore the installation of public EV charging infrastructure and conduct an outreach campaign to create awareness of the incentives available from the State toward the purchase of electric vehicles for commercial fleets and installation of charging infrastructure on commercial properties.

Plainfield has already incorporated the Statewide electric vehicle charging station requirement into its municipal code, which requires a portion of the parking from new development or major use changes to be equipped for electric vehicle charging, thus achieving Initiative 1.1.

The City has also begun the process of electrifying its fleet, including having 21 electrified vehicles in its fleet as of this writing. It intends to continue to electrify its fleet.

The specific Strategy 1 Initiatives to be pursued by the City include the following:

- ▶ **1.2 Train First Responders on EVs and EVSE** - *To further public confidence and maintain emergency preparedness, require training on electric vehicles and associated infrastructure for local first responders.*
- ▶ **1.3 Train Non-Emergency Staff on EVs and EVSE** - *Initiate electric vehicle cross-training for non-emergency staff such as code officials, automotive technicians, and electricians.*
- ▶ **1.4 Purchase Alternative Fuel Vehicles** - *Replace existing municipal fleet vehicles with plug-in hybrid, battery electric, or other sustainable alternative fuel vehicles, using fleet analysis to inform purchases.*
- ▶ **1.5 Improve Municipal Fleet Efficiency** - *Coordinate the strategic replacement (or retirement) of vehicles, scheduling of preventative maintenance, and improvement of driver efficiency to reduce the GHG footprint of all municipal fleets – public works, police, fire, etc. Requires tracking of fleet data such as age of vehicles, duty cycle, and use patterns.*
- ▶ **1.6 Install Public EV Charging Infrastructure** - *Install electric vehicle charging infrastructure, including chargers, signage, and safety and accessibility features, for public use.*
- ▶ **1.7 Encourage Non-Municipal Fleets to Improve Efficiency** - *Contact local commercial fleet managers to start conversation about strategically replacing (or retiring) vehicles and improving driver efficiency to reduce their fleet GHG footprint. Offer resources to ease the process, such as procurement tools and incentive information.*
- ▶ **1.8 Encourage Workplace EV Charging Infrastructure** - *Meet with local employers to ask them to install workplace EV charging. If possible, offer incentives such as promotion in municipal communications, a “ribbon cutting” event with public officials, and/or a fast-tracked permitting process.*

1.2 & 1.3 TRAIN FIRST RESPONDERS AND NON EMERGENCY STAFF ON EVS AND EVSE

Fire suppression methods and other emergency response for electric vehicles and charging equipment differ from those for traditional fuel vehicles. Emergency responders who are not trained in response to EV related emergencies put themselves and those involved in the emergencies at great risk of injury, property damage, or death.

The National Fire Protection Association, the National Alternative Fuels Training Consortium, and Kean

To further public confidence and maintain emergency preparedness, require training on electric vehicles and associated infrastructure for local first responders.

Initiate electric vehicle cross-training for non-emergency staff such as code officials, automotive technicians, and electricians.



“Make Your Town Electric Vehicle Friendly” Action

University, and the US Department of Energy's Electric Vehicle Infrastructure Training Program are examples of organizations that offer courses for emergency response professionals.

NEXT STEPS

The City's Office of Emergency Management Director will work with the heads of the Plainfield Fire Department and the Police Department will require their staff to complete one or more training courses in emergency response to alternative fuel vehicles on a regular basis as may be needed to maintain certification and remain up to date on best practices.

Similar to Emergency Response personnel, Director of the Department of Public Works the City will work with its code enforcement personnel and technical in-house staff and contractors to receive regular training and education on electric vehicles and EVSE.

1.4 PURCHASE ALTERNATIVE FUEL VEHICLES

Replacing older fleet vehicles with newer alternative fuel vehicles can reduce municipal climate impact and costs associated with vehicle upkeep and fueling. The moment that a vehicle no longer serves its purpose or becomes a burden to maintain is a "leverage point" - an opportunity that can be leveraged to make a greater impact - to change energy usage patterns. At the time of this writing, the City has 21 electric vehicles in its fleet.

Replace existing municipal fleet vehicles with plug-in hybrid, battery electric, or other sustainable alternative fuel vehicles, using fleet analysis to inform purchases.



"Purchase Alternative Fuel Vehicles" Action



"Meet Target for Green Fleets" Action

The decision as to which vehicles the City should prioritize for replacement should include the following:

- ▶ **Current maintenance and fueling costs of existing ICE vehicle** - Vehicles with the highest fueling and maintenance costs should among the first targets for comparable EV replacement. Older vehicles and larger vehicles typically have the worst fuel efficiency, but may cost little to maintain or use due to infrequent usage;
- ▶ **Rate of usage** - The payback period for an EV (the amount of time it takes for the savings in fuel and maintenance costs to exceed the cost difference between the EV and its internal-combustion equivalent) is shortest for vehicles with the highest rate of usage (miles per year). Vehicles that rack up the most miles each year should be among the first targets for comparable EV replacement.
- ▶ **Type of usage** - Vehicles whose daily uses include long idling periods (such as a police car or bus) or frequent stop-and-go patterns (such as a garbage truck or school bus) are great candidates for electric replacement as those use patterns are most wasteful in ICE vehicles;
- ▶ **Available electrified alternatives** - The City should evaluate the costs and reliability of available electric alternatives against newer ICE or HEV models.
- ▶ **Grid and electric system compatibility** - The City should ensure that it is able to install the necessary EVSE at appropriate facilities to charge the EV replacement vehicle to at least 80% charge between uses.
- ▶ **Plans for On-Site Solar** - The City can get the most out of its investment in EVs and in renewable energy if it electrifies fleet vehicles that will be charging at facilities that are targeted for on-site solar installations, as the vehicles could essentially charge for free using energy generated on-site from the solar array.
- ▶ **Available Funding** - The City should put vehicles at the front of the line for replacement if special grants or financing programs are available for the specific vehicle category. This should especially be the case for heavier duty vehicles that have a higher ticket price.

The City may find that it is more economically practical to contract with a vehicle conversion professional to convert current fuel-based fleet vehicles to HEV, BEV or PHEV. Such conversions replace or supplement the ICE engine with an battery and/or motor.

Sustainable Jersey publishes a vehicle inventory spreadsheet that makes it easy to track the usage patterns, fueling costs, and emissions of vehicles in a municipality's fleet. Other similar tools are published by other providers as well, often at a cost.

FINANCIAL INCENTIVES AND SAVINGS

- ▶ At the time of this writing, the New Jersey Clean Fleet EV Incentive Program through New Jersey Clean Energy offers \$4,000 grants toward the purchase of light-duty BEVs, \$10,000 for class 2B through 6 BEVs, \$5,000 for public level-two chargers and, for overburdened communities, \$4,000 for level two fleet vehicle chargers.
- ▶ Municipalities can take advantage of tax credits for purchase of electric vehicles either by having the tax credit passed through directly from the vendor or through direct application for reimbursement from the federal government.
- ▶ Through the Regional Green House Gas Initiative (RGGI), NJ State agencies will occasionally offer grants for the replacement diesel powered medium and heavy-duty vehicles, such as school buses, garbage trucks, and the like, with electric alternatives. The most recent *Stop the Soot* grant cycle ended September 4, 2023. Overburdened communities receive priority in the grant program. **The City should continue to monitor for future rounds of this grant program.**
 - ▶ The NJ ZIP program operated through the NJ EDA provides between \$20,000 and \$175,000 in assistance to acquire a new zero-emission vehicle. Base voucher amounts will depend on vehicle class; however, overburdened communities are eligible for a 10% increase in voucher value, and there is a 25% increase available for school buses. **Phase 2 (2023) is closed; however, the City should continue to monitor for future phases.**
- ▶ NJ Municipalities are also eligible for sale tax exemptions for new or used Zero Emission Vehicles (ZEVs) sold, rented or leased in the State.
- ▶ Plainfield can advocate for or join a collaborative of municipalities and agencies in Union County to collectively bid for electric vehicles in order to achieve a discounted prices. Municipal collaboratives

Incentive programs and mechanisms to reduce the costs of EV acquisition after adoption of this Plan may differ from those listed here. The City will need to assess the usage and maintenance patterns of their vehicles against the available incentive programs to determine which programs offer the greatest payoff.

OBSTACLES AND BARRIERS

Some of the obstacles and barriers that the City may face in this initiative include:

- ▶ Eligibility of desired vehicles for grants, incentives, or legal obstacles to municipal acquisition;
- ▶ Competition for grants and covering municipal portion of costs of acquisition;
- ▶ Costs and logistics associated with acquiring or leasing specialized vehicles like fire and garbage trucks;
- ▶ Ability to synchronize installation of charging/fueling equipment with acquisition of alternative fuel or electric vehicles.

NEXT STEPS

1. The City's Fleet Manager will oversee a periodic, system-wide assessment of the condition of the City's vehicle fleet including taking account of the costs of maintaining and fueling those vehicles, known problems and pending service or repairs, and information such as odometer readings, actual gas

mileage, and other available data reflecting the condition and efficiency of the vehicle.

2. The Fleet Manager will identify the vehicles which are highest priority for replacement based on the assessment and use of software that compares the cost of an EV replacement with their PHEV, HEV, and ICE alternatives.
3. The Fleet Manager will work with the City's Grant Writer to monitor for funding opportunities to offset the cost of vehicle electrification, and keep the Fleet Manager apprised of all such programs.
4. The Fleet Manager will coordinate with the CFO and Administrator to apply for funding support for EV purchases.
 - a. City will aim to replace a number of vehicles up to the maximum number eligible for funding support.
 - b. The City will simultaneously pursue funding assistance for the installation of appropriately-powered EVSE at the facilities where the funded EVs or PHEVs will typically be parked or stored.

1.5 IMPROVE MUNICIPAL FLEET EFFICIENCY

The City can take a number of actions to make its fleet more efficient beyond electrifying its vehicle fleet. These include:

- ▶ **Idle Reduction Technology** - Installing Idle reduction equipment into fleet vehicles that are expected to remain in operation for at least five years. Idle reduction equipment temporarily shuts off a vehicle's engine while idling while powering electronic devices like air conditioning and audio at full or reduced performance on battery power. An "Idling Reduction Savings Calculator" worksheet is included in the appendices to this Plan.;
- ▶ **Behavior Changes** - Training or educating police, public works, and other municipal personnel on efficient driving and idling practices;
- ▶ **Low Rolling Resistance Tires** - According to the US Department of Energy, "Rolling resistance is the energy lost from drag and friction of a tire rolling over a surface. The phenomenon is complex, and nearly all operating conditions can affect the final outcome. Conventionally fueled passenger vehicles use about 4%–11% of their fuel just to overcome tire rolling resistance. All-electric passenger vehicles can use approximately 25% of their energy for this purpose. For heavy trucks, this quantity can be as high as 30%–33%. A 10% reduction in rolling resistance would improve fuel economy approximately 3% for light- and heavy-duty vehicles. Installing low rolling resistance tires can help fleets reduce fuel costs. It's also important to ensure proper tire inflation." Establishing a

Coordinate the strategic replacement (or retirement) of vehicles, scheduling of preventative maintenance, and improvement of driver efficiency to reduce the GHG footprint of all municipal fleets – public works, police, fire, etc. Requires tracking of fleet data such as age of vehicles, duty cycle, and use patterns.



"Fleet Inventory" Action

Note 1. Idle Reduction Types

University of Massachusetts, Amherst, Center for Agriculture, Food, and the Environment, identifies these types of IRT:

- Idle Limiter – The simplest form of IRT, this mechanism turns a vehicle's engine off after it has been idling for a predetermined period of time.
- Electronic Stop/Start System – An electronic device that monitors vehicle battery levels while the engine is off, but appliances are in use. Once battery levels drop below a certain point, the device turns the engine on for a set amount of time to recharge the battery, and then turns the engine off again.
- Auxiliary Power Unit (APU) – A small secondary power source that allows a vehicle's electronic appliances to be used when the primary engine is not running. APUs can be powered using the vehicle's main fuel supply, a small separate fuel tank, alternative fuel, rechargeable batteries, or rooftop solar panels.
- Fuel Operated Heater (FOH) and Battery Air Conditioning System (BAC) – Small independent heating and cooling systems. FOHs can operate on a range of fuels, including gas, diesel, and alternative fuels. BACs are powered with rechargeable batteries,

City-wide policy to only replace fleet vehicle tires with low rolling resistance tires can help to reduce fuel consumption for medium and heavy-duty internal combustion vehicles.

- ▶ **Speed Control Modules** - Contract with an appropriate vendor to set speed limits on non-emergency vehicles to prevent vehicles from driving inefficiently. According to the US Department of Energy, every 5 MPH over 50 MPH on a light duty vehicle equates to costing an additional \$0.25 per gallon of fuel. That amount varies by vehicle type and age.
- ▶ **Select Smaller Vehicles Where Available** - Lighter weight vehicles use less fuel and can often meet the same needs as their larger counterparts (consider, for example, a Ford Escape instead of the larger Ford Explorer).

which can be charged by the engine while it is running, or by rooftop solar panels. These two systems are frequently utilized together.

- Plug-in Hybrid Systems – Rechargeable battery systems can be installed to run power take-offs, bucket truck lifts, dump truck hydraulics and other truck equipment, even when the engine is off.”

OBSTACLES AND BARRIERS

The most significant obstacle to making the City's fleet more efficient through interventions such as those listed above will be buy-in from Department Heads or fleet drivers.

NEXT STEPS

1. Consistent with the steps for initiative 1.4, the Fleet Manager will maintain an inventory to track fleet usage and costs and other information to identify prime targets for electrification, and monitor grant and funding opportunities.
2. The Green Team will work with Department heads to post fuel-efficiency literature in common areas used by fleet driving personnel;
3. The Fleet Manager will work with Department Heads to train fleet drivers on efficient driving practices and to identify fleet efficiency solutions that are most achievable and appropriate each department's needs and capabilities.
4. When replacement of existing vehicles with electric options or conversion of existing vehicles to electric or plug-in electric propulsion is not feasible, the City will investigate installing fuel-efficiency improvement technologies into newer existing vehicles or replace older vehicles with more fuel efficient alternatives.

1.6 INSTALL PUBLIC EV CHARGING INFRASTRUCTURE

Public EV charging infrastructure can be installed on municipal properties that are open to the public as well as in public rights-of-way. Municipalities can also appeal to State and County agencies to install public EVSE at transit parking areas or other facilities that the City itself does not have ownership of.

Install electric vehicle charging infrastructure, including chargers, signage, and safety and accessibility features, for public use.



“Public Electric Vehicle Charging” Action

Based on guidance from Sustainable Jersey, the U.S. Department of Energy's Alternative Fuels Data Center (https://afdc.energy.gov/fuels/electricity_ev_readiness.html#select-locations), and other experts, Public EV is most effective when installed in places where it can be used by:

1. Commuters parking at or near transit stops during the day;
2. Workers who park on public lots or curbs spaces during the workday;
3. Apartment dwellers in older buildings that either have no parking or parking without EV spaces;
4. Shoppers, diners, and visitors to public facilities like courts and libraries.

TYPES OF EVSE

The type of EVSE to be installed will depend on the fleet's needs and the current and potential capability of the site's electrical systems. There are three basic categories of EVSE based on the maximum amount of power the charger provides to the battery. See "Note 2. Typical EVSE Charger Levels" on page 28.

Level 1 chargers can charge 16 to 40 miles of driving in an 8-hour work day based on the 2 to 5 miles of range per hour stated in the previous section, and even for fleet vehicles with substantial downtime between uses. From a public use perspective, these are ideal in public lots used by rail commuters or local workers who will park their vehicles in those lots for at least 6 hours.

Level 2 and DCFC chargers are ideal for vehicles that drive many miles per day and/or have minimal downtime between uses, such as emergency vehicles or public users who are charging their vehicles while shopping, dining, or using a public or private service.

Public charging stations with DCFC or Level 2 charging should be located in public areas where EV users are likely to leave their vehicles while shopping or enjoying services for up to a few hours. DCFC chargers can charge a car to 80% in 30 minutes, which makes them ideal along highways where drivers may need to recharge quickly, but overpowered for situations where vehicles may be left at the charging station for more than 30 minutes.

NETWORKED VERSUS NON-NETWORKED CHARGERS

In addition to the power level categories, EVSE come in "networked" and "non-networked" formats. Networked EVSE have a higher up-front cost and costs for the benefit of being connected to a telecommunications network, but also provide benefits such as allowing fleet managers to monitor charging activity or for the municipality to payments for public charging through a program membership. Some hosts of networked charging stations have found that the costs of the network connection exceed the benefits. Non-networked chargers can also accept payment through credit cards and other traditional forms of payment; however, this must be assessed on a case by case basis.

FINANCIAL INCENTIVES AND SAVINGS

At the time of this writing, the New Jersey Clean Fleet EV Incentive Program through New Jersey Clean Energy offers \$4,000 grants toward the purchase of fleet Level 2 EV Charging Stations and \$5,000 grants toward public Level 2 EV Chargers, with a limit of 2 charging stations in a grant period for areas with populations of less than 20,000 persons. Up to \$50,000 may also be available for one DCFC charging stations. Overburdened municipalities like Plainfield are eligible for an additional 50% bonus to be provided in the form of either additional funding or additional eligible chargers. The City may also be eligible for additional rebates from PSE&G for DCFC infrastructure installation. EV charging equipment is also eligible for a 30% tax credit (Alternative Fuel Vehicle Refueling Property Credit), further reducing the costs to the City.

Note 2. Typical EVSE Charger Levels

As summarized by the Delaware Valley Regional Planning Commission:

- "Level 1: Provides charging through a 120 V AC plug and does not require installation of additional charging equipment. Can deliver 2 to 5 miles of range per hour of charging. Most often used in homes, but sometimes used at workplaces. Level 1 charging at home or work may be able to provide adequate charging for most commuters.
- Level 2: Provides charging through a 240 V (for residential) or 208 V (for commercial) plug and requires installation of additional charging equipment. Level 2 can deliver 10 to 20 miles of range per hour of charging. Used in homes, workplaces, and for public charging.
- DC Fast Charging (DCFC): Provides charging through 480 V AC input and requires highly specialized, high-powered equipment as well as special equipment in the vehicle itself. DCFC can deliver 60 to 80 miles of range in 20 minutes of charging. Used most often in public charging stations, especially along long-distance traffic corridors. The cost for DCFC generally makes it too expensive for everyday use. Note that if you think you may need to use DCFC, be sure that the vehicle you purchase has fast charging provisions installed. For some vehicles this is an option. For the 2021 Chevrolet Bolt, this option has an MSRP of \$750. Plug-in hybrid electric vehicles typically do not have fast charging capabilities."

OBSTACLES AND CHALLENGES

The first challenge faced by a municipality looking to install fleet or public charging stations is identifying the locations where chargers will be most convenient and cost effective based on costs to install and power the equipment and proximity to places that EV drivers will likely visit. The second is determining the most efficient and reliable form of ownership - whether the equipment will be the City's responsibility or that of a third party. After installation, the challenges include possibility of vandalism or misuse requiring repairs and maintenance, and monitoring for potential issues and to measure performance.

MEASURES OF SUCCESS

The City will strive to install public EV charging infrastructure at a rate of at least two (2) stations per 10,000 residents over the next three to five years.

NEXT STEPS

1. The City will conduct feasibility studies to identify the optimal locations to create a local public EV Charging network with a focus on publicly owned parking lots and public rights-of-way under local control, including the preliminary study included within this Plan;
2. The DPW Director will assess the infrastructure of buildings, parking facilities, and rights-of-way in priority areas for EVSE, and establish a list of the sites most immediately ready for infrastructure;
3. The DPW Director will work with the City's Grant Writer to monitor grants and assistance for public EV charging infrastructure;
4. The DPW Director will coordinate with the City's finance, administrative, and engineering staff and professionals to install the funded equipment and identify and implement the ownership model;
5. The Green Team and City staff will raise public awareness of the City's EV charging network through social media, news letters, and other communications;
6. DPW Director will monitor usage of EV Charging facilities to evaluate the success of the initial installations and take away lessons for future installations.



LEVEL 2 CHARGING		
Program	 NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION It Pay\$ to Plug In	 Electric Vehicle Charging Program
Eligibility	Multi-Unit Dwelling, Publicly accessible, Workplace, Fleet	Multi-Unit Dwelling and Publicly accessible L2. (<i>Workplace and fleet chargers are NOT eligible unless they're publicly accessible</i>)
Incentive	Up to \$4,000 per L2 port (min: 2, max: 20 per location)	Up to \$7,500 per L2 stub (make-ready meter-to-stub) Plus up to \$10,000 per site (make-ready – service upgrade)
Eligible Costs	Purchase of charging station(s) and associated	Make-ready meter-to-stub includes service panels, junction boxes, conduit,

Figure 10. NJDEP's 2023 Level 2 Charging Incentive Comparison Table, last updated January 2023

1.7 ENCOURAGE NON-MUNICIPAL FLEETS TO IMPROVE EFFICIENCY

After establishing its own fleet replacement and fleet efficiency schedule and policy/program, and demonstrating its efficacy by achieving one or more measures of success, the City will publicly promote the positive outcomes of its fleet- efficiency undertaking and conduct specific outreach to businesses in the City to promote similar practices and make them aware of the financial incentives available to them.

Contact local commercial fleet managers to start conversation about strategically replacing (or retiring) vehicles and improving driver efficiency to reduce their fleet GHG footprint. Offer resources to ease the process, such as procurement tools and incentive information.



“Meet Target for Green Fleets” Action

“Fleet Inventory” Action

OBSTACLES AND CHALLENGES

Buy-in from local businesses will be a challenge, particularly as it may be challenging to connect to owners

or managers with authority to change fleet efficiency, such as may be the case with national chains.

NEXT STEPS

1. The Green Team will create marketing materials benefits of fleet electrification and financial assistance available for transition. This may include information about the City's own fleet electrification progress;
2. The Green team will coordinate with the governing body, administration, clerk, finance, and other departments, as well as local business organizations to distribute materials through regular mailings, social media posts, City website, email blasts, and events.
3. The Green team will partner with the City's Downtown Improvement District and other local business groups to organize meetings with business owners and managers.

1.8 ENCOURAGE WORKPLACE EV CHARGING INFRASTRUCTURE

One of the best ways to increase the availability of electric vehicle charging infrastructure in the City is to reach out to the owners and operators of the buildings where people work in the City. New multi-family residential buildings and commercial buildings are required by statute to provide EV or EV-ready parking spaces. However, the City can use its influence to encourage business owners and commercial property owners to voluntarily provide EV charging infrastructure for their employees.

Meet with local employers to ask them to install workplace EV charging. If possible, offer incentives such as promotion in municipal communications, a “ribbon cutting” event with public officials, and/or a fast-tracked permitting process.



“Make Your Town EV Friendly” Action



“Electric Vehicle Outreach” Action

Over the three- to five-year outlook period of this Plan, the City will aim to reach at least five (5) local employers. Measures of outreach success will include at least three workplace EV chargers installed as a result of the outreach, or a rate of at least two workplace chargers per 100 businesses.

OBSTACLES AND CHALLENGES

Property owners and managers often do not understand the benefits of providing EVSE, or the financing programs available to make them more affordable. Additionally, many businesses in urban settings are renting their facilities and have limited influence or decision making when it comes to making facilities improvements. Ownership structures of commercial buildings may also result in complex chains of command and communication that limit the success of outreach initiatives.

STRATEGIES AND NEXT STEPS

1. The City's Green Team will create promotional materials, including inserts to provide with utility bills and tax mailers to commercial property owners/managers, advertising the financial incentives for EVSE on commercial properties and the benefits of having EV parking spaces, and offering a promotional opportunity, such as a ribbon cutting with a City official and publication on the City's website and social media pages.
2. The Green Team will partner with the Downtown Improvement District and other local organizations to identify opportunities to communicate directly to businesses and commercial property owners on this initiative.
3. The City will also instruct its Grant Writers to monitor grant opportunities that encourage partnerships between municipal governments and private property owners to install EVSE on private properties.

OTHER INITIATIVES: LANDLORD OUTREACH

Included as part of its other outreach efforts, the City will use regular communications, bill inserts, and other media and tools available to educate landlords about grants offered by the New Jersey BPU of up to \$6,000

for owners and operators of “multi-unit dwellings” (MUD) in overburdened municipalities like Plainfield for the purchase of up to six (6) Level 2 charging stations, as well as other incentives available to landlords to offset the cost of EVSE.

PUBLIC CHARGING FEASIBILITY ANALYSIS

The City wishes to establish a network or networks of public electric vehicle charging infrastructure. EV charging stations can be installed in parking lots and along rights of way. As part of the preparation of this Community Energy Plan, DMR Architects conducted an analysis using publicly available geographic information system data, which was mapped to help to identify areas within the City which are most suitable for investment in the creation of public EV charging infrastructure.

Data collected for this exercise included:

- The Community DCFC (DC-Fast Charging) Suitability Score data published by the NJ Department of Environmental Protection, which scores Census Tracts on their suitability for Fast Charging infrastructure;
- Corridor DCFC Charging Suitability Score data published by the NJ Department of Environmental Protection, which scores stretches of highway corridors for their suitability for Fast Charging infrastructure;
- Estimated jobs by Census Block, from the Longitudinal Employer-Household Dataset published by the U.S. Census Bureau via their OnTheMap web-mapping tool, which represents an estimate of the number of persons employed in a Census Block;
- Parcels occupied by public, commercial, industrial, and multi-family uses, based upon 2022 property data published by the County, which helps to visualize shopping, workplace, and residential clusters;
- The locations of publicly owned parking lots and municipal buildings.

The data suggests that the most suitable areas in the City for the City to invest its efforts into creating a public EV charging network is the area around NJ Transit’s Plainfield train station. This area allows the City to reach a diverse customer base including commuters who park near the station, employees and patrons of businesses in and around the downtown, municipal employees and people seeking municipal services, visitors to the arts center, people attending religious services, and residents of multi-family buildings who may not have access to on-site charging infrastructure. The DCFC Charging Suitability data from the NJ DEP also suggests that the corridor along East Front Street between the Plainfield Station and Netherwood Station may be a stronger candidate, likely due to socio-economic data and data on EV ownership which is partially influenced by neighboring municipalities.

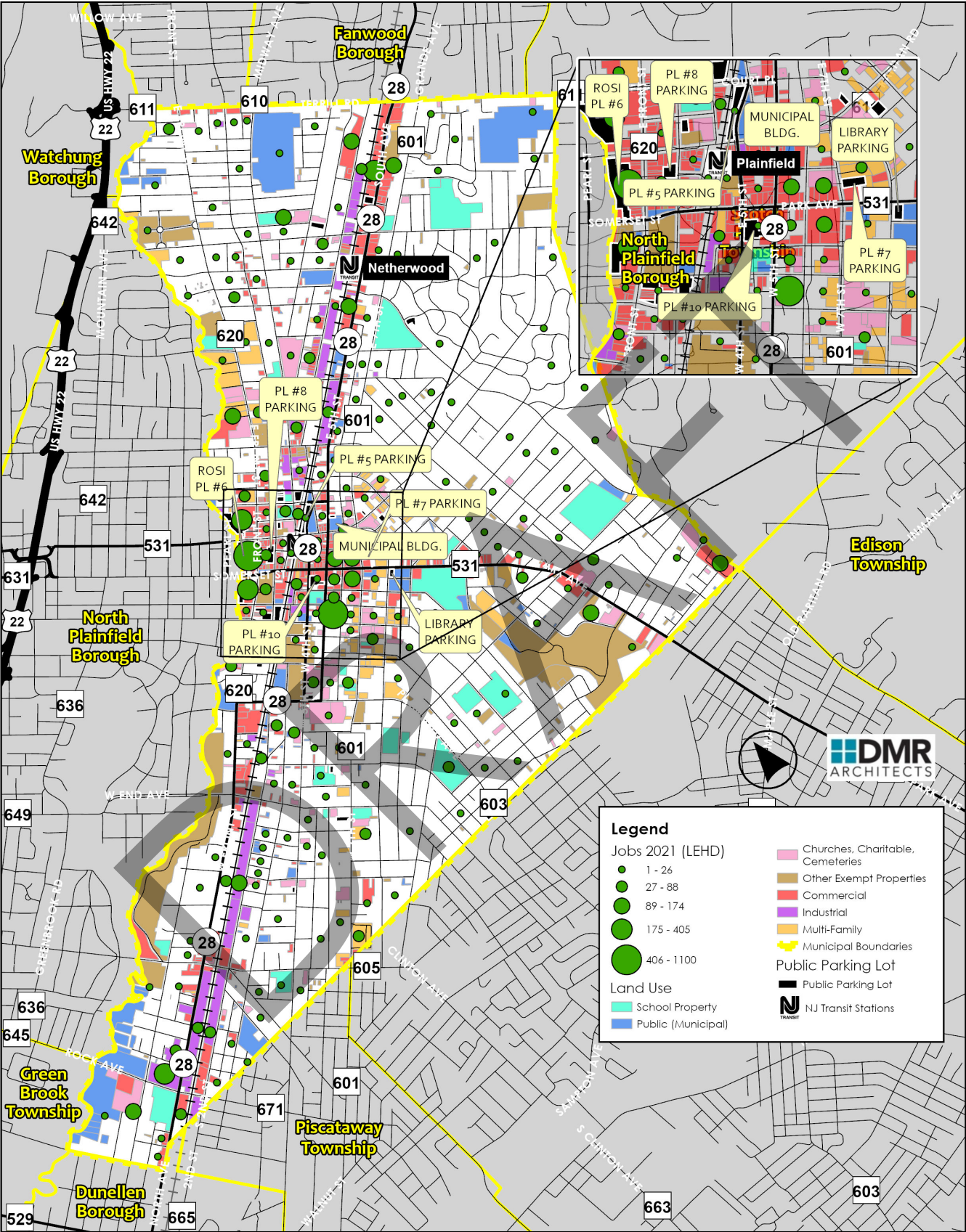
It is the recommendation of this analysis, based upon the data above, that Parking Lot 8 (located on East 2nd Street between Park Avenue and Watchung Avenue) is an ideal location for early installations of public EV spaces on municipal properties for the purpose of serving shoppers, businesses, commuters, and residents. Lot 5 (along East Fourth Street between Roosevelt Avenue and Watchung Avenue) and Lot 10 (located on West 5th Street, south of Park Avenue) are ideally situated but are limited to use by commuters and permit holders, respectively. Lot 7, at the corner of East 7th Street and Park Avenue, benefits from proximity to houses of worship, businesses, and multi-family housing, but is not likely to attract commuters. Other locations in the Downtown, such as the municipal building parking lot, police station, and library should also be considered early on as they can serve municipal employees and people seeking municipal services. Parking Lot 6, behind East Front Street between Watchung Avenue and Somerset Street, is a potential candidate for charging stations but is lower priority due to being in a less central location.

As publicly-owned parking lots in the downtown are largely limited to use by municipal employees, much of the public parking takes place on the street. The City could install curbside EVSE along streets under local jurisdiction, such as East Fourth Street or Watchung Avenue. It may also consider working with Union County, the NJ DOT, and New Jersey transit to install curbside charging spaces on Park Avenue and Front Street and in the Plainfield Station parking lot, which are not under the City’s jurisdiction, and work with churches and owners of private parking lots in the Downtown to install EV spaces using funds the City may be able

to obtain through grant funding.

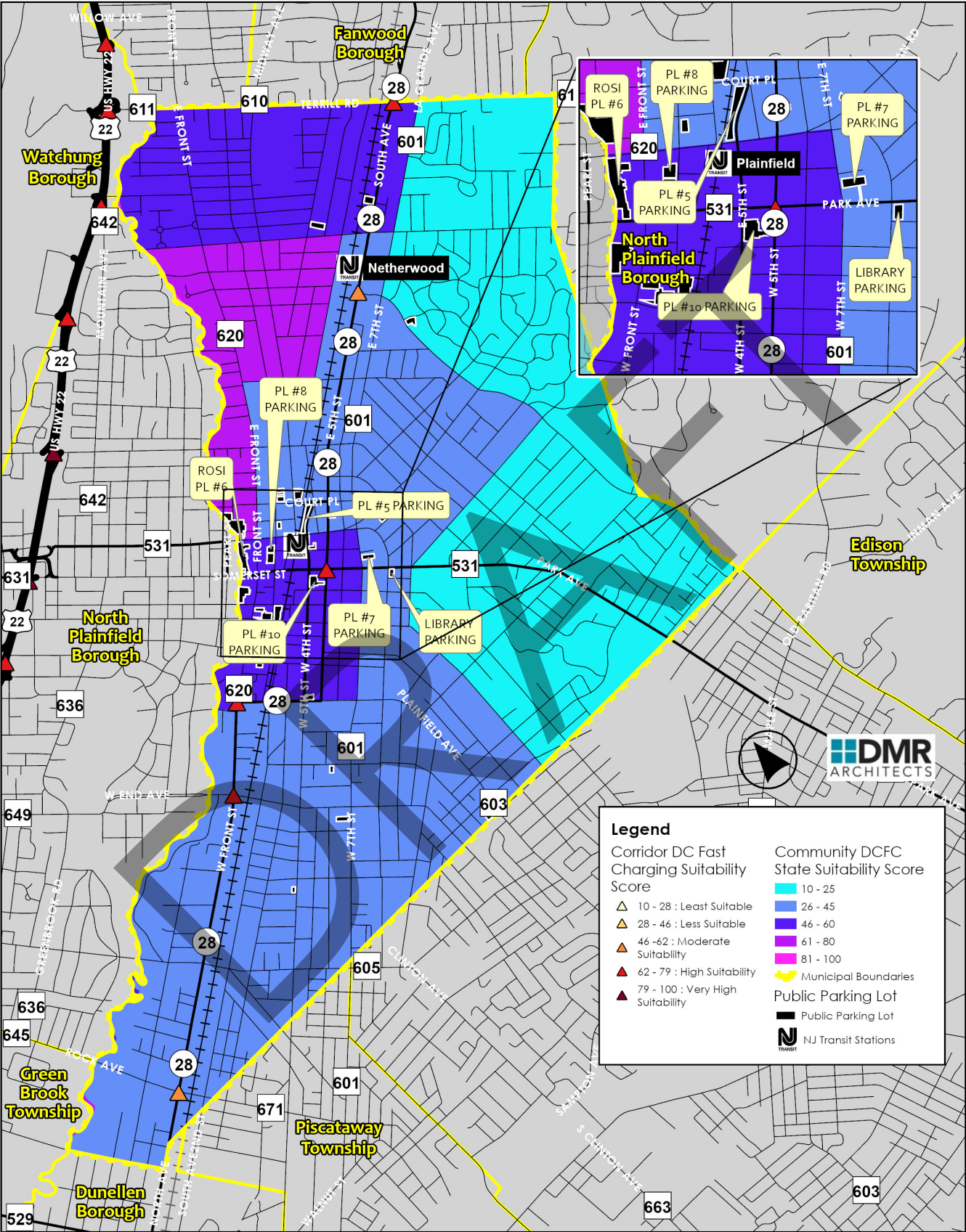
The City will need to employ a qualified professional to assess the availability and adequacy of existing infrastructure to support charging equipment on any public lots or in public rights-of-way, or to analyze the costs and benefits and potential usership of specific EV charging locations. The level of charger (Level 1, Level 2, and DCFC) may also depend on the target user. A commuter that parks for over eight hours a day in a commuter lot may only need a Level 1 or Level 2 charger to achieve a full charge while parking, whereas someone patronizing a local store or restaurant may park for up to two hours and may need a Level 2 or DCFC charger to charge their vehicle. Many chargers add an extra fee for time parked after the vehicle is charged.

DRAFT



Map 4. Public EV Site Suitability Analysis Map - Existing Conditions. Demand factors including proximity to high-intensity uses and employment.

1 • REDUCE ENERGY CONSUMPTION AND EMISSIONS FROM TRANSPORTATION



Map 5. Public EV Site Suitability Analysis Map - Fast Charging Suitability. DCFC Suitability as measured by NJ DEP.

1 • REDUCE ENERGY CONSUMPTION AND EMISSIONS FROM TRANSPORTATION

STRATEGY 2: ACCELERATE DEPLOYMENT OF RENEWABLE ENERGY AND DISTRIBUTED ENERGY RESOURCES

The goal of Strategy 2 is to expand the adoption of solar-generated electricity and other forms of microgeneration by the City and by City residents and businesses. Actions include adopting ordinances to remove barriers to private and community solar projects, installing solar energy systems on City properties, and reducing obstacles to accessing clean energy, particularly among the City's LMI residents.

A core component of the success of Strategy 2 is a type of program called community solar. Solar energy installations come in a few different forms. Private solar, such as rooftop panels installed on a home or a warehouse, provide on-site electricity and sell whatever is left over to the grid, providing a credit on the property-owner's utility bill. Utility providers, such as PSE&G, can also install solar energy systems which contribute to the total grid electric production. Community solar is a system in which a property owner can develop solar energy infrastructure on their property, or lease land or roof area to another party to develop the infrastructure, and allow residents and businesses to subscribe to a portion of the energy generated, which is credited to their utility bill proportionate to the amount of solar energy that they have subscribed to. Municipalities can facilitate the development of community solar by hosting large scale solar developments on public properties or ensuring that their ordinances permit large scale solar developments.

The specific Strategy 2 Initiatives to be pursued by the City include the following:

- ▶ **2.1 Adopt Supportive Zoning and Permitting for Private Solar** - Provide clear guidance/standards for solar developers and limit barriers to solar adoption such as lengthy permitting and multiple reviews.
- ▶ **2.2 Post Solar Permitting Checklist** - Provide clear guidance/standards for solar developers with a permitting checklist that can be easily found on the municipality's website. Solicit feedback from users and revise checklist based on comments.
- ▶ **2.3 Adopt Zoning and Permitting for Community Solar** - Update municipal zoning ordinances to specifically allow large-scale solar projects, and designate future community solar sites as redevelopment zones. Consider offering direct assistance with permitting, expediting the permitting process, and/or reducing permitting fees for community solar.
- ▶ **2.4 Train First Responders on Solar** - To further public confidence and maintain emergency preparedness, require training on solar infrastructure for first responders.
- ▶ **2.6 Install On-Site Municipal Renewable Generation** - Host a solar, wind, or geothermal project on municipal property to generate renewable energy for municipal facilities. Such projects can be leased from a developer or purchased and owned outright.

2.1 ADOPT SUPPORTIVE ZONING AND PERMITTING FOR PRIVATE SOLAR

The City will ensure that private solar is clearly permitted as an accessory use in the City, and limit regulatory language to reduce unnecessary barriers like added costs and outdated technological standards.

Provide clear guidance/standards for solar developers and limit barriers to solar adoption such as lengthy permitting and multiple reviews.



"Make Your Town Solar Friendly" Action

A supportive zoning ordinance for private solar infrastructure will establish only the minimum necessary standards to protect public health, safety, and welfare. Sustainable Jersey publishes a document entitled "Guidance for Creating a Solar Friendly Zoning Ordinance" which outlines the "Dos" and "Don'ts" of drafting ordinances surrounding solar. Some of key takeaways of this are:

- ▶ The ordinance should avoid setting standards or definitions specifying types of technology, models, standards, or electrical sizes as they may become outdated or may not be applicable to all situations;

- ▶ The ordinance should not be overly burdensome, such as requiring site plan approval for all solar equipment. For example, solar facilities should not be conditional uses.
- ▶ Permitting fees for solar installations should be minimal and should not exceed fees established in N.J.A.C. 5:23-4.20(c)2.iii(13).
- ▶ The guide includes ordinance-friendly definitions which Sustainable Jersey believes will minimize confusion or obstructions to solar proliferation.
- ▶ To the extent that the ordinance provides standards for solar facilities, the standards should be distinct for ground-mounted / freestanding versus roof-mounted equipment.
- ▶ Avoid abstract language regulating the visual impact of solar on a neighborhood.

The above referenced guidance document is contained in the appendices to this Plan.

Adopting a solar supportive ordinance is a quick, low-cost action that the City can take shortly after the adoption of this plan.

OBSTACLES AND CHALLENGES

The City should anticipate that members of the public may have concerns about the appearance of solar panels and their related equipment.

NEXT STEPS

1. The City's planners will draft a solar permitting ordinance and permitting documents that establish requirements for private solar;
2. Planners will coordinate with other departments to ensure that permitting documents are satisfactory to permitting and enforcement staff, determine whether to eliminate or expedite the permitting process, and establish reasonable fees for permitting which do not deter private solar installation;
3. Ordinance and permitting documents will be adopted through the duly required process.

2.2 POST SOLAR PERMITTING CHECKLIST

Permitting checklists help both developers and the parties responsible for reviewing their development applications stay cognizant of the major requirements of municipal ordinances and policy documents. Solar permitting checklists help to reduce obstacles to residents and other solar installation applicants who are not familiar with development processes.

Provide clear guidance/standards for solar developers with a permitting checklist that can be easily found on the municipality's website. Solicit feedback from users and revise checklist based on comments.



"Make Your Town Solar Friendly" Action

The Interstate Renewable Energy Council provides the following guidance for Application checklists:

- ▶ List required forms, such as building permit application form, and where they can be located
- ▶ List and describe required diagrams or plans, including the number of copies needed
- ▶ List any other required documentation, signatures or approvals
- ▶ Describe the fee structure and options for payment
- ▶ Provide online or in-person application submittal instructions
- ▶ Provide information about office hours, and appropriate staff contacts
- ▶ Include citations to relevant code or other sources as much as possible for the applicant to reference

And the following guidance for review-side checklists:

- ▶ List the information required in advance of the inspection

- ▶ List what the inspector will look at on-site and what requirements are expected to be met
- ▶ Consider dividing checklist into appropriate sections, such as utility service/AC power source, inverter, arrays/modules, and grounding/bonding
- ▶ Explain who needs to be there and what applicant can expect during the inspection
- ▶ Provide information about office hours, and appropriate staff contacts
- ▶ Include citations to relevant code or other sources as much as possible for the applicant to reference

An example of the Boulder, CO solar permitting checklist is included in the exhibits to this plan.

NEXT STEPS

1. The City's planners will work with relevant staff to prepare a checklist corresponding to the solar ordinance and other City codes, and meeting the guidelines from Sustainable Jersey and its sources.
2. The checklist will be adopted by the appropriate means and posted in a public location and on the City's website.
3. The City will update the permitting documents on an as needed basis to address challenges identified by users of the checklist.

2.3 ADOPT ZONING AND PERMITTING FOR COMMUNITY SOLAR

This initiative is similar to the prior two and, in fact, may be adopted simultaneously with the general solar permitting ordinance and checklist. Zoning and permitting for community solar differs from those for solar mounted on private properties for private purposes in a few ways:

- ▶ Private solar projects are developed at the scale needed to offset electric demand on that property, whereas community solar projects are developed at a scale to offset electric demand for multiple properties;
- ▶ Private solar is an accessory use to a residence or business whereas community solar may be seen as a principal use in that it is used to generate revenues for the property owner or lessee of the solar-mounting surface.

The principles for adopting solar friendly zoning and permitting are generally the same for community solar as for private solar – avoid language that may become obsolescent and avoid creating unnecessary standards or permitting steps.

Because community solar takes place at a larger scale than private solar (typically), and because there is an incentive by the developer to maximize that scale to serve more customers, it may be appropriate for the City to establish separate and more stringent regulations for community solar projects than for private solar installations; primarily setback limits to residential properties, screening, and security.

Going beyond simply zoning to allow large-scale solar installations,

Update municipal zoning ordinances to specifically allow large-scale solar projects, and designate future community solar sites as redevelopment zones. Consider offering direct assistance with permitting, expediting the permitting process, and/or reducing permitting fees for community solar.



"Municipally Supported Community Solar" Action



Figure 11. How Community Solar Works;
Credit: Neighborhoodpower.com.

the City can maximize the benefits of community solar on private properties by permitting community solar installations as a principal use in a designated redevelopment or rehabilitation area, as the development experiences a lessened tax burden through a Payment in Lieu of Taxes (PILOT) or a 5-year tax abatement, which can then be passed through to customers. The City can also City could reach out to the owners of the largest properties in the City to encourage them to install solar facilities for private use or to sell power back to the grid, such as in the form of a community solar installation.

OBSTACLES AND BARRIERS

The ordinance permitting community solar installations may need to reconcile any public concerns or perceptions of large-scale solar installation, such as through appropriate setbacks or screening requirements.

NEXT STEPS

1. The City will authorize its planning consultant to amend the City's zoning ordinance to permit large-scale solar arrays as a principal permitted or conditional use on private properties.
2. The permitting ordinance will be duly reviewed, adopted, and enforced by the relevant governing bodies, boards, staff, and professionals.

2.4 TRAIN FIRST RESPONDERS ON SOLAR

The personnel responsible for emergency response or for inspecting and permitting solar installations may not be familiar with solar energy systems and the fire safety and suppression considerations unique to those systems. The City can require training for these staff on how to address this technology, in order to ensure the safety of City residents and workers. Such training programs are offered by a number of institutions for use by municipal staff in various roles.

To further public confidence and maintain emergency preparedness, require training on solar infrastructure for first responders.



"Make Your Town Solar Friendly" Action

Sustainable Jersey identifies three providers for training courses for municipalities to consider:

- ▶ Kean University's Fire Safety Training Program;
- ▶ US Department of Energy associated SolSmart, which provides webinars and virtual training resources;
- ▶ IREC's Clean Energy Resources and Training, which provides webinars and virtual training resources.

OBSTACLES AND BARRIERS

Department heads will need to identify the training program more appropriate to their needs.

NEXT STEPS

- ▶ OEM Director to instruct emergency response chiefs to require their staff to complete training related to emergencies associated with solar.
- ▶ The OEM Director will work with those department heads to identify the most appropriate training program for their needs and capabilities.

2.6 INSTALL ON-SITE MUNICIPAL RENEWABLE GENERATION

MUNICIPAL PROPERTIES

The City and the Plainfield Board of Education own a number of properties that may be suitable to generate solar energy. Several schools are already host to rooftop solar installations. Google's Project Sunroof, a mapping service that calculates

Host a solar, wind, or geothermal project on municipal property to generate renewable energy for municipal facilities. Such projects can be leased from a developer or purchased and owned outright.



"Municipal On-Site Solar System" Action

potential solar electricity generation and savings, estimates potential average electric generation from rooftops on the above listed sites at 14.19 Watts per available square foot of roof area, and provides estimates of available roof space at addresses entered into the system.

City Hall at 515 Watchung Avenue has an estimated 3,647 square feet of roof area according to the service, which could theoretically support a 51.75 kW system based on 14.19 W/s.f. The service also estimates that the building receives 1,442 hours of usable sunlight in a year, potentially generating 74,630 kWh a year or 6,219 a month. For comparison, the Maxson Middle School building, which Sunroof estimates as having over 40,000 square feet of usable roof space, is currently host to a 123.17 kW system, and the High School at 950 Park Avenue has over 147,000 s.f. of usable roof space and is host to an 874.92 kW system.



Figure 12. Screenshot of Google Project Sunroof graphic for City Hall. Yellow indicates greater sun exposure, brown indicates less sun exposure.

Many of the City's public properties have an abundance of surface parking area, which can be equipped with solar canopy systems over parking spots. These tend to cost more to install than roof systems as they require more costly mounting equipment and may cost more to connect to electric infrastructure. On the other hand, roof mounted systems, only requires roofs to be in good condition. Project Sunroof does not estimate the capacity of parking lots or other ground areas for solar installations.

COSTS

According to a representative of a commercial solar installer, the approximate cost to install solar on a non-residential building is \$2.85 per watt, or \$2,850 per kilowatt.

Sustainable Jersey's "Municipal On Site Solar System" action guide estimates an average maintenance cost for solar infrastructure at "\$10-20 per kW per year".

MODES OF OWNERSHIP

The following is taken from Sustainable Jersey's "Municipal On Site Solar System" action guide:

- ▶ *Municipally Owned Solar PV Systems: When a municipality purchases solar photovoltaic equipment outright, the project is no different than any other larger capital improvement project. This approach usually offers a better return on investment than financing the project with a lease or other arrangement. However, outright solar PV purchases present multiple challenges: acquiring immediate capital to cover upfront costs; managing procurement, permitting, and installation; and maintaining the system over time. The municipality is also tasked with capturing all available revenue from the project, which includes displaced utility purchase value and revenue from the sale of the Renewable Energy Certificates (RECs). See "Note 3. Renewable Energy Credits (RECs)" on page 40.*
- ▶ *Financed Solar PV Systems: Commercial financing products are a popular approach to implementing municipal on-site solar projects.*
- ▶ *Leased Systems: Under a leasing arrangement, the municipality pays a monthly leasing fee over a specific term to use the electricity generated by the panels, which are owned by a third party. With a PPA, the municipality contracts to purchase all the electricity that the (third party-owned) system produces at a known price for a fixed term. In both arrangements, there is typically an end-of-term buyout option and a robust maintenance agreement over the term.*

Energy consultants can help scope out the financing opportunities for a project. Some energy consultants structure their fees to be included in the project financing, allowing the municipality to avoid the fees as upfront cost."

It should be noted that the language above was written prior to the passing of the Inflation Reduction Act by the federal government in 2022, which allowed municipalities to directly receive the same benefits as the federal tax credit to private citizens and businesses through the "direct pay" model. This model makes ownership of a municipal renewable energy project a competitive alternative to leasing or PPAs.

Note 3. Renewable Energy Credits (RECs)

Vouchers of monetary value representing a megawatt-hour (MWh) of renewable electricity generation. In New Jersey, RECs acquired from solar installations are known as Solar Renewable Energy Certificates or "SRECs." As directed by the Clean Energy Act of 2018, New Jersey's original SREC Program was closed in 2020 and replaced with the Successor Solar Incentive (SuSI) Program that launched in mid-2021, which awards "SREC-IIs" for solar energy generation. Projects under 5 MW receive SREC-IIs via the Administratively Determined Incentive (ADI) Program. More information on SRECs, including the latest details on the SuSI Program, can be found at NJCleanEnergy.com/RE.

COMMUNITY SOLAR VERSUS ON-SITE GENERATION

With on-site generation of energy from a solar project on a City property, the City can directly utilize the energy generated from the installation, allowing it municipal operations to continue during power outages, while also generating revenues from the sale of RECs.

With a community solar installation on municipal property, however, the community solar provider owns and maintains the solar equipment, and electricity is sold directly to the grid. The benefits to the City through this model include lease payments from the community solar provider to the City, discounts to the City if it signs up as the anchor subscriber, and limited up-front costs to the City.

Based on discussions with a community solar provider, the minimum size for a successful community solar project is 30,000 to 50,000 square feet. According to NJDEP building coverage data, the only publicly owned buildings with roof areas greater than one-acre are school buildings, most if not all of which already have rooftop solar.

Sustainable Jersey provides guidelines for the process of launching a Community Solar program and the time frame thereof:

1. **Planning:** The process of forming a committee, hosting public meetings and stakeholder meetings, and determining the priorities and goals of the project – whether that may be generating revenue from municipal properties, providing low cost energy to LMI households, or something else – may take several weeks.
2. **Public Education and User Interface:** Educating the public about the program and creating the means for residents and businesses to sign up to participate could take 4 to 6 months.
3. **Selecting a Vendor/Partner:** The bidding, selection, and/or on-boarding process could take 2 to 3 months or longer.

LOW- AND MODERATE-INCOME INCLUSION

The NJ BPU requires all community solar projects to reserve 51% or more of their capacity for low- and moderate-income subscribers and to guarantee an energy bill credit discount of at least 15%, meaning that the energy purchased by a subscriber from a community solar project will cost 15% less than what it might have cost through the utility provider.

OBSTACLES AND BARRIERS

The condition and age of the infrastructure on municipal properties will affect the costs of installing solar

and may determine the mode of ownership and control over solar panels.

NEXT STEPS

1. The City will contract a qualified professional or firm to conduct a Solar Feasibility Study(ies) to determine whether one or more municipal buildings are suitable for rooftop solar, to assess economic benefits of solar against the costs to the City, to advise which buildings are suitable for Community Solar, and to identify incentives available to reduce the costs to the City related to installation for behind-the-meter use.
2. Based upon the study outcomes, the City will begin the process of either installing solar on select buildings for behind-the-meter use or partnering with Community Solar providers to host projects on municipal properties.
 - a. For behind the meter installations, the City will conduct a bidding process to select installers to erect and maintain the system and manage sale of renewable energy certificates.
 - b. For Community Solar projects, the City will conduct a bidding process to select a community solar provider.
3. Where appropriate, the City will authorize its planning professionals or staff to conduct redevelopment investigations of municipally owned properties to be considered for community solar in order to determine if those properties are eligible for designation as an area in need of redevelopment and to adopt a redevelopment plan permitting community solar and granting incentives for community solar development, in accordance with N.J.S.A. 40A:12A-1 et seq.
4. The City will use its outreach media and events to tout the economic and societal benefits from installing solar on a municipal building.

DRAFT

STRATEGY 3: MAXIMIZE ENERGY EFFICIENCY AND CONSERVATION AND REDUCE PEAK DEMAND

The goal of Strategy 3 is to take actions within the City's power to reduce energy usage by the municipality, residents and businesses. As technology advances, appliances, equipment, and construction materials become more energy efficient. The City can take direct action to upgrade its own facilities, and can launch public outreach initiatives to make the public aware of services and resources available from the state and from PSE&G to offset the costs of improving building energy efficiency.

- ▶ **3.1 Upgrade Energy Efficiency for Municipal Facilities** - Upgrade municipal facilities to be more energy efficient. New Jersey's Clean Energy Program and electric and natural gas utilities offers incentive programs that guide municipalities through the upgrade process, starting with free audits to establish the most effective measures to reduce energy use. Following implementation, showcase upgrades in energy efficiency outreach to local commercial entities.
- ▶ **3.3 Commercial Energy Efficiency Outreach Campaign** - Implement an outreach effort to help local businesses take advantage of energy efficiency incentive programs offered by New Jersey's electric and natural gas utilities, including the Direct Install (DI) program.

3.1 UPGRADE ENERGY EFFICIENCY FOR MUNICIPAL FACILITIES

An important piece of the City's energy strategy is reducing its energy consumption by replacing inefficient equipment, fixtures, and appliances and identify areas where energy is being wasted due to outdated building design or improper building maintenance. The City desires to achieve a 20% reduction in energy consumption from its most energy-demanding facility or 20% across all of its facilities.

Upgrade municipal facilities to be more energy efficient. New Jersey's Clean Energy Program and electric and natural gas utilities offers incentive programs that guide municipalities through the upgrade process, starting with free audits to establish the most effective measures to reduce energy use. Following implementation, showcase upgrades in energy efficiency outreach to local commercial entities.

INCENTIVES AND FUNDING PROGRAMS

LOCAL GOVERNMENT ENERGY AUDIT (LGEA)

The New Jersey BPU's Clean Energy Program's (NJCEP) LGEA program covers 100% of the cost of an audit of a municipality's building energy use, including "offices, courtrooms, town halls, police and fire stations, sanitation buildings, transportation structures, schools and community centers".

Buildings must have had an average peak demand of 200kW or greater in the past 12 months.

According to the website for the LGEA program, "The audit includes an inventory of all energy-consuming equipment, comprehensive utility bill analysis, facility benchmarking, and a screening for solar, combined heat & power, and electric vehicle charging stations. Add-on / targeted audit options as outlined in the program guide may also be available. When your audit is complete, you'll have a list of recommended, cost-justified measures and facility upgrades that will help reduce operating

Note 4. Energy Upgrade Types

- Direct Install - Provides turnkey energy efficiency solutions for small commercial customers, including local government facilities for municipalities and schools. Includes a free on-site energy assessment (similar to an ASHRAE Level I audit), energy efficiency upgrade recommendations, and an incentive of up to 80% of installed cost for completing those recommendations.
- Prescriptive Equipment - Offers simple rebates on a wide range of pre-qualified "standard" energy efficiency measures.
- Custom Equipment - Offers incentives for energy efficiency measures that do not fall under the Prescriptive Program.
- Engineered Solutions - Provides tailored energy efficiency assistance to larger public entities. Includes an investment grade (ASHRAE Level 3) energy audit, engineering design, bid-ready document development, installation vendor selection assistance,

expenses and, in many cases, improve the health and productivity of the buildings' occupants."

LGEA caps the audit cost reimbursement at the lesser of \$100,000 or 100% of the audit.

LGEA offers technical assistance to program participants to obtain older utility bills and to interpret utility bills as part of the audit process. LGEA audits are available for buildings owned or leased by the City.

An example of an audit report published on the LGEA web page is the Asbury Park municipal complex audit report, prepared by TRC, which provided the City of Asbury Park with two alternative scenarios for upgrading their facilities to reduce energy costs based on the time period for savings to be realized. It also identifies potential project financing incentives for suggested energy upgrades.

construction administration, commissioning, and maintenance and verification services to support the implementation of cost-effective and comprehensive efficiency projects.

- Energy Management - Helps identify and implement no and low-cost energy efficiency measures via equipment tune-ups and commissioning.



"Energy Efficiency for Municipal Facilities" Action

ENERGY SAVINGS IMPROVEMENT PROGRAM (ESIP)

The ESIP is an alternative method for local government units to finance energy conservation improvements, adopted by the State legislature in 2009 and amended in 2012. The program does not "fund" energy improvements; rather, it helps municipalities realize cost savings from efficiency improvements, at no cost to the taxpayer, by paying or the cost of the improvement over a 15 to 20 year period through a portion of the energy-cost savings.

The first step in the ESIP process is an energy audit, such as the ones reimbursed through LGEA. Subsequently, the municipality must prepare an Energy Savings Plan (ESP) that identifies existing systems serving the targeted buildings, such as boilers, HVAC, and appliances, and lays out direct energy saving strategies related to those systems. The ESP must show that the energy savings over the 15 to 20 year period will offset or exceed the total project costs. This process ensures that the municipality can finance the project(s) through just the energy savings.

DIRECT INSTALL

If buildings are not eligible for LGEA or ESIP, the City can apply to the Direct Install program provided by PSE&G for buildings with an average peak demand of less than 200kW over a 12 month period. The program includes a free on-site energy audit and covers up to 80% of the costs of installing more energy efficient systems. The municipality's burden of the cost (as little as 20%) is paid off over 5 years as a fee on the municipality's energy bill. Meanwhile, the program promises to cut energy costs by as much as 30%. See "Note 4. Energy Upgrade Types" on page 42.

MONITORING ENERGY USE

An essential part of the energy efficiency process is benchmarking - collecting and analyzing data on the energy usage in each building and comparing to buildings in similar categories in order to identify facilities that might be more wasteful than others. In the Fall of 2023, Sustainable Jersey and PSE&G offered a Technical Assistance program to assist municipalities in tracking building energy efficiency and pursue incentives for facility upgrades. The program also offers to set municipalities up with building portfolio management software to monitor energy use. The program also offers \$2,500 to assist with the municipal responsibilities related to this assistance, such as costs for staff or professionals to collect the requisite data for building energy monitoring. Sustainable Jersey anticipates future rounds for this program.

BARRIERS AND OBSTACLES

The condition of buildings targeted for improvement and the City's internal structure for managing, accessing, and monitoring data on energy consumption at a building level will impact the ease of implementing this

action.

NEXT STEPS

1. The City's DPW Director will work with Administration and the City's Grant Writers to seek technical and grant assistance from Sustainable Jersey to assemble energy usage data necessary to monitor energy usage;
2. CFO or DPW Director will utilize the portfolio management software established with Sustainable Jersey's assistance on a monthly basis to identify buildings that are under-performing with respect to energy efficiency;
3. The CFO or DPW Director will review the requirements of the LGEA, ESIP, and Direct Install programs to determine eligibility for worst performing buildings;
4. The City will retain an energy auditor through an RFP process or, in the case of Direct Install, use PSE&G's selected auditor;
5. City will seek funding or participate in the financial incentive programs to assist with implementing most applicable and cost effective recommendations of the energy auditor.

3.3 COMMERCIAL ENERGY EFFICIENCY OUTREACH CAMPAIGN

Commercial and industrial users consumed approximately one-third of all electricity and natural gas purchased in Plainfield in 2020. While more than 20% of one- to four-family housing units in the City had participated in an energy efficiency incentive program as of March 2021, only 8.54% of commercial and industrial properties had done the same. Encouraging businesses to make improvements that reduce their energy usage is, therefore, one of the most effective actions the City can take to reduce local energy consumption. The City will take the following actions with a goal of 10% of commercial and industrial property owners to make energy efficient upgrades to their properties:

Implement an outreach effort to help local businesses take advantage of energy efficiency incentive programs offered by New Jersey's electric and natural gas utilities, including the Direct Install (DI) program.



"Commercial Energy Efficiency Outreach" Action

The City will use available outreach tools to encourage its businesses to participate in PSE&G's Direct Install program. As described in relation to municipal properties, above, the Direct Install program assists businesses to assess opportunities to reduce energy use by as much as 30%, and covers up to 80% of the costs of energy improvements up front, while allowing the business to pay off its own share of the cost of improvements interest free over 5 years through a fee added to their energy bill.

In the Fall of 2023, Sustainable Jersey and PSE&G ran a grant and technical assistance program through which Sustainable Jersey will take the lead on commercial outreach actions and provide funding (competitive) to compensate the City for resources expended to implement the commercial outreach campaign.

NEXT STEPS

The City will aim to take the following steps as part of this initiative:

1. The City will apply for technical assistance and outreach campaign grant funding from Sustainable Jersey and/or PSE&G to facilitate and expedite the creation of a commercial outreach campaign.
2. The Green Team will work with Sustainable Jersey / PSE&G as appropriate or take the lead to generate outreach materials advertising energy efficiency incentive programs to business owners and commercial property owners in various languages;
3. Materials to be distributed in regular mailers, posted on City website and social pages, announced during public hearings.

4. The Green Team will coordinate with the Special Improvement District and other local business groups to identify opportunities to promote energy efficiency to local businesses and commercial property owners.
5. The Green Team will consider using an incentive to encourage business owners who are motivated by the City's outreach campaign to notify the City that they've taken advantage of energy efficiency incentives, to help the City track the success of its campaign and analyze strategic effectiveness.

DRAFT

STRATEGY 4: REDUCE ENERGY CONSUMPTION AND EMISSIONS FROM THE BUILDING SECTOR

New construction projects are opportunities for municipalities to set a trend moving forward for environmentally responsible, high-quality buildings that meet green building standards. Green buildings provide a number of benefits to the community, to the developer, to the operator, and to the occupants of the buildings. They demand less of the community's resources, place lesser burdens on community infrastructure, have lower long term operating and maintenance costs, and provide healthier living and working spaces than buildings that do not meet green building standards.

Plainfield will take the following actions to encouraging green building practices in the City:

- ▶ **4.1 Construct New Municipal Buildings as Model Green Buildings** - Implement a policy encouraging or requiring consideration of green building practices for any new municipal construction project. Highlight the incentives from NJCEP's New Construction Energy Efficiency program. Following construction, showcase green building features with on-site kiosks and digital webpages to encourage others to follow suit.
- ▶ **4.3 Require Developers to Complete Green Development Checklist** - Pass a Green Building Policy or Resolution that requires developers to submit a completed Green Development Checklist with Site Plan Applications. Checklist should refer developers to NJCEP's Commercial and Residential New Construction Energy Efficiency programs.

4.1 CONSTRUCT NEW MUNICIPAL BUILDINGS AS MODEL GREEN BUILDINGS

It is often said that the greenest building is the one that already exists; constructing new buildings is carbon intensive and material intensive. However, it is sometimes necessary to construct new buildings or adapt existing buildings to accommodate the evolving needs of local government. That moment when a new facility is needed is an opportunity to demonstrate to the public that the community's leadership values energy and material efficiency and healthy, productive physical environments and understands the importance of lowering long-term operating costs by conforming the new building to green building standards.

Implement a policy encouraging or requiring consideration of green building practices for any new municipal construction project. Highlight the incentives from NJCEP's New Construction Energy Efficiency program. Following construction, showcase green building features with on-site kiosks and digital webpages to encourage others to follow suit.



"New Construction" Action

"Green Building Policy/Resolution" Action

The City need not commit to a specific project; however, it can adopt a green building policy resolution which encourages or commits the City to seeking green building certification for any future construction or adaptation of new municipal buildings.

NEXT STEPS

1. The Director of Economic Development will advise the governing body to adopt a Green Building Policy Resolution which encourages or requires the City to consider seeking green building certification for new municipal buildings;
2. At such time that new buildings are needed, the Economic Development Department, Public Works, Administration, Finance, and other departments will identify a minimum green building rating to achieve based upon the relevance to the building type;
3. Upon construction and opening of such building, the City (possibly through the Green Team) will conduct a campaign to tout the green characteristics of the new building and educate the public about the benefits of the building's green features.

4.3 REQUIRE DEVELOPERS TO COMPLETE GREEN DEVELOPMENT CHECKLIST

A development checklist does not have the same regulatory impact as an ordinance; however, by requiring a developer to disclose the environmental impact of a development, the City can motivate the developer to take steps to improve the project's green profile.

Sustainable Jersey publishes a sample green building checklist which the City will use as the basis for drafting its own checklist. Some of the items in the checklist include, but are not limited to:

- ▶ Whether the project is on a brownfield;
- ▶ The proximity of the project to public transit and/or complete streets;
- ▶ Whether the project preserves or adaptively reuses existing or historical buildings;
- ▶ Impact of the project on stormwater;
- ▶ Provision of amenities like open space, conservation or restoration of environmental features, inclusionary set-asides, facilitating local agriculture (farmers market space), compact and efficient vehicle parking spaces, commuter shuttles, bike parking facilities, and the like.
- ▶ Use of low-impact design features like bio-swales, green walls, pervious pavement, and the like;
- ▶ Use of recycled building materials; and
- ▶ Use of energy efficient equipment/appliances, on-site generation, water efficiency or reuse, use of natural air and light.

Pass a Green Building Policy or Resolution that requires developers to submit a completed Green Development Checklist with Site Plan Applications. Checklist should refer developers to NJCEP's Commercial and Residential New Construction Energy Efficiency programs.



“Create a Green Development Checklist” Action

“Green Building Policy/Resolution” Action

Note 5. Benefits of a Green Building Policy (Sustainable Jersey)

- Owners of older homes are particularly vulnerable to rising energy costs. Homes built prior to the 1970's oil embargo are often much less energy-efficient than newer units.
- More than half of the 80 million single-family homes in the United States were constructed before modern energy codes existed.
- Many homes are poorly insulated, have high levels of air infiltration, inefficient heating and air conditioning systems, and inefficient water heaters and appliances.
- About 40% of households report at least some winter drafts, and 60% complain of a room that is too warm in the summer.
- Energy efficiency assessments can identify sources of poor air quality and other safety and comfort issues in the home that can be addressed in recommended energy efficiency upgrades.

The sample checklist, along with a sample green building resolution, are contained within the appendices to this Plan.

NEXT STEPS

1. The City's Planning staff to review with the Building Department and engineering consultant the sample checklist and sample resolution contained within this plan as well as other example checklists and resolutions and draft checklists and resolutions that meet the City's needs;
2. The City will duly adopt an ordinance requiring completion of the checklist with any development application for major new development.
 - a. The City will make reasonable exceptions with respect to the size and type of development to ensure it does not impact homeowners repairing, renovating, or making modest expansions to their homes.
 - b. The City will explore enhancing the checklist to incorporate initiatives required for certification under LEED or other green building rating systems, in order to encourage developers to pursue LEED level improvements.

STRATEGY 6: SUPPORT COMMUNITY ENERGY PLANNING AND ACTION WITH AN EMPHASIS ON ENCOURAGING AND SUPPORTING PARTICIPATION BY LOW- AND MODERATE-INCOME AND ENVIRONMENTAL JUSTICE COMMUNITIES

The objective of Strategy 6 is to ensure that the City's most vulnerable cohorts, including LMI households, households with language barriers, and others, are engaged and included in the City's energy initiatives. Many of the actions that individuals can take to reduce energy costs or adopt clean energy require significant up front costs. As an overburdened community, it is essential that Plainfield ensure that LMI households can benefit from and be involved in initiatives such as any community solar projects, and that LMI households and non-English proficient persons or other communication barriers are engaged and made aware of opportunities for them to reduce their energy costs and energy impact.

The initiatives to be pursued by the City include:

- ▶ **6.1 Make Community Energy Planning Inclusive** - *Ensure low- and moderate-income residents are represented in energy planning processes, both on the core planning team and among those contributing via public comment. Methods include scheduling meetings at convenient times (varying meeting time if needed), engaging with community organizations that can elevate underrepresented voices, and advertising planning meetings in appropriate media.*
- ▶ **6.2 Conduct Energy Efficiency Outreach to Low- and Moderate-Income Residents** - *Promote state and utility energy efficiency programs for low- and moderate-income (LMI) residents using community-serving institutions as messengers, using non-English promotional materials where appropriate, and emphasizing co-benefits of energy efficiency upgrades (health, safety, and comfort).*
- ▶ **6.3 Support Shared Mobility Programs** - *Promote and develop shared transportation networks of cars, bikes, scooters, etc. with design features that particularly assist low- and moderate-income residents. Encourage shared transportation services to expand access in low-income neighborhoods and provide low-income membership options.*

6.1 MAKE COMMUNITY ENERGY PLANNING INCLUSIVE

The desired outcome of this initiative is to ensure that all residents can be involved in the planning process and that planning bodies represent the diversity of the community.

The City's planning board is already diverse and represents multiple backgrounds, and the City already hosts application materials and Planning Board meeting documents on its website.

To continue to promote inclusive planning, the City will strive to do the following:

Ensure low- and moderate-income residents are represented in energy planning processes, both on the core planning team and among those contributing via public comment. Methods include scheduling meetings at convenient times (varying meeting time if needed), engaging with community organizations that can elevate underrepresented voices, and advertising planning meetings in appropriate media.



"Improve Public Engagement in Planning and Zoning" Action

NEXT STEPS

1. The City will ensure that all future announcements of land use board vacancies are distributed to community organizations and houses of worship serving diverse cohorts;
2. The land use boards will continue to search for opportunities to increase the public's access to the planning process.

6.2 CONDUCT ENERGY EFFICIENCY OUTREACH TO LOW- AND MODERATE-INCOME RESIDENTS

This Community Energy Plan has identified several programs designed to make energy efficiency and clean energy affordable to homeowners and owners of multi-unit dwellings. Cohorts that are more difficult to engage include renter households, homeowners with language barriers, and homeowners who are elderly, and homeowners for whom the most impactful projects are out of reach even with incentives and rebates to offset project costs.

Promote state and utility energy efficiency programs for low- and moderate-income (LMI) residents using community-serving institutions as messengers, using non-English promotional materials where appropriate, and emphasizing co-benefits of energy efficiency upgrades (health, safety, and comfort).



“Energy Assistance Outreach” Action

INCENTIVE AND COST-ASSISTANCE PROGRAMS

- ▶ PSE&G’s “Marketplace” website offers substantial discounts on energy and water-saving items that renters and homeowners with limited budgets can purchase and install in their homes, including low-flow shower heads, energy saving power-strips, thermostats, and LED light bulbs. In some cases, the purchaser can receive these items for free.

Helping renters access the Marketplace is an effective way help them save energy and money; and Marketplace shoppers are also likely to follow the redirect links for PSE&G’s energy efficiency incentive programs for larger purchases like HVAC, boilers, and furnaces. PSE&G will occasionally send sample packages to address where new accounts are established to make customers aware of cost saving opportunities.

- ▶ PSE&G offers a Home Weatherization Program for Income-Qualified Customers, which provides free energy efficiency assessments to income qualified customers and covers the installation cost of up to \$6,000 in energy efficiency upgrades and \$1,500 in health and safety improvements. The qualifying income range for the program is between 250% and 400% of the federal poverty level.
- ▶ Comfort Partners is a joint program between PSE&G and NJCEP that provides energy efficiency and weatherization assistance to households at or below 250% of the federal poverty level.

PSE&G and other State and utility entities also offer a number of programs to assist income-eligible persons as well as elderly or disabled persons to afford their home energy and heating costs. See “Note 6. Income Based Energy Assistance Programs” on page 49.

NEXT STEPS

1. The City will host a “Green Fair”, either as a one time event or a periodically repeating event, to educate the public about available programs, opportunities, or energy saving practices. The City will seek sponsorship from PSE&G, NJ BPU, Sustainable Jersey, home and small-business energy efficiency contractors, hybrid and EV car dealerships, solar installers, and home electronics vendors others who can use the Fair to reach-out to potential customers in the City. The City can also post exhibits at the Fair about its own energy accomplishments, goals, and objectives, and to seek public input about potential initiatives.
 - ▶ As the City’s outreach body on all things “green”, the Green Team will be responsible for recruiting partners, organizing and advertising the event, and generating marketing materials.
 - ▶ Advertising materials and informational materials will be prepared in at least two languages to

Note 6. Income Based Energy Assistance Programs

- **Lifeline Program** - Operated by the NJ Department of Human Services to assist income eligible disabled adults or seniors to afford utility costs;
- **LIHEAP (Low Income Home Energy Assistance Program) / Universal Service Fund** - Helps to offset home energy and heating costs for low-income households.
- **PAGE (Payment Assistance for Gas and Electric)** - Helps to offset energy and gas costs for income eligible households.

reach as many LMI residents as possible;

- ▶ Materials will be distributed to LMI-serving institutions to further expand the reach of advertising;
 - ▶ The event will be family friendly to ensure that families with children can easily participate.
2. The City will work with PSE&G to include information about the PSE&G Marketplace and PSE&G's rebate and incentive programs in regular City mailers and electronic communications.
 3. The Green Team will distribute informational materials to LMI-serving institutions to continue to educate the public year-round

The objective of this outreach program will be to encourage at least 5% of income-eligible residents to participate in LMI energy efficiency programs.

6.3 SUPPORT SHARED MOBILITY PROGRAMS

Shared mobility services are programs that help people access a variety of modes of transportation at a relatively low cost, and include car-shares (on-demand car rentals), bike shares, scooter shares, and even micro-transit programs like van-pooling, company shuttles, and local transit programs with limited service.

Promote and develop shared transportation networks of cars, bikes, scooters, etc. with design features that particularly assist low- and moderate-income residents. Encourage shared transportation services to expand access in low-income neighborhoods and provide low-income membership options.

Shared mobility services can fill the gaps left by underfunded public transit systems and may even provide greater convenience. They are particularly valuable in low- and moderate-income communities as they can help to remove transportation barriers associated with the cost of owning a car, or logistical concerns over where to store bikes and scooters.

ACTIONS TO DATE AND ONGOING OPPORTUNITIES

The City previously contracted with Limebike to provide a local bike-share program, but that program has been discontinued. The City is exploring the creation of a pedestrian mall on North Avenue between Park Avenue and Watchung Avenue, at the heart of its Downtown and in front of the NJ Transit Station. Pedestrian malls make excellent anchor points for mobility sharing hubs such as racks and lockers for shared bikes and scooters or reserved parking spaces for car-shares.

The City also desires to explore intracity transit options to address what it perceives as gaps in service within the City. Options to address these gaps include pursuing funds to establish and sustain intracity transit services, such as circulator buses or on-demand shuttles, supporting carpool and vanpool matching services, and working with redevelopers to provide or contribute to bus or shuttle services that connect large redevelopment projects to local destinations such as transit stops, public services, and supermarkets.

OBSTACLES AND CHALLENGES

1. Marketing to effectively make the public aware of programs (bus routes, schedules, carpool matching services), and gaining the public's confidence the reliability of those services in order to maximize usership;
2. Addressing concerns by the public about bike, scooter, and car sharing programs such as taking up space on sidewalks or removal of parking spaces to install docks, reservation of parking spaces for car-shares, hazards related to dockless programs.

NEXT STEPS

1. City to examine the reasons that the partnership with Limebike was discontinued, and identify strategies to make future bike-share programs more successful;
2. Economic Development Department to work with designated redevelopers of larger residential/mixed-

use developments to provide complementary shuttle services to bring residents to the City's train and bus stops and major destinations like nearby retail malls. This may be achieved through Redevelopment Agreements and Community Benefit Agreements;

3. City to explore a partnership with neighboring municipalities to contract with bike-share, car share, and/or bus/shuttle service providers to provide services or stations at key transportation and shopping hubs, and arrange for discounted fees for low- and moderate-income households.
4. Economic Development Department to pursue grant funding to support the creation of alternative intracity transit services

DRAFT

STRATEGY 7: EXPAND THE CLEAN ENERGY INNOVATION ECONOMY

As renewable energy generation technology has improved, so has technologies designed to make renewable energy work better for both utility providers and end users. An example of this is energy storage technology - typically a battery that can store energy during off-peak hours and release it during peak hours, or that can provide a stable power source during blackouts and brownouts.

Consider a residential rooftop solar energy system: The system generates the most energy during the daytime, when many end-users (residents) are not home and therefore using little to no energy. Thanks to net metering, a household with rooftop solar can sell energy back to the grid to power uses like offices, schools, and public services for which peak energy demand takes place in the daytime; however, most of the energy required by that household to power their evening activities will be coming from the utility provider (PSE&G, in this case). Energy storage allows that household to make direct use of the energy generated from the rooftop installation by storing solar-generated energy during the day and releasing it in the evenings.

For public services, energy storage systems not only help to offset energy costs, but also to provide for continuity of services during power outages or natural disasters. Consider, for example, a severe snow-storm that results in local power-outages; a solar-powered energy storage system at the DPW site, fire station, or police station, will ensure that roads are kept clear and that emergency services will remain operational, without depending generators that emit fumes from burning of gasoline or natural gas.

Energy storage systems also work for facilities without on-site renewable generation. For customers who elect to be billed based on their energy usage during on- or off-peak hours, energy storage systems can be charged during off-peak hours, when energy costs are lower, using electricity delivered from the grid, so that they can be used to power the customer's activities during peak hours when it would cost more to purchase electricity from the utility. This is a process called "peak shaving".

For both private and public users, regardless of the peak hours of electricity use, battery storage creates opportunities for long term cost savings, as utility providers typically charge their customers different rates according to either on-peak or off-peak hours of usage or the total amount of energy used in the billing period.

Microgrids, which combine energy storage systems with forms of renewable on-site energy generation systems to reduce energy costs and allow neighborhoods, campuses, or whole communities to continue to have electricity when the larger grid fails, may be considered for campuses or for areas with concentrations of government, public, and community facilities, businesses, and vital infrastructure like hospitals or utilities.

- ▶ **7.1 Adopt Energy Storage Policies** - *Adopt standards and establish requirements for permitting battery energy storage systems. Post information about energy storage regulations to the municipal website and ensure appropriate municipal staff are informed.*
- ▶ **7.2 Install an Energy Storage Project** - *Install on-site energy storage, such as batteries, compressed air, or thermal storage, for municipal facilities. Following construction, showcase the project with on-site kiosks and municipal webpages to encourage others to follow suit.*

7.1 ADOPT ENERGY STORAGE POLICIES

As the introduction to this chapter explains, energy storage provides benefits to private and public users by maximizing the benefits of their on-site solar installations, offsetting demand-based energy costs from their utility provider, and providing a source of electricity during a power-outage. Ensuring that the City's ordinances permit battery energy storage systems (BESS) is key to enabling property owners and businesses to take advantage of the benefits of this technology.

Adopt standards and establish requirements for permitting battery energy storage systems. Post information about energy storage regulations to the municipal website and ensure appropriate municipal staff are informed.

Ensuring that the City's ordinances permit battery energy storage systems (BESS) is key to enabling property owners and businesses to take advantage of the benefits of this technology.

From a zoning perspective, energy storage systems are, generally, accessory uses and accessory structures, except in instances where the sole use of the site is the housing of energy-storage equipment as part of a microgrid or regional grid system, in which case they are principal uses. Batteries for residential and commercial/industrial uses may require different permitting processes.

However, energy storage systems are an emerging technology for which regulation must include fire, nuisance, and public safety considerations. A model law published by New York State Energy Research and Development Authority (NYSERDA) is included in the appendices of this Plan, and contains recommended language to regulate the placement, maintenance, and permitting of energy storage systems.

The preface section of the model law recommends that, before adopting a permitting law, municipalities should take a number of actions to prepare its personnel and reviewing bodies for handling the review and permitting of energy storage installation applications, responding to fires and other emergencies relating to storage systems, and handling of decommissioned storage systems.

The Model Law makes a significant distinction between the treatment of "Tier 1" and "Tier 2" BESS. Tier 1 is a system that the Model Law defines as having "an aggregate energy capacity less than or equal to 600kWh" and consisting of only one (1) energy storage system technology if in an enclosed space. Tier 2 systems have "an aggregate energy capacity greater than 600kWh" or consist of more than one energy storage battery in an enclosed space. The Model Law permits Tier 1 BESS "in all zoning districts, subject to the Uniform Code and the 'Battery Energy Storage System Permit,' and [is] exempt from site plan review." The model BESS Permit is also included in the appendices to this plan. The Model Law contains a lengthy regulatory section concerning Tier 2 systems, making clear that Tier 1 systems pose much lower risks to public safety or welfare.

When considering whether to adopt legislation permitting battery storage, the City should invite energy storage system developers and installers to speak at a public meeting to residents, business owners, and property owners are made aware of the benefits of the technology as well as any associated risks.

NEXT STEPS

1. Within the next 18 months, the City will authorize its planning staff and professionals to draft an ordinance permitting small scale battery storage systems with coordination with various departments including buildings and emergency response teams, and ideally with consultation from experts in BESS technology.
2. Based upon discussions between the professionals and departments, the City will duly adopt ordinances and permitting documents for the desired or acceptable tier(s) of BESS as determined in step 1.



Figure 13. Generac Residential BESS system

7.2 INSTALL AN ENERGY STORAGE PROJECT

BESS on City properties can not only maximize the benefits to the City from installing on-site solar installations, but can also ensure that the City and its various services can continue to operate at full or functional capacity during a blackout. Additionally,

Install on-site energy storage, such as batteries, compressed air, or thermal storage, for municipal facilities. Following construction, showcase the project with on-site kiosks and municipal webpages to encourage others to follow suit.

installing battery storage at emergency shelters, emergency staging areas, or senior centers can ensure that vulnerable populations have a safe place to stay during natural disaster, severe heat events, or other emergencies.

Another significant benefit of BESS, when installed with on-site solar, is that the solar system can charge the battery during the day, when the sun is up, allowing the facility to run at least partially on battery power at night. As with the solar panels, this eventually pays off in the form of lower electric utility bills.

For the above reasons, the City should view BESS installation as an essential part of any installation of solar or wind energy systems on public property, rather than as an initiative to be pursued separately. While a City-hosted solar energy system would generate revenues through net metering or through community solar subscriptions, BESS installed with solar energy systems gives the City the means to maximize its energy savings and meet the needs of its constituents even in an emergency.

Facilities that host essential services, have solar

INCENTIVES

New Jersey does not have a BESS incentive program at this time; however, the solar investment tax credit (ITC) component of the Inflation Reduction Act provided a tax credit for BESS in 2023 and may continue to in 2024. If the tax credit continues, local governments may be able to receive direct payments from the federal government.

OTHER FINANCIAL CONSIDERATIONS

The City can take direct ownership of the system - paying up-front for the system or borrowing for it - or it can pursue one of three other options to enjoy the benefits of BESS:

- ▶ Shared Savings Agreement (SSA): The system is owned by a third party but the City still benefits from reduced utility costs and back-up power.
- ▶ Lease: The City leases the system from the provider.
- ▶ Power Purchase Agreement (PPA): The system is owned and financed by a third party, and the City purchases power directly from that third party at a reduced rate.

NEXT STEPS

1. Within the next two years, the Economic Development Department will work with DPW and emergency service departments to assess whether a battery storage system would meet the City's needs, such as reducing peak energy costs, storing energy from solar installations, or providing emergency power backup, and identifying facilities that would be a priority for such an installation;
2. The City will monitor and apply for funding opportunities to conduct feasibility studies and/or to install battery storage systems;
3. Any installations will be completed in a manner consistent with funding program and/or investment tax credit requirements and/or the desired form of ownership for the storage system.

7.3 DEVELOP LOCAL MICROGRID

A microgrid is a localized and self-sufficient electrical grid that is typically limited to a campus or neighborhood level. They tend to be more efficient than regional grids as there is less electric loss between the point of electric generation and the customer. They can also be more resilient than regional grids, and provide back-up power when the larger grid fails. Microgrids can run on software based "controllers" that allocate power in the most efficient way to reduce costs, maximize availability, or

Participate in development of a microgrid. Microgrid development generally starts with a feasibility study, followed by project design, then project implementation. Following construction, showcase the project with on-site kiosks, a municipal webpage, and/or ribbon-cutting event.

achieve other purposes. They may consist of a combination of solar panels, batteries, combined heat & energy plants, and other sources of power generation and storage.

Microgrids are effective systems for keeping businesses, essential services, and government operations running following storms. The smart “controller” may save customers money or even generate revenue by selling electricity back to the grid.

Downtown Plainfield is host to several buildings from different levels of government, as well as the NJ Transit train station, businesses, industrial buildings, and schools. While it does not have critical facilities like hospitals or wastewater/water treatment facilities in that area, there may be a benefit to the businesses and government facilities in the downtown to participating in a microgrid.

OBSTACLES AND BARRIERS

There may not be buy-in from other government entities or businesses with a presence in the Downtown to participate even in the exploration of a microgrid, and ultimately the economic costs of creating such a system may not outweigh the benefits.

NEXT STEPS

Within the next three years the City will seek funding to conduct a feasibility study to determine the economic and social costs and benefits of creating a microgrid in the area around the downtown. The City will attempt to engage partners such as PSE&G, the Board of Education, Housing Authority, Parking Authority, NJ Transit, County, the Downtown Improvement District, emergency services, childcare providers, and senior living providers, and large commercial property owners who may benefit from participation in the grid as well as contributing by hosting sources of energy generation.

Any implemented microgrid will be celebrated to demonstrate the efficiency of such system to the public and local businesses and visitors and to inspire other communities to consider their own localized energy systems and other forms of energy pioneering.

DRAFT

CONCLUSION

The Community Energy Plan examines 23 actions that the City will take over a three-to-five year period in order to advance the State's Energy Master Plan, reduce energy costs, expand access to clean energy to low-and moderate-income households, and create green jobs locally. Some of these actions require little to no cost to the City, such as conducting public outreach about incentive programs, engaging clean energy developers to provide discounts to City employees and property owners, and adoption of ordinances, checklists, and permitting documents to expand opportunities for clean energy and transit oriented development.

Other actions in this Plan require larger investments by the City, such as installing renewable energy generation and storage systems, improving streetscapes, and replacing inefficient fleet vehicles with electric vehicles or hybrid vehicles. The City can, however, use a number of strategies to reduce the costs associated with those actions and avoid passing the costs of the actions on to taxpayers. These include leasing clean energy systems when available instead of purchasing and owning them, taking advantage of incentives from PSE&G and the State and Federal governments, entering into purchasing cooperatives with other governments, utilizing other special financing programs, and strategically offsetting borrowing costs with energy savings.

It should be noted that the time of this writing is a particularly advantageous moment for the City to make investments in clean energy, energy savings, and environmentally friendly infrastructure, as they have been identified as priorities by the State and Federal governments. The availability of the grants, rebates, and supportive programs identified in this Plan may change with the balance of political power, and some are scheduled to expire or shrink, or may not be renewed after 2024. Therefore it is recommended that the City take advantage of the financing opportunities in this Plan early.

NEXT STEPS

Following the adopting of the Community Energy Plan, the City will establish a Green Team comprised of elected officials, City staff, and community members, to set the City's agenda and priorities for implementing actions listed in this Plan document as well as actions laid out by Sustainable Jersey for certification as a sustainable community.

APPENDIX

1

WORKPLAN TEMPLATE

Strategy 1: Reduce Energy Consumption and Emissions from the Transportation Sector

List initiatives included in this strategy:

- 1.1 Adopt Supportive Zoning and Regulations for EV [Go to initiative](#)
- 1.2 Train First Responders on EVs and EVSE [Go to initiative](#)
- 1.3 Train Non-Emergency Staff on EVs and EVSE [Go to initiative](#)
- 1.4 Purchase Alternative Fuel Vehicles [Go to initiative](#)
- 1.5 Improve Municipal Fleet Efficiency [Go to initiative](#)
- 1.6 Install Public EV Charging Infrastructure [Go to initiative](#)
- 1.7 Encourage Non-Municipal Fleets to Improve [Go to initiative](#)
- 1.8 Encourage Workplace EV Charging Infrastructure [Go to initiative](#)
- 1.9 Community EV Outreach [Go to initiative](#)

1.1 Adopt Supportive Zoning and Regulations for EV Infrastructure								
Status in CEP:								
Initiative already being implemented		Initiative Summary: Pass NJDCA's Model Statewide Municipal EV Ordinance specifying electric vehicle charging stations (EVSE) as a permitted accessory use, establishing the permitting process for charging stations, and requiring Make-Ready and EVSE parking in new multifamily developments and parking lots. Modify the model ordinance standards for safety, signage, etc. as needed.						
Current Status:			Measures of Success:				Resources:	
NJDCA's model ordinance has been adopted into the City Code			Ordinance is adopted and visible on the web-hosted City Code				<ul style="list-style-type: none"> • NJDCA's Model Statewide Ordinance • US DOE's Blueprint 4B: EV Charging Infrastructure for the Community • Sustainable Jersey's Make Your Town Electric Vehicle Friendly action • Great Plains Institute's Summary of Best Practices in EV Ordinances 	
Potential Stakeholders:	Initiative lead:	Planned initiative start date:	Anticipated initiative length:	Priority:	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
	Zenobia Fields, Director of Economic Development	Completed	Ongoing enforcement	Completed	Land Use Boards, Building Department	None anticipated	None anticipated	Continue enforcement of ordinance through review and approvals of development applications

1.2 Train First Responders on EVs and EVSE								
Status in CEP:								
Initiative included in plan		Initiative Summary: To further public confidence and maintain emergency preparedness, require training on electric vehicles and associated infrastructure for local first responders.						
Current Status:			Measures of Success:				Resources:	
No action to date			<ul style="list-style-type: none"> • Training held for each relevant department • Policy established for ongoing training 				<ul style="list-style-type: none"> • Sustainable Jersey Make Your Town Electric Vehicle Friendly action • NFPA's Alternative Fuel Vehicles Safety Training Program 	
Potential Stakeholders:	Initiative lead:	Planned initiative start date:	Anticipated initiative length:	Priority:	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> • Local fleet managers that handle EVs • Neighboring municipalities Police, Fire 	Director Kenneth Childress, OEM Director	Within 1 year	Ongoing	Moderate	Police, Fire	None anticipated	None anticipated	<ol style="list-style-type: none"> 1. OEM Director to advise Police and Fire Department chiefs to require EV training; 2. Police and Fire Department chiefs to identify suitable training program; 3. Training to be repeated on regular basis

1.3 Train Non-Emergency Staff on EVs and EVSE								
Status in CEP:								
Initiative included in plan		Initiative Summary: Initiate electric vehicle cross-training for non-emergency staff such as code officials, automotive technicians, and electricians.						
Current Status:			Measures of Success:				Resources:	
No action to date			<ul style="list-style-type: none"> • Training held for each relevant department • Policy established for ongoing training 				<ul style="list-style-type: none"> • Sustainable Jersey's Make Your Town Electric Vehicle Friendly action • NAFTC's Courses and Workshops • Electric Vehicle Infrastructure Training Program 	
Potential Stakeholders:	Initiative lead:	Planned initiative start date:	Anticipated initiative length:	Priority:	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
	Oren K. Dabney, Director of DPW	Within 1 year	Ongoing	Moderate	Buildings (Economic Development), Fire, Public Works	None anticipated	None anticipated	<ol style="list-style-type: none"> 1. DPW Director to advise Building Department Director and Fire Department chief to require EV training; 2. Department heads to identify suitable training program; 3. Training to be repeated on regular basis; Director of DPW to lead implementation

1.4 Purchase Alternative Fuel Vehicles								
Status in CEP:								

Initiative already being implemented		Initiative Summary: Replace existing municipal fleet vehicles with plug-in hybrid, battery electric, or other sustainable alternative fuel vehicles, using fleet analysis to inform purchases.						
Current Status: <i>City has electrified a portion of its fleet</i>		Measures of Success: <ul style="list-style-type: none"> Strategic list prioritizing vehicles in fleet to replace with AFVs Fleet charging infrastructure installed for municipal vehicles 25th battery electric vehicle added to municipal fleet First heavy-duty electric vehicle added to municipal fleet 				Resources: <ul style="list-style-type: none"> Sustainable Jersey's Purchase Alternative Fuel Vehicles action Sustainable Jersey's Alternative Fuel Vehicle Procurement Guide Fleets for the Future Electric Vehicle Procurement Best Practices Guide DVRPC's Electric Vehicle Resource Kit for Municipalities US DOE's Blueprint 4A: Electric Vehicles and Fleet Electrification 		
Potential Stakeholders: - Local transportation providers; - Local EV vendors;	Initiative lead: Jervey Sistrunk, Fleet Manager	Planned initiative start date: Within 1 year	Anticipated initiative length: Ongoing	Priority: High	Departments Involved: Police, Fire, Recreation, Public Works, Finance	Anticipated funding sources: NJ BPU, NJ DEP, NJ EDA, Inflation Reduction Act	Obstacles/Barriers: Funding competitiveness, availability of suitable replacements, driver buy-in, synchronizing vehicle acquisition with installation of charging equipment	Next steps: (specific and tangible): 1. List fleet vehicles in order of replacement priority based upon usage patterns and maintenance/fueling costs; 2. Monitor for and apply to funding programs to replace or purchase new vehicles and for EV charging equipment to support electrification; 3. Move more expensive vehicles to the front of the list when special funding programs become available; 4. Update list periodically based on changing usage patterns or maintenance issues

1.5 Improve Municipal Fleet Efficiency

Status in CEP: Initiative already being implemented		Initiative Summary: Coordinate the strategic replacement (or retirement) of vehicles and improvement of driver efficiency to reduce the GHG footprint of all municipal fleets – public works, police, fire, etc. Requires tracking of fleet data such as age of vehicles, duty cycle, and use patterns.						
Current Status: <i>21 Plug in vehicles in the inventory</i>		Measures of Success: <ul style="list-style-type: none"> Annual fleet inventory process established Municipal fleet procurement plan 20% reduction in fleet emissions within 4-year span 				Resources: <ul style="list-style-type: none"> Sustainable Jersey's Fleet Inventory action Sustainable Jersey's Meet Target for Green Fleets action Sustainable Jersey's Alternative Fuel Vehicle Procurement Guide Atlas Public Policy's Fleet Procurement Analysis Tool DVRPC's Electric Vehicle Resource Kit for Municipalities 		
Potential Stakeholders: <ul style="list-style-type: none"> Fleet management companies (e.g., transportation analytics firms) Municipal services contractors (e.g., waste services companies) Local vehicle repair or enhancement specialists 	Initiative lead: Jervey Sistrunk, Fleet Manager; Green Team	Planned initiative start date: Within 1 year	Anticipated initiative length: Ongoing	Priority: High	Departments Involved: Police, Fire, Recreation, Public Works, Finance	Anticipated funding sources: NJ BPU, NJ DEP, NJ EDA, Inflation Reduction Act	Obstacles/Barriers: Funding competitiveness, availability of suitable replacements, buy-in from fleet drivers of efficient driving practices	Next steps: (specific and tangible): 1. List fleet vehicles in order of replacement priority based upon usage patterns and maintenance/fueling costs; 2. Monitor for and apply to funding programs to replace or purchase new vehicles; 3. Move more expensive vehicles to the front of the list when special funding programs become available; 4. Update list periodically based on changing usage patterns or maintenance issues; 5. Train and educate fleet vehicle drivers (e.g. police officers, contractors) on efficient driving practices; 6. The Green Team will work with Department heads to post fuel-efficiency literature in common areas used by fleet driving personnel; 7. When vehicle replacement is impractical, make less costly vehicle modifications such as installing idle reduction technology, fuel efficient tires, or converting ICE vehicles to hybrids or EVs.

1.6 Install Public EV Charging Infrastructure

Status in CEP: Initiative included in plan		Initiative Summary: Install electric vehicle charging infrastructure, including chargers, signage, and safety and accessibility features, for public use.						
Current Status: <i>None action to date</i>		Measures of Success: <ul style="list-style-type: none"> First public EV charging station installed 2 public EV charging stations per 10,000 residents 				Resources: <ul style="list-style-type: none"> Sustainable Jersey's Public Electric Vehicle Charging Infrastructure action NJDEP's iPayS to Plug in Grant program Sustainable Jersey's Alternative Fuel Vehicle Procurement Guide DVRPC's Electric Vehicle Resource Kit for Municipalities US DOE's Blueprint 4B: EV Charging Infrastructure for the Community 		
Potential Stakeholders: <ul style="list-style-type: none"> PSE&G Commercial parking lot owners Large Shopping Centers State & County transportation agencies with R.O.W. Jurisdiction Parking authority Downtown Improvement District NJ Transit 	Initiative lead: Oren K. Dabney, Director of DPW	Planned initiative start date: Within 1 year	Anticipated initiative length: 3 years	Priority: Moderate	Departments Involved: Public works, buildings, fire	Anticipated funding sources: NJ BPU, NJ DEP, NJ EDA, Inflation Reduction Act	Obstacles/Barriers: Funding competitiveness; Determining forms of ownership, management	Next steps: (specific and tangible): 1. Identify optimal locations for placement of public EV charging stations based upon public usage; 2. Assess electrical infrastructure of municipal buildings or facilities in those areas; 3. Monitor and apply for grants and assistance for EV charging infrastructure; 4. Install equipment at selected locations; 5. Build public awareness through City's social media, news letters, and other communications.

<ul style="list-style-type: none"> Resident organizations (e.g., homeowners associations) Solar developers Neighboring municipalities Large property owners 	Zenobia Fields, Director of Economic Development Governing body	Within 1 year	Less than 1 year	High	Governing body, buildings, planning board	None anticipated	Resident concerns regarding aesthetics and safety of solar installations	<ol style="list-style-type: none"> Economic Development Director and/or governing body to instruct planning staff/consultants to draft a solar permitting ordinance and permitting documents that establishes the standards for private and utility scale solar facilities; Governing body to introduce ordinance; Planning board to review ordinance for consistency with the Master Plan; Governing body to adopt ordinance; Planning and building staff to ensure permitting documents meet the needs of permitting staff; Permitting documents to be included with other required construction documents in City offices and website.
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2.4 Train First Responders on Solar								
Status in CEP:		Initiative included in plan						
Initiative included in plan		Initiative Summary: To further public confidence and maintain emergency preparedness, require training on solar infrastructure for first responders.						
Current Status:		Measures of Success:				Resources:		
No training in place		<ul style="list-style-type: none"> Training for relevant departments Cross-train building, zoning, inspection, and permitting staff Policy for ongoing training 				<ul style="list-style-type: none"> Kean University's Fire Safety Training Program Interstate Renewable Energy's Council Allied Professional Training USDOE's SolSmart Program Guide Sustainable Jersey's Make Your Town Solar Friendly action 		
Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
First responder unions or associations	Director Kenneth Childress, OEM Director	Within 1 year	Ongoing	Moderate	Fire	None anticipated	None anticipated	<ol style="list-style-type: none"> OEM Director to advise Fire Department chiefs to require Solar training; Police and Fire Department chiefs to identify suitable training program; Training to be repeated on regular basis

2.5 Train Non-Emergency Staff on Solar								
Status in CEP:		Initiative not included in plan						
Initiative not included in plan		Initiative Summary: To ensure municipal staff are prepared to deal with permitting, inspection, etc. for solar installations in the community, require training on solar infrastructure for municipal staff.						
Current Status:		Measures of Success:				Resources:		
If the municipality has undertaken this initiative in the past, provide a description of past activities.		<i>(modify to suit your community)</i> <ul style="list-style-type: none"> Training for relevant departments Cross-train building, zoning, inspection, and permitting staff Policy for ongoing training 				<ul style="list-style-type: none"> Interstate Renewable Energy Council's Allied Professional Training USDOE's SolSmart Program Guide Sustainable Jersey's Make Your Town Solar Friendly action 		
Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<i>(modify to suit your community)</i> • Neighboring municipalities	Enter name of point person	Enter text	Enter text	Enter text	Enter text	Enter text	Enter text	Enter text

2.6 Install On-Site Municipal Renewable Generation								
Status in CEP:		Initiative included in plan						
Initiative included in plan		Initiative Summary: Host a solar, wind, or geothermal project on municipal property to generate renewable energy for municipal facilities. Such projects can be leased from a developer or purchased and owned outright.						
Current Status:		Measures of Success:				Resources:		
Solar previously installed on school buildings		<ul style="list-style-type: none"> Contract with a developer to buy or lease a renewable installation on municipal property Implement outreach to illustrate benefits of renewable energy to the community using the municipal project 				<ul style="list-style-type: none"> Sustainable Jersey Municipal On-Site Solar System; Municipal Wind Energy System, and Municipal Geothermal Energy System actions American Cities Climate Challenge On-site Solar Procurement Guidance NICEP's Renewable Energy webpage 		
Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> Renewable energy developer(s) Local media Public school district NJ BPU Community Solar Providers 	Oren K. Dabney, Director of DPW	Within 2 years	2 to 3 years	High	DPIW	NJ BPU, NJ DEP, NJ EDA, Inflation Reduction Act	<ul style="list-style-type: none"> Age of buildings or electrical systems Condition of buildings 	<ol style="list-style-type: none"> Identify large buildings under municipal or BOE control Find a solar feasibility study to determine the costs and pay-off conditions for installing arrays on each property; RFP for solar developers for either on-site energy consumption or utility-side generation Use communications and events to tout the benefits of the solar installation

2.7 Buy Renewable Energy for Municipal Facilities								
Status in CEP:		Initiative not included in plan						
Initiative not included in plan		Initiative Summary: Buy renewable electricity for municipal facilities directly from a green energy supplier or participate in a buying pool that supplies electricity with high renewable content. The accompanying renewable energy credits (RECs) should be certified as PJM Class 1.						

Current Status: <i>If the municipality has undertaken this initiative in the past, provide a description of past activities.</i>		Measures of Success: <i>(modify to suit your community)</i> • Contract with third-party supplier or buying pool with a greater proportion of renewable content than current Renewable Portfolio Standard (22.5% for 2021) • Renewable portion is mostly, if not all, PJM Class 1 RECs				Resources: • Sustainable Jersey's Buy Electricity from a Renewable Source action		
Potential Stakeholders: <i>(modify to suit your community)</i> • Energy consultant • Energy buying pool (e.g., NJSEM)	Initiative lead: <i>Enter name of point person</i>	Planned initiative start date: <i>Enter text</i>	Anticipated initiative length: <i>Enter text</i>	Priority: <i>Enter text</i>	Departments Involved: <i>Enter text</i>	Anticipated funding sources: <i>Enter text</i>	Obstacles/Barriers: <i>Sustainable Jersey's Buy Electricity from a Renewable Source action</i>	Next steps: (specific and tangible): <i>Enter text</i>

2.8 Offer a Solar Employee Benefit Program								
Status in CEP: Initiative not included in plan		Initiative Summary: Offer a collective solar purchasing program for municipal employees, promoted via existing employee communication network. This type of program utilizes scale and low customer acquisition costs to make installing solar more affordable for participating employees. Schools and municipalities can collaborate to form a larger pool of potential customers, even including student families in the offer.						
Current Status: <i>If the municipality has undertaken this initiative in the past, provide a description of past activities.</i>		Measures of Success: <i>(modify to suit your community)</i> • 10% of employees get a quote through purchasing program • 5% of employees participate in the program				Resources: • Sustainable Jersey's Community-led Solar Initiatives action • National Renewable Energy Laboratory's Solarize Guidebook		
Potential Stakeholders: <i>(modify to suit your community)</i> • Municipal employee associations • Public school district • Local solar developer(s) • Parent-teacher associations	Initiative lead: <i>Enter name of point person</i>	Planned initiative start date: <i>Enter text</i>	Anticipated initiative length: <i>Enter text</i>	Priority: <i>Enter text</i>	Departments Involved: <i>Enter text</i>	Anticipated funding sources: <i>Enter text</i>	Obstacles/Barriers: <i>Enter text</i>	Next steps: (specific and tangible): <i>Enter text</i>

2.9 Institute a Community-wide Solar Purchasing Program								
Status in CEP: Initiative not included in plan		Initiative Summary: Partner with solar installers or a solar marketplace to offer special pricing on solar installations to residents and/or businesses for a limited time. Solicit bids for a solar installer partner with a Request for Proposals, then award the contract and advertise the offering to the community. Alternatively, partner with a competitive online solar marketplace to offer residents a custom online webpage to receive quotes.						
Current Status: <i>If the municipality has undertaken this initiative in the past, provide a description of past activities.</i>		Measures of Success: <i>(modify to suit your community)</i> • 5% of residents receive quotes for solar installations • 2% of residents install solar as part of the campaign				Resources: • Sustainable Jersey's Community-led Solar Initiatives action • National Renewable Energy Laboratory's Solarize Guidebook • US DOE's Blueprint 3A: Solar & Storage – Power Purchase Agreements and Direct Ownership		
Potential Stakeholders: <i>(modify to suit your community)</i> • Local solar developer(s) • Service organizations • Local media • Homeowners associations	Initiative lead: <i>Enter name of point person</i>	Planned initiative start date: <i>Enter text</i>	Anticipated initiative length: <i>Enter text</i>	Priority: <i>Enter text</i>	Departments Involved: <i>Enter text</i>	Anticipated funding sources: <i>Enter text</i>	Obstacles/Barriers: <i>Enter text</i>	Next steps: (specific and tangible): <i>Enter text</i>

2.10 Implement Renewable Government Energy Aggregation (R-GEA)								
Status in CEP: Initiative not included in plan		Initiative Summary: Establish a Renewable Government Energy Aggregation (R-GEA) program. R-GEA is a third-party electric supply contract negotiated by a municipality (or group of municipalities) on behalf of its residents. Utilizing their size, municipalities can negotiate for a supply that is more sustainable, often less expensive, and with better and more secure terms than can typically be achieved by individual residents.						
Current Status: <i>If the municipality has undertaken this initiative in the past, provide a description of past activities.</i>		Measures of Success: <i>(modify to suit your community)</i> • Third-party supplier bids received below utility electricity rate • R-GEA contract contains renewable content at least 20% above the current RPS at the time (RPS is 22.5% for 2021)				Resources: • Sustainable Jersey's How-To Guide: Renewable Government Energy Aggregation • Sustainable Jersey's Renewable Government Energy Aggregation action		
Potential Stakeholders: <i>(modify to suit your community)</i> • Energy consultant(s) • Local media • Neighboring municipalities	Initiative lead: <i>Enter name of point person</i>	Planned initiative start date: <i>Enter text</i>	Anticipated initiative length: <i>Enter text</i>	Priority: <i>Enter text</i>	Departments Involved: <i>Enter text</i>	Anticipated funding sources: <i>Enter text</i>	Obstacles/Barriers: <i>Enter text</i>	Next steps: (specific and tangible): <i>Enter text</i>

2.11 Support Community Solar as Project Ambassador								
Status in CEP: Initiative not included in plan		Initiative Summary: Establish a Renewable Government Energy Aggregation (R-GEA) program. R-GEA is a third-party electric supply contract negotiated by a municipality (or group of municipalities) on behalf of its residents. Utilizing their size, municipalities can negotiate for a supply that is more sustainable, often less expensive, and with better and more secure terms than can typically be achieved by individual residents.						
Current Status:		Measures of Success:				Resources:		

<ul style="list-style-type: none"> Public school district Neighboring municipalities Not for-profit groups PSE&G 	Oren K. Dabney, Director of DPW	Within 1 year	Three years	High	Public Works Finance Buildings	ESIP LGEA Direct Install CEP Implementation grant Sustainable Jersey State & Federal grant programs	Condition of buildings Management and access to building energy use data	<ol style="list-style-type: none"> Seek Technical Assistance from Sustainable Jersey to establish its Energy Star Portfolio Manager Use the Portfolio Manager to identify buildings where energy use should be reduced Identify eligibility and applicability of various funding programs Conduct building audits according to the applicable program requirements Apply for desired funding program: RFP for contractors to carry out recommended improvements
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3.2 Residential Energy Efficiency Outreach Campaign

Status in CEP:	
Initiative not included in plan	Initiative Summary: Implement an outreach effort to help residents take advantage of energy efficiency incentive programs offered by New Jersey's electric and natural gas utilities, including Home Performance with ENERGY STAR and Comfort Partners.

Current Status:	Measures of Success:	Resources:
	<ul style="list-style-type: none"> Outreach team training with Sustainable Jersey 5% of residents participate in Direct Install program during the campaign 	<ul style="list-style-type: none"> NJ gas and electric utilities' Residential Energy Efficiency Program websites Sustainable Jersey's Residential Energy Efficiency Outreach action

Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> Natural gas or electric utility Local Direct Install contractor Building Owners and Managers Association (BOMA) Local business associations (inc. Minority business association) Large employers 								

3.3 Commercial Energy Efficiency Outreach Campaign

Status in CEP:	
Initiative included in plan	Initiative Summary: Implement an outreach effort to help local businesses take advantage of energy efficiency incentive programs offered by New Jersey's electric and natural gas utilities, including the Direct Install program.

Current Status:	Measures of Success:	Resources:
8.54% of businesses participated in an energy efficiency program as of 2021	<ul style="list-style-type: none"> Outreach team training with Sustainable Jersey 10% of businesses participate in an Energy Efficiency program during the campaign 	<ul style="list-style-type: none"> NJ gas and electric utilities' Commercial Energy Efficiency Program websites Sustainable Jersey's Commercial Energy Efficiency Outreach action US DOE's Blueprint 2A: Energy Efficiency: Energy Audits, Building Upgrades

Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> PSE&G Local Direct Install contractor Building Owners and Managers Association (BOMA) Local business associations (inc. Minority business association) Large employers 	Green Team (to be established)	Within 1 year	Ongoing	Moderate	Green Team, Clerk, Governing Body, Administration, Finance	Sustainable Jersey PSE&G	Business buy-in; Bureaucratic business structures	<ol style="list-style-type: none"> Green Team to work with PSE&G and Sustainable Jersey to create marketing materials promoting programs incentivizing energy efficiency upgrades; Green Team may apply for grant funding and technical assistance from Sustainable Jersey and PSE&G to implement campaign; Green team to coordinate with governing body, administration, clerk, finance, and other departments, as well as business associations such as the Special Improvement District to distribute materials through regular mailings, social media posts, City website, email blasts, events.

3.4 Conduct Energy Efficiency Outreach to Large Energy Users

Status in CEP:	
Initiative not included in plan	Initiative Summary: Contact large energy users in the community to prompt interest in managing energy use, including participating in utility commercial energy efficiency incentive programs like Engineered Solutions and PJM's Demand Response program.

Current Status:	Measures of Success:	Resources:
If the municipality has undertaken this initiative in the past, provide a description of past activities.	<ul style="list-style-type: none"> One of the community's largest energy users enrolls in utility energy efficiency program One of the community's largest energy users enrolls in demand-side management program 	<ul style="list-style-type: none"> NJ gas and electric utilities' Commercial Energy Efficiency Program websites Rutgers University's Green Building Manual Sustainable Jersey's Commercial Energy Efficiency Outreach action PJM's Demand Response Program US DOE's Blueprint 2A: Energy Efficiency: Energy Audits, Building Upgrades

Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> Natural gas or electric utility Business associations Rutgers University Center for Green Building 	Enter name of point person	Enter text	Enter text	Enter text	Enter text	Enter text	Enter text	Enter text

Strategy 4: Reduce Energy Consumption and Emissions from the Building Sector

List initiatives included in this strategy:

- 4.1 Construct New Municipal Buildings as Model Green Buildings
- 4.2 Encourage Benchmarking and Commissioning for Existing Buildings
- 4.3 Require Developers to Complete Green Development Checklist
- 4.4 Conduct Outreach Targeting New Construction in the Community

- [Go to Initiative](#)
- [Go to Initiative](#)
- [Go to Initiative](#)
- [Go to Initiative](#)

4.1 Construct New Municipal Buildings as Model Green Buildings								
Status in CEP:		Initiative included in plan						
Initiative included in plan		Initiative Summary: Implement a policy encouraging or requiring consideration of green building practices for any new municipal construction project. Highlight the incentives from NJCEP's New Construction Energy Efficiency program. Following construction, showcase green building features with on-site kiosks and digital webpages to encourage others to follow suit.						
Current Status:		Measures of Success:				Resources:		
None to date		<ul style="list-style-type: none"> • Pass resolution or ordinance encouraging/requiring that new municipal buildings follow green building practices • Construct the municipality's first LEED-Certified (Certified, Silver, Gold, Platinum) building, or building meeting other energy or environmental certifications that may be more appropriate • Hold a public event touting the "green" features of a new municipal building 				<ul style="list-style-type: none"> • Sustainable Jersey's New Construction action • Sustainable Jersey's Green Building Policy/Resolution action • Rutgers University's Green Building Manual 		
Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> • Local media • Regional environmental interest groups • U.S. Green Building Council and LEED credentialed professionals 	Zenobia Fields, Director of Economic Development	2 to 5 years	2 to 3 years	Moderate	Public Works Administration Finance	Enter text	Perception of upfront costs without consideration of long-term cost savings	<ol style="list-style-type: none"> 1. Adopt a Green Building Policy resolution encouraging or requiring green building practices for future municipal buildings 2. For any future municipal building construction, establish a minimum green building threshold to be met. Include this threshold in RFP materials. 3. Following construction and opening, conduct a campaign to educate the public about the green features of the building and the benefits reaped by the public from those features
4.2 Encourage Benchmarking and Commissioning for Existing Buildings								
Status in CEP:		Initiative not included in plan						
Initiative not included in plan		Initiative Summary: Educate local building managers about benchmarking and commissioning. Inform building managers of utility building management programs that include benchmarking and/or commissioning.						
Current Status:		Measures of Success:				Resources:		
If the municipality has undertaken this initiative in the past, provide a description of past activities.		(modify to suit your community) <ul style="list-style-type: none"> • Information about benchmarking and commissioning posted to municipal website • Major building owner agrees to have buildings benchmarked and commissioned 				<ul style="list-style-type: none"> • NJ gas and electric utilities' Commercial Energy Efficiency Program websites • Sustainable Jersey Commercial Energy Efficiency Outreach action 		
Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
(modify to suit your community) <ul style="list-style-type: none"> • Commercial building managers • Natural gas or electric utility • Facility maintenance services companies 	Enter name of point person	Enter text	Enter text	Enter text	Enter text	Enter text	Enter text	Enter text
4.3 Require Developers to Complete Green Development Checklist								
Status in CEP:		Initiative included in plan						
Initiative included in plan		Initiative Summary: Pass a Green Building Policy or Resolution that requires developers to submit a completed Green Development Checklist with Site Plan Applications. Checklist should refer developers to NJCEP's New Construction Energy Efficiency programs.						
Current Status:		Measures of Success:				Resources:		
None to date		<ul style="list-style-type: none"> • Green Development Checklist published • Municipal ordinance requires developers to submit a completed Green Development Checklist • Major new development utilizes recommendations from Green Development Checklist 				<ul style="list-style-type: none"> • Sustainable Jersey's Create a Green Development Checklist action • Sustainable Jersey's Green Building Policy/Resolution action 		
Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> • U.S. Green Building Council and LEED credentialed professionals 	Zenobia Fields, Director of Economic Development	Within 1 year	Less than 6 months	Low	Buildings Planning Board Zoning Board	None	Making developers and reviewing staff/boards aware of the requirement	<ol style="list-style-type: none"> 1. City to instruct professionals and staff to create a Green Development Checklist based upon successful examples elsewhere 2. Governing body to introduce and adopt an ordinance requiring developers to submit a completed Green Development Checklist 3. Boards and staff to enforce this requirement and encourage developers to implement actions on those checklists
4.4 Conduct Outreach Targeting New Construction in the Community								
Status in CEP:		Initiative not included in plan						
Initiative not included in plan		Initiative Summary: Reach out to developers to encourage participation in NJCEP's New Construction Energy Efficiency incentive programs.						
Current Status:		Measures of Success:				Resources:		

If the municipality has undertaken this initiative in the past, provide a description of past activities.		(modify to suit your community) • Information on NJCEP's New Construction Energy Efficiency incentive programs distributed via multiple mediums • Major new development utilizes NJCEP program(s)				• NJCEP's Commercial New Construction Energy Efficiency webpage • US DOE's Blueprint 2C: Building Efficiency & Electrification Campaign		
Potential Stakeholders:	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
(modify to suit your community) • Builders trade associations (e.g., U.S. Green Building Council) • Building architects and developers • Financial institutions	Enter name of point person	Enter text	Enter text	Enter text	Enter text	Enter text	Enter text	Enter text

Strategy 6: Support Community Energy Planning and Action with an Emphasis on Encouraging and Supporting Participation by Low- and Moderate-Income and Environmental Justice Communities

- List initiatives included in this strategy:
- 6.1 Make Community Energy Planning Inclusive [Go to initiative](#)
 - 6.2 Conduct Energy Efficiency Outreach to Low- and Moderate-Income Residents [Go to initiative](#)
 - 6.3 Support Shared Mobility Programs [Go to initiative](#)
 - 6.4 Support Low- and Moderate-Income Community Solar Subscriptions [Go to initiative](#)
 - 6.5 Conduct Energy Efficiency Outreach to Community-Serving Institutions [Go to initiative](#)

6.1 Make Community Energy Planning Inclusive										
Status in CEP:		Initiative already being implemented							Initiative Summary: Ensure low- and moderate-income residents are represented in energy planning processes, both on the core planning team and among those contributing via public comment. Methods include scheduling meetings at convenient times (varying meeting time if needed), engaging with community organizations who can bring in underrepresented voices, and advertising planning meetings in appropriate media.	
Current Status:		Diverse board make-up; application and other agenda materials available online				Measures of Success: • Demographics of entire community represented on planning team • Public comment meetings well-attended			Resources: • Sustainable Jersey's Improve Public Engagement in Planning and Zoning action • Cadmus and USDN's Guidebook on Equitable Clean Energy Program Design • US DOE's Blueprint 1: Energy Planning	
Potential Stakeholders :	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):		
• Local media • Community improvement/assistance organizations • Public school district • Faith-based organizations	Governing Body Land Use Board Secretaries and Chairpersons	Within 1 year	Ongoing	Moderate	Land Use Boards	None	Language barriers Meeting Schedules	1. Governing body to ensure that all future announcements of vacancies on land use boards are distributed to prominent community groups associated with various demographic groups. 2. Land use board secretaries and leadership to work with City officials to expand opportunities for public participation in board hearings on significant applications, including tools for the public to hear or comment on applications or ordinances when they are unable to attend meetings in person.		

6.2 Conduct Energy Efficiency Outreach to Low- and Moderate-Income Residents										
Status in CEP:		Initiative included in plan							Initiative Summary: Promote state and utility energy efficiency programs for low- and moderate-income residents using community-serving institutions as messengers, using non-English promotional materials where appropriate, and emphasizing co-benefits of energy efficiency upgrades (health, safety, and comfort).	
Current Status:		None to date				Measures of Success: • Use events and public announcements/mailings to educate the public about energy efficiency and support programs. • 5% of eligible residents participate in income-qualifying state/utility energy efficiency programs			Resources: • Utility residential energy efficiency program websites . • Sustainable Jersey's Energy Assistance Outreach action • Sustainable Jersey's Residential Energy Efficiency Outreach action [see Resources section] • US DOE's Justice40 Initiative	
Potential Stakeholders :	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):		
• Affordable housing owners/managers (public & private) • Tenant's organizations • Public school district • Faith-based & community organizations • PSE&G	Green Team (to be established)	Within 1 year	Ongoing	Moderate	Clerk Finance Administration	Sustainable Jersey PSE&G	Language barriers	1. Green Team to work with Sustainable Jersey and PSE&G to generate marketing materials advertising the availability of income-targeted energy efficiency and energy support programs 2. Marketing materials to be distributed through City mailings, email-blasts, social media posts, and posted on the City's website, in City buildings and schools, and at well attended events such as fairs sponsored by the City.		

6.3 Support Shared Mobility Programs										
Status in CEP:		Initiative included in plan							Initiative Summary: Promote and develop shared transportation networks of cars, bikes, scooters, etc. with design features that particularly assist low- and moderate-income residents. Encourage shared transportation services to expand access in low-income neighborhoods and provide low-income membership options.	

Current Status: The City previously worked with Limebike to provide a dockless bike share in the City		Measures of Success: • Launch new shared transportation option in the municipality • Create low-income membership option for residents using a shared transportation network				Resources: • The Greenlining Institute's Electric Carsharing in Underserved Communities • Federal Highway Administration's Travel Behavior: Shared Mobility and Transportation Equity • US DOE's Justice40 Initiative		
Potential Stakeholders : • Shared electric bike/scooter companies • Shared automobile companies • Neighboring municipalities • Shopping centers • Special improvement districts • Redevelopers • Bus and shuttle providers	Initiative lead: Zenobia Fields, Director of Economic Development	Planned initiative start date Within 2 years	Anticipated initiative length: 2-3 years	Priority Moderate	Departments Involved: Economic Development Finance Public Works	Anticipated funding sources: Sustainable Jersey TBD	Obstacles/Barriers: • Marketing to maximize user/ridership • Identifying suitable locations for docks / shared car parking spaces • Selecting routes for transit connector buses • Addressing public concerns about bike/scooter/car shares • Selecting vendors for shared mobility services	Next steps: (specific and tangible): 1. City to examine the reasons that the partnership with Limebike was discontinued, and identify strategies to make future bike-share programs more successful; 2. City to work with designated redevelopers of larger residential/mixed-use developments to provide complementary shuttle services to bring residents to the City's train and bus stops and major destinations like nearby retail malls. This will be achieved through Redevelopment Agreements and Community Benefit Agreements; 3. City to explore a partnership with neighboring municipalities to contract with bike-share, car share, and/or bus/shuttle service providers to provide services or stations at key transportation and shopping hubs, and arrange for discounted fees for low- and moderate-income households. 4. City to pursue grant funding to support the creation of alternative intra-city transit services

6.4 Support Low- and Moderate-Income Community Solar Subscriptions

Status in CEP: Initiative not included in plan	Initiative Summary: As a partner in a community solar project, implement a policy that reserves some project capacity for LMI residents and/or a discount for LMI subscribers to the project.
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Current Status: If the municipality has undertaken this initiative in the past, provide a description of past activities.		Measures of Success: (modify to suit your community) • Over 51% of the community solar project capacity reserved for LMI residents • Discount of 15% or more to LMI subscribers of community solar project				Resources: • Sustainable Jersey Municipally Supported Community Solar action • Sustainable Jersey Community Solar Guide • US DOE's Justice40 Initiative		
Potential Stakeholders: (modify to suit your community) • Community solar developers • Affordable housing owners/managers (public & private) • Community nonprofits • Tenant's organizations	Initiative lead: Enter name of point person	Planned initiative start date Enter text	Anticipated initiative length: Enter text	Priority Enter text	Departments Involved: Enter text	Anticipated funding sources: Enter text	Obstacles/Barriers: Enter text	Next steps: (specific and tangible): Enter text

6.5 Conduct Energy Efficiency Outreach to Community-Serving Institutions

Status in CEP: Initiative not included in plan	Initiative Summary: Reach out to limited-capacity entities that serve low- and moderate-income communities to encourage participation in state and utility energy efficiency programs. Outreach strategies include messaging indirect benefits of energy efficiency to organizational mission and segmenting outreach to different types of organization with different needs.
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Current Status: If the municipality has undertaken this initiative in the past, provide a description of past activities.		Measures of Success: (modify to suit your community) • Hold an event specifically targeting community-serving institutions for energy efficiency programs • Hold UEZ or Opportunity Zone, if they exist in municipality • 5% of eligible entities participate in a state/utility energy efficiency program				Resources: • NJ gas and electric utilities' Commercial Energy Efficiency Program websites • Sustainable Jersey's Energy Assistance Outreach action • ACEEE's Extending the Benefits of Nonresidential Energy Efficiency to Low-Income Communities		
Potential Stakeholders: (modify to suit your community) • Affordable housing owners/managers (public & private) • Health clinics • Faith-based organizations • Community foundations • Local business associations • Food banks • Homeless shelter	Initiative lead: Enter name of point person	Planned initiative start date Enter text	Anticipated initiative length: Enter text	Priority Enter text	Departments Involved: Enter text	Anticipated funding sources: Enter text	Obstacles/Barriers: Enter text	Next steps: (specific and tangible): Enter text

Strategy 7: Expand the Clean Energy Innovation Economy

List initiatives included in this strategy:

- 7.1 Adopt Energy Storage Policies [Go to Initiative](#)
- 7.2 Install an Energy Storage System [Go to Initiative](#)
- 7.3 Develop Local Microgrid [Go to Initiative](#)
- 7.4 Develop/Participate in a District Energy System [Go to Initiative](#)

7.1 Adopt Energy Storage Policies								
Status in CEP:		Initiative included in plan						
		Initiative Summary: Adopt standards and establish requirements for permitting battery energy storage systems. Post information about energy storage regulations to the municipal website and ensure appropriate municipal staff are informed.						
Current Status:			Measures of Success:			Resources:		
None in place			<ul style="list-style-type: none"> Regulations adopted addressing battery energy storage Permitting system for energy storage established 			<ul style="list-style-type: none"> NYSEBDA's Battery Energy Storage System Guidebook 		
Potential Stakeholders :	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> Electric utility Energy storage companies Large energy users 	Zenobia Fields, Director of Economic Development	Within 18 months	Less than 6 months	Low	Buildings Fire Planning Board Planning and Engineering Professionals	None	Public perception of battery storage systems	<ol style="list-style-type: none"> City to authorize consultants or planning staff to draft ordinance permitting small scale battery storage systems. Planners to consult with fire and building departments to assess concerns related to permitting and fire. Permitting documents to be created according to the scale of battery storage systems to be permitted and feedback from fire/buildings. Ordinance and permits to be introduced and adopted by governing body with consistency review from the Planning Board.

7.2 Install an Energy Storage System								
Status in CEP:		Initiative included in plan						
		Initiative Summary: Install on-site energy storage, such as batteries, compressed air, or thermal storage, for municipal facilities. Following construction, showcase the project with on-site kiosks and municipal webpages to encourage others to follow suit.						
Current Status:			Measures of Success:			Resources:		
None to date			<ul style="list-style-type: none"> RFP for municipal energy storage system posted Energy storage project installed and operational 			<ul style="list-style-type: none"> SolSmart's Solar + Storage: A Guide for Local Governments Carbon Trust's Energy Storage Guide 		
Potential Stakeholders :	Initiative lead:	Planned initiative start date	Anticipated initiative length:	Priority	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> Electric utility Energy storage company School districts Utility authority, public housing, etc. 	Zenobia Fields, Director of Economic Development	Within 2 years	1 to 2 years	Low	DPW Emergency Services	State and Federal Grants, Inflation Reduction Act	<ul style="list-style-type: none"> Assessing optimal locations Addressing safety issues and concerns 	<ol style="list-style-type: none"> City to conduct an assessment of needs and purposes for storage systems, such as reducing peak energy costs, storing energy from solar installations, or providing emergency power backup. City to identify facility(ies) where energy storage is a priority. City to monitor and apply for funding opportunities to offset the cost of battery systems. City to RFP for installation of battery systems consistent with funding program requirements and desired form of ownership of the storage system.

7.3 Develop Local Microgrid								
Status in CEP:		Initiative included in plan						
		Initiative Summary: Participate in development of a microgrid. Microgrid development generally starts with a feasibility study, followed by project design, then project implementation. Following construction, showcase the project with on-site kiosks, a municipal webpage, and/or ribbon-cutting event.						
Current Status:			Measures of Success:			Resources:		
None to date			<ul style="list-style-type: none"> Microgrid feasibility study completed Microgrid completed 			<ul style="list-style-type: none"> NJBPU's Town Center Distributed Energy Resource Microgrid Program 		
Potential Stakeholders:	Initiative lead:	Planned initiative start date:	Anticipated initiative length:	Priority:	Departments Involved:	Anticipated funding sources:	Obstacles/Barriers:	Next steps: (specific and tangible):
<ul style="list-style-type: none"> PSE&G School/school districts Housing Authority Parking Authority NJ Transit County Downtown Improvement District Police, fire departments Childcare providers Senior living providers 	Zenobia Fields, Director of Economic Development	Within 3 years	5 years	Moderate	Public works Economic development Emergency Management Finance Engineering	BPU Sustainable Jersey IRA	<ul style="list-style-type: none"> Buy-in Economic feasibility (generation potential, energy demand) Responsiveness of property owners 	<ol style="list-style-type: none"> Seek funding for feasibility study Conduct feasibility study If determined to be feasible, conduct outreach to businesses, critical facilities, multi-family developments in delineated area

7.4 Develop/Participate in a District Energy System								
Status in CEP:		Initiative included in plan						
		Initiative Summary: Partner on developing an energy-efficient district energy system. District energy development generally starts with finding interested partners who a feasibility study, followed by project design, then construction. Once complete, showcase the project with on-site kiosks, a municipal webpage, and/or ribbon-cutting event.						

Current Status: <i>If the municipality has undertaken this initiative in the past, provide a description of past activities.</i>		Measures of Success: <i>(modify to suit your community)</i> • Feasibility study for district energy completed • District energy system installed and operational				Resources: • International District Energy Association's Community Energy Planning, Development and Delivery Guide .		
Potential Stakeholders: <i>(modify to suit your community)</i> • Electric and natural gas utilities • Downtown business associations • Construction companies	Initiative lead: <i>Enter name of point person</i>	Planned initiative start date: <i>Enter text</i>	Anticipated initiative length: <i>Enter text</i>	Priority: <i>Enter text</i>	Departments Involved: <i>Enter text</i>	Anticipated funding sources: <i>Enter text</i>	Obstacles/Barriers: <i>Enter text</i>	Next steps: (specific and tangible): <i>Enter text</i>

Go to:

- Strategy 1: [Transportation](#)
- Strategy 2: [Renewable Energy](#)
- Strategy 3: [Energy Efficiency](#)
- Strategy 4: [Building Sector](#)
- Strategy 6: [Environmental Justice](#)
- Strategy 7: [Clean Energy Innovations](#)
- CEP [Municipal Summary](#)

DRAFT

APPENDIX

2

IDLING REDUCTION SAVINGS CALCULATOR

Idling Reduction Savings Calculator

For an interactive Excel version of this calculator, please go to http://www.transportation.anl.gov/downloads/idling_worksheet.xls.

Calculate Costs for Avoidable Idling

1	How much fuel is used for idling? (If you don't know, see reference table on reverse.)	Realistically, how many hours each year might you use idling reduction (IR) devices instead of idling?	What is the price of fuel?	Avoidable Idling Fuel Costs
	<input type="text"/> gallons/hour	<input type="text"/> hours/year	\$ <input type="text"/> /gallon	\$ <input type="text"/> /year +
2			What is your average fuel economy?	
	<input type="text"/> gallons/hour	<input type="text"/> hours/year	<input type="text"/> miles/gallon	<input type="text"/> miles/year
3	How much does an oil change cost?	How many miles between oil changes?		Preventive Maintenance Cost¹
	\$ <input type="text"/> /oil change	<input type="text"/> miles/oil change	\$ <input type="text"/> /mile	\$ <input type="text"/> /year +
4	How much does an engine overhaul or new vehicle cost?	How many miles between overhauls or vehicle replacement?		Overhaul or Replacement Cost¹
	\$ <input type="text"/> /overhaul or replacement	<input type="text"/> miles/overhaul or replacement	\$ <input type="text"/> /mile	\$ <input type="text"/> /year
5	Add values in right-hand column =			Total Avoidable Idling Costs
				\$ <input type="text"/> /year

Calculate Costs for Idling Reduction (IR) – Device and/or Electrified Parking Space (EPS)

6	How much fuel is used by the IR device?	How many hours each year could you use IR devices instead of idling?*	Price of fuel (same as price listed in line 1)	Fuel cost for IR device	
	<input type="text"/> gallons/hour	<input type="text"/> hours/year	\$ <input type="text"/> /gallon	\$ <input type="text"/> /year	
7			Maintenance cost for IR device		Operating Cost for On-board IR Device
			\$ <input type="text"/> /year	+ \$ <input type="text"/> /year	\$ <input type="text"/> /year
8	Cost per hour to plug into EPS	How many hours each year could you use EPSs instead of idling?*	Cost to plug in		Total Operating Costs for IR
	\$ <input type="text"/> /hour	<input type="text"/> hours/year	\$ <input type="text"/> /year	+ \$ <input type="text"/> /year	\$ <input type="text"/> /year

Calculate Savings from IR

9	Capital cost of on-board IR device	SAVINGS Line 5 – Line 8	Payback Time
	\$ <input type="text"/>	÷ \$ <input type="text"/> /year saved	<input type="text"/> years

10 ^A - ^B = gallons saved/year

* Total number of hours from lines 6 and 8 should equal the number of hours in line 1.
¹ TMC Recommended Practice 1108, "Analysis of Costs from Idling and Parasitic Devices for Heavy Duty Trucks" (2003). Technology & Maintenance Council, American Trucking Associations (TMC/ATA).

How Much Fuel Is Used for Idling?

Vehicle Type	Class	Fuel Type	Size Indicator		Idling Fuel Use (gal/h)		Source
			Engine Size (l)	GVWR (lb)	No load	With load	
Passenger Car (Ford Focus)	1	G	2	–	0.16	0.29	ANL 1
Passenger Car (Volkswagen Jetta)	1	D	2	–	0.17	0.39	ANL 1
Passenger Car (Ford Crown Victoria)	1	G	4.6	–	0.39	0.59	ANL 1 & 2
Medium Heavy Truck	6	G	5–7	19,700–26,000	0.84	–	WVU
Delivery Truck	5	D	–	19,500	0.84	1.1 ¹	NREL
Tow Truck	6	D	–	26,000	0.59	1.14 ²	ORNL
Medium Heavy Truck	6–7	D	6–10	23,000–33,000	0.44	–	WVU
Transit Bus	7	D	–	30,000	0.97	–	ORNL
Combination Truck	7	D	–	32,000	0.49	–	ORNL
Bucket Truck	8	D	–	37,000	0.90	1.50 ²	ORNL
Tractor-Semitrailer	8	D	–	80,000	0.64	1.15 ^{3,1}	TMC

D = diesel. G = gasoline. Gal = gallon(s). GVWR = gross vehicle weight rating. h = hour(s). l = liter(s). lb = pound(s). PTO = power take-off.

¹ High idle.

² PTO on.

³ Air conditioning on.

Sources

ANL 1: Stutenberg, K., and Lohse-Busch, H. "APRF [Advanced Powertrain Research Facility at Argonne National Laboratory] Conventional Vehicles Snapshot Study." Presentation to U.S. DOE, December 2, 2012.

ANL 2: Rask, E.; Keller, G.; Lohse-Busch, H.; et al. (2013). "Final Report: Police Cruiser Fuel Consumption Characterization." Work performed by Argonne National Laboratory for the Illinois Tollway Authority.

NREL: National Renewable Energy Laboratory Project Draft Final Report for the Period August 1, 2012, through March 31, 2014, "Data Collection, Testing and Analysis of Hybrid Electric Trucks and Buses Operating in California Fleets." ARB Agreement Number 11-600, NREL Contract Number FIA-12-1763, April 15, 2014.

ORNL: Lascrain, M.B.; Franzese, O.; Capps, G.; et al. (2012). *Medium Truck Duty Cycle Data from Real-World Driving Environments: Project Final Report* (ORNL/TM-2012/240). Work performed by Oak Ridge National Laboratory for the U.S. DOE.

TMC: TMC Recommended Practice 1108, "Analysis of Costs from Idling and Parasitic Devices for Heavy Duty Trucks" (2003). Technology & Maintenance Council, American Trucking Associations (TMC/ATA).

WVU: Khan, ABM S.; Clark, N.N.; Gautam, M.; et al. (2009). "Idle Emissions from Medium Heavy Duty Diesel and Gasoline Trucks." *Journal of the Air & Waste Management Association* (59:3) 354–359.

Other Idling Reduction Resources

- IdleBox www.cleancities.energy.gov/idlebox
- IdleBase <http://cleancities.energy.gov/idlebase>
- National Idling Reduction Network News energy.gov/eere/vehicles/vehicle-technologies-office-national-idling-reduction-network-news
- Argonne National Laboratory <http://www.transportation.anl.gov/engines/idling.html>
- Alternative Fuels Data Center http://www.afdc.energy.gov/conservation/idling_reduction_basics.html

APPENDIX

3

MODEL SOLAR SUPPORTIVE ZONING ORDINANCE

GUIDANCE FOR CREATING A SOLAR FRIENDLY ORDINANCE

The purpose of this Sustainable Jersey Guidance document is to assist municipalities in crafting a solar ordinance that meets the objectives outlined in the Make Your Town EV Friendly Action and that is best suited to each community's character and land use objectives.

Discussion and sample language regarding the following areas is included in this guidance:

Intent/Background/Purpose

- Address goals and benefits of solar/renewable energy

Definitions

- Define solar technologies and terms

General Regulations

- Address issues such as height, size, setbacks, and lot coverage

Permitting Fees

- Establish permitting fees for residential rooftop solar PV installations

INTENT/BACKGROUND/PURPOSE

- The purpose will generally highlight the benefits of solar for the community: environmental, energy security, economic, etc.
- If the ordinance is a "stand-alone" ordinance, the municipality may wish to tie the regulations back to New Jersey's Municipal Land Use Law by referencing applicable language that may apply to solar (e.g., health, safety, welfare).

This section should:

- Clarify a municipality's rationale for establishing a solar energy ordinance in language that is compatible with existing local land use plans and zoning code.
- Clarify the types of solar systems the municipality is protecting through the ordinance (small-scale, utility scale, etc.).

Sample Language for Intent/Background/Purpose:

The purpose of this Ordinance is to provide a clear-cut regulatory system for solar energy, a renewable and non-polluting energy resource that reduces fossil fuel emissions, including greenhouse gases that contribute to global climate change. The specific goals of the [Master Plan/Climate Plan] of [Municipality] support renewable energy and the use of solar energy is encouraged by New Jersey legislation.

OR

The purpose of the Ordinance is to facilitate the construction, installation and operation of Solar Energy Facilities in [Municipality] in a manner that protects public health, safety and welfare and avoids significant impacts to protected resources such as important agricultural lands, endangered

species, high value biological habitats and other protected resources. It is the intent of this ordinance to encourage solar facilities that reduce reliance on fossil fuels, increase local economic development and job creation, reduce greenhouse gas emissions, assist New Jersey in meeting its Renewable Portfolio Standards, and/or promote economic development diversification.

OR

The purpose of this ordinance is to provide a regulatory framework for the construction of Solar Energy Systems in [Municipality], subject to reasonable restrictions, which will preserve the public health, safety, and welfare, while also maintaining the character of [Municipality].

OR

The purpose of this ordinance is to provide for the use of solar energy, including specifications related to the land development, installation and construction of solar energy systems in [Municipality], subject to reasonable conditions to protect the public health, safety, and welfare. This section applies to solar energy systems to be installed and constructed on any property.

What NOT to do

Purpose sections should not:

- include specific goals such as number of megawatts (MW) or number of projects;
- make reference to specific types of technology that could quickly become outdated or impractical.

Not specifying PV system size and/or technology allows for innovation and advancement in PV technology where a smaller amount of land or roof space could result in a larger capacity system (as measured in W or kW).

DEFINITIONS

- Each municipality should consider its requirements for the types of solar facilities it envisions for its community when considering which definitions to utilize in the Ordinance.
- Any term used in the text of the ordinance must be defined. The definition of each term can greatly impact how an ordinance is enforced; providing accurate definitions of these terms will ensure clarity in the enforcement of the ordinance. Definitions may be included in the body of the alternative energy ordinance, if it is a stand-alone ordinance, or may be incorporated into the Definitions section of the solar ordinance.

This section should:

- Clearly define each term specific to solar energy systems included in the ordinance.
- Provide separate definitions for small scale accessory use (Solar Energy System) and utility scale principal use (Solar Energy Facility) so that they can be regulated distinctly.
- Provide definitions of solar energy system types such as: roof-mounted, ground-mounted, and building-integrated.

Sample Language for Definitions:

- **Solar Energy System – Accessory Use**

An energy system that consists of one or more solar collection devices, solar energy related “balance of system” equipment, and other associated infrastructure with the primary intention of generating electricity, storing electricity, or otherwise converting solar energy to a different form of energy. Solar energy systems may generate energy in excess of the energy requirements of a property only if it is to be sold back to a public utility in accordance with the NJ Net Metering law [see Note below on net-metering in New Jersey].

OR

A solar energy system – accessory use consists of one (1) or more photovoltaic, concentrated solar thermal, or solar hot water devices either free-standing ground, building integrated or roof mounted, as well as related equipment which is intended for the purpose of reducing or meeting the energy needs of the property’s principal use.

These definitions include physically what a solar energy system is (can be solar hot water or PV), how it is to be used.

These definitions apply only to accessory use systems. These definitions do not allow utility-scale use.

Note on net-metering in New Jersey:

- Net metering helps customers maximize their renewable energy investments. It enables customers to obtain full retail credits on their utility bill for each kWh of electricity their system produces up to 100% of their electricity usage over the course of a year.
- When a renewable energy system produces more electricity than the customer actually uses, the customer will be compensated with credits at the full retail value of the electricity for the production over and above what they use. For example, on a typical sunny day at moderate temperatures, a customer with a solar system may use less electricity than the system actually generates. When electricity production exceeds usage, the utility meter will spin backwards and provide the customer with credits for the excess energy produced. These credits can be used by customers as needed.
- For more information, see: <http://www.njcleanenergy.com/renewable-energy/programs/net-metering-and-interconnection>

- **Solar Energy Facility – Principal Use**

An alternative energy facility that consists of one or more ground-mounted, free-standing, or building-integrated solar collection devices, solar energy related equipment and other associated infrastructure with the primary intention of generating electricity or otherwise converting solar energy to a different form of energy for primarily off-site use.

OR

An area of land or other area (e.g. parking lot canopy, landfill, brownfield, etc.) used for a solar collection system principally used to capture solar energy, convert it to electrical energy or thermal power and supply electrical or thermal power primarily for off-site use. Principal solar energy systems consist of one (1) or more free-standing ground, or roof mounted solar collector devices, solar related equipment and other accessory structures and buildings including light reflectors, concentrators, and heat exchangers, substations, electrical infrastructure, transmission lines and other appurtenant structures.

- This definition applies to ordinances that choose to address utility-scale solar energy facilities. Such facilities would be considered a principal use.

- **Ground-Mounted Solar Energy System**

A solar energy system that is directly installed on solar racking systems, which are attached to an anchor in the ground and wired to connect to an adjacent home or building. Ground-mounted systems may be appropriate when insufficient space, structural and shading issues, or other restrictions prohibit rooftop solar.

- A ground mounted solar energy system is a subset or particular type of solar energy system that may require additional restrictions or review. Municipalities may wish to impose specific regulations on ground-mounted solar energy systems, in which case, a definition would be important to include.

- **Solar Farm or Solar Garden**

A set of solar collection devices designed to capture sunlight and convert it to electricity primarily for offsite consumption and use; some electricity may be used by an onsite building or structure.

- Solar gardens can be designed as community solar systems in which community members can own shares in the solar system; subscribe to receive the generated solar power; or can purchase the output of the solar system to offset their own utility bills. [Sample language for solar gardens from: Southern NH Planning Commission. Solar Friendly Best Planning Practices, p. 4: snhpc.org/pdf/FinalSolarResourceGuide2015.pdf]

What NOT to do

- Definition section should not specify the electrical size of the PV system (i.e. defining a small scale system as equal to or less than 100 kW). Not specifying PV system size allows for innovation and advancement in PV technology where a smaller amount of land or roof space could result in a larger capacity system (as measured in W or kW).
- Definitions sections should not address concerns about system siting; these concerns should be addressed through appropriate use, setback, or height restrictions to ensure that the land use and siting goals are met no matter the system size. This allows more flexibility to those who wish to site or install solar on their roof.

GENERAL REGULATIONS

The general regulations are guidelines or added requirements that may be integrated into the local review process. This section of the ordinance can present regulations that the municipality may include in the ordinance, such as height, setbacks, aesthetics/screening, and impervious coverage.

This section should clarify approval standards that:

- may be imposed upon specific types of solar energy systems (i.e., ground-mounted/freestanding versus roof-mounted);
- may be imposed upon specific districts; or
- may be generally applied to all solar energy systems.

Setbacks

Ground-Mounted: For ground-mounted solar energy systems, setback requirements can help alleviate aesthetic and safety concerns, yet overly restrictive setback requirements can limit the available space in which a solar PV array can be sited. Since solar PV panels rely on adequate access to sunlight, municipalities may want to consider easing setback requirements for ground-mounted solar PV systems.

Sample Language for Ground-Mounted:

The location of the Ground-Mounted System shall meet all applicable accessory-use setback requirements of the zoning district in which it is located.

OR

All Ground-Mounted Systems shall be set back a distance of ____ feet from any property line in a residential zoning district or in conformance with the area and bulk standards for accessory structures in commercial districts as provided herein.

OR

Ground-Mounted Systems shall not be permitted in a front yard unless the applicant demonstrates that the rear yard locations will not result in acceptable solar access.

Roof-Mounted: Setback regulations for roof-mounted systems can ensure that adequate pathways exist for access along roof edges and ridge lines for first responders in case of a fire or for maintenance crews in the case of system repair. The minimum construction requirements can be found in the NJ Editions of the National Electrical Code, International Building Code (and by reference, International Fire Code), and International Residential Code, as applicable. Items not covered within these codes may be added to a local ordinance.

Sample Language for Roof-Mounted:

The design of the solar energy system shall conform to applicable local, state and national solar codes and standards. A building permit reviewed by department staff shall be obtained for a

solar energy system. All design and installation work shall comply with all applicable provisions in the National Electric Code (NEC), the International Residential Code (IRC), International Commercial Building Code, State Fire Code, and any additional requirements set forth by the local utility (for any grid-connected solar systems). [Sample language from: Solar Simplified, p. 9: solarsimplified.org/zoning/solar-zoning-toolbox/solarzoningordinance]

Height: Height regulations can help alleviate local land use concerns over aesthetics (e.g. how much of the system can be seen from the street). However, height restrictions can prevent a solar PV system from being installed if the building on which it is sited is already at maximum allowed height if the municipality does not specify an exemption for the system in its ordinance. Separate height language options are provided for sloped and flat roofs. In communities with both sloped and flat roof types, it may be most appropriate to include separate regulations by roof type.

Sample Language for Height Regulations:

Height – Sloped Roof

For a roof-mounted system installed on a sloped roof, the highest point of the system shall not exceed the highest point of the roof to which it is attached as allowed by setback requirements.

Height – Flat Roof

For a roof-mounted system installed on a flat roof, the highest point of the system shall be permitted to exceed the district’s height limit by up to fifteen (15) feet above the rooftop to which it is attached.

Height – Ground-Mounted

Ground-mounted or freestanding solar energy systems shall not exceed applicable maximum accessory structure height in the zoning district in which the solar energy system is located.

Height – Parking Canopies

A solar energy system may exceed the applicable maximum accessory structure height if it will cover an impervious surface parking area. Height may not exceed the height of the primary structure that the parking area serves. Minimum height of the parking canopy must allow clearance for emergency service and service vehicles.

What NOT to do

If an ordinance is designed and enforced properly, the height and setback restrictions should alleviate aesthetic concerns about solar PV systems. Therefore, municipalities should not over-regulate for aesthetic concerns such as:

- conspicuous panels that are visible from the street,
- conspicuous equipment tied to the panels, or
- glare.

SPECIAL CONSIDERATIONS: HISTORIC DISTRICTS

Municipalities with historic districts should work with their Historic Preservation Commission to determine whether there will be restrictions on solar PV installations in historic districts that will require review. If design guidelines, siting restrictions, or review requirements exist, they should be laid out explicitly in the ordinance to ensure that a clear and understandable review process is known to the applicant. Review processes add time and added labor cost through delayed installations, so municipalities should attempt to make solar provisions for historic districts minimally restrictive. Below are two examples of design guidelines for installing solar on historic properties.

- **Implementing Solar PV Projects on Historic Buildings and in Historic Districts**, National Renewable Energy Laboratory:
www.nrel.gov/docs/fy11osti/51297.pdf
- **Installing Solar Panels on Historic Buildings**, North Carolina Solar Center:
nccleantech.ncsu.edu/wp-content/uploads/Installing-Solar-Panels-on-Historic-Buildings_FINAL_2012.pdf
- **Solar Panels on Historic Properties**, National Park Service:
www.nps.gov/tps/sustainability/new-technology/solar-on-historic.htm

Sample Language for Historic Districts:

Solar energy systems within a historic district or on a historic resource property are not permitted unless written approval or a Certificate of Appropriateness has been granted by the Historic Preservation Commission as established by [historic preservation ordinance].

OR

All solar energy systems/facilities within [historic district/overlay/etc.] or on a historic resource property as defined by [the municipal inventory/register/etc.] must follow the administrative procedures required by [historic preservation ordinance].

SPECIAL CONSIDERATIONS: TREES

While it is true that shade of any kind interferes with a solar energy system's ability to operate, removing trees to install solar technology is generally not recommended. However, there are legitimate arguments for and against removing trees to accommodate solar panels. There is no clear right answer and much of the calculus depends on the values and objectives of each community. Municipalities are encouraged to consider if this is an issue warranting local regulation. If there is an existing tree protection ordinance, for example, the municipality can determine if solar panels should be given any special consideration and amend the ordinance accordingly.

PERMITTING FEES

Using a flat-fee method instead of a value-based method to assess permit fees streamlines the process and ensures that larger residential solar energy systems are not arbitrarily penalized. Fees should fairly reflect the time needed for city staff to review and issue a permit as these costs to the municipality remain constant regardless of system size for standard residential roof-mounted arrays.

The permitting fee ordinance should:

Establish reasonable residential permit fees in line with NJAC 5:23-4.20:

NJAC 5:23-4.20 (c) 2. iii. (13) For photovoltaic systems, the fee shall be based on the designated kilowatt rating of the solar photovoltaic system as follows:

- (A) One to 50 kilowatts, the fee shall be \$ 65.00;*
- (B) Fifty-one to 100 kilowatts, the fee shall be \$ 129.00; and*
- (C) Greater than 100 kilowatts, the fee shall be \$ 640.00.*

The municipality should strive to set a fee that covers the cost of average plan review and inspections. To set the fee, the municipality can multiply the billable hourly rates for staff involved in the review process that can be expected for 80% of permit submittals. Examples of these calculations are provided in the Department of Energy SunShot document *Best Management Practices for Solar Installation*, which can be found at: marc.org/Environment/Energy/pdf/BMP-Process-Step-2-1-A-Standardize-Permit-Fees.aspx

What NOT to do

Fees based on the size or value of the solar PV installation unfairly penalize homeowners even though the cost to process the permit application for both systems is approximately the same. For example, the permit application for a smaller residential solar PV system costs the municipality approximately the same amount to process as a larger residential solar PV system, but a value-based fee structure can result in higher fees being assessed for the larger system. Fees should be set that reflect the time needed for staff to process the application.

Resources

Zoning and Permitting Background Documents

American Planning Association (APA). Briefing Papers #3: Integrating Solar into Local Plans.
www.planning.org/research/solar/briefingpapers/localplans.htm

American Planning Association (APA). Briefing Papers #4: Integrating Solar into Local Development Regulations.
www.planning.org/research/solar/briefingpapers/localdevelopmentregulations.htm

American Planning Association (APA). Briefing Papers #5: Balancing Solar Energy Use with Potential Competing Interests. [includes guidance on historic districts and trees]
www.planning.org/research/solar/briefingpapers/potentialcompetinginterests.htm

Delaware Valley Regional Planning Commission. Renewable Energy Ordinance Framework for Solar PV.
www.dvrpc.org/EnergyClimate/ModelOrdinance/Solar/pdf/2016_DVRPC_Solar_REOF_Reformatted_Final.pdf

EnergizeCT. Connecticut Rooftop Solar PV Permitting Guide.
www.energizect.com/sites/default/files/uploads/%281%29%20CT%20Rooftop%20Solar%20PV%20Permitting%20Guide%20v1.0.pdf

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[NAME OF MUNICIPALITY]

COUNTY OF [NAME OF COUNTY], NEW JERSEY

ORDINANCE XXX

AN ORDINANCE SUPPORTING SOLAR ENERGY SYSTEMS

BE IT ORDAINED by the Township Committee of the [name of municipality], in the County of [name of county] and State of New Jersey,

SECTION 1 PURPOSE OF ORDINANCE

Facilitation of the construction, installation and operation of Solar Energy Systems in [name of municipality], subject to reasonable restrictions, which will preserve the public health, safety, and welfare, while also maintaining the character of the Township and avoid significant impacts to protected resources such as important agricultural lands, endangered species, high value biological habitats and other protected resources. It is the intent of this ordinance to encourage solar facilities that reduce reliance on fossil fuels, increase local economic development and job creation, reduce greenhouse gas emissions, assist New Jersey in meeting its Renewable Portfolio Standards, and/or promote economic development diversification.

SECTION 2 DEFINITIONS

A. Solar Energy System—Accessory Use - a solar energy system—accessory use consists of one (1) or more photovoltaic, concentrated solar thermal, or solar hot water devices either free-standing ground, building integrated or roof mounted, as well as related equipment which is intended for the purpose of reducing or meeting the energy needs of the property's principal use.

B. Solar Energy Facility —Principal Use - An alternative energy facility that consists of one or more ground-mounted, free-standing, or building-integrated solar collection devices, solar energy related equipment and other associated infrastructure with the primary intention of generating electricity or otherwise converting solar energy to a different form of energy for primarily off-site use.

C. Ground-Mounted Solar Energy System - A solar energy system that is directly installed on solar racking systems, which are attached to an anchor in the ground and wired to connect to an adjacent home or building. Ground-mounted systems may be appropriate when insufficient space, structural and shading issues, or other restrictions prohibit rooftop solar.

D. Solar Farm or Solar Garden — A set of solar collection devices designed to capture sunlight and convert it to electricity primarily for offsite consumption and use; some electricity may be used by an onsite building or structure. Solar gardens can be designed as community solar systems in which community members can own shares in the solar system; subscribe to receive the generated solar power; or can purchase the output of the solar system to offset their own utility bills.

SECTION 3 GENERAL REGULATIONS

- A. All solar energy systems shall be designed, erected and installed in accordance with all applicable provisions in the National Electric Code (NEC), the International Residential Code

(IRC), International Commercial Building Code, State Fire Code, and any additional requirements set forth by the local utility (for any grid-connected solar systems) .

- B. Solar energy systems are permitted in all zoning districts as an accessory use to permitted, conditional and special exception uses with appropriate building permit.
- C. Principal use solar energy facilities, solar farms and gardens must be in accordance with applicable laws and regulations.
- D. Setbacks Ground-Mounted: The location of the Ground-Mounted System shall meet all applicable accessory-use setback requirements of the zoning district in which it is located.
- E. Height -Sloped Roof: For a roof-mounted system installed on a sloped roof, the highest point of the system shall not exceed the highest point of the roof to which it is attached as allowed by setback requirements.
- F. Height -Flat Roof: For a roof-mounted system installed on a flat roof, the highest point of the system shall be permitted to exceed the district's height limit by up to fifteen (15) feet above the rooftop to which it is attached.
- G. Height —Ground-Mounted: Ground-mounted or freestanding solar energy systems shall not exceed applicable maximum accessory structure height in the zoning district in which the solar energy system is located.
- H. H. Height -Parking Canopies: A solar energy system may exceed the applicable maximum accessory structure height if it will cover an impervious surface parking area. Height may not exceed the height of the primary structure that the parking area serves. Minimum height of the parking canopy must allow clearance for emergency service and service vehicles.

SECTION 4 SPECIAL CONSIDERATIONS: HISTORIC DISTRICTS

Solar energy systems within a historic district or on a historic resource property are not permitted unless written approval or a Certificate of Appropriateness has been granted by the Historic Preservation Commission as established by [name of municipality].

SECTION 5 SOLAR READY ZONING

Solar ready zoning should be considered as one among multiple considerations in planning new developments.

SECTION 6 PERMITTING FEES

Established in line with NJAC 5:23-4.20: NJAC5:23-4.20 (c) 2.iii. (13) For photovoltaic systems, the fee shall be based on the designated kilowatt rating of the solar photovoltaic system as follows:

- A. One to 50 kilowatts, the fee shall be \$ 65.00;
 - B. Fifty-one to 100 kilowatts, the fee shall be \$ 129.00;
- and
- C. Greater than 100 kilowatts, the fee shall be \$ 640.00.

APPENDIX

4

BOULDER, CO SOLAR PV SYSTEM CHECKLIST



**Boulder County
Community Planning
& Permitting
Publications**

Solar Photovoltaic Systems Checklist

Community Planning & Permitting
Courthouse Annex Building
2045 13th Street
PO Box 471
Boulder, CO 80302

**Building Safety &
Inspection Services:**
EZBP & License Applications,
Reports & Letters
ezbp@bouldercounty.org
303-441-3926

Plan Review & Building Code Questions:
building@bouldercounty.org
720-564-2640
www.bouldercounty.org

Solar Photovoltaic Systems Checklist

Per 2020 NEC (National Electrical Code)

Solar photovoltaic applications are reviewed by the county electrical inspectors. The following checklist shall be submitted with your plans. Each item on the list shall be marked to verify it is part of the submittal. Incomplete information may result in plan rejection or delay in the approval of your project.

All accessory ground-mounted solar arrays require Site Plan Review Waiver (SPRW) approval as a part of the permit application.

Plan Submittal Requirements

All ground mounted systems require:

- A completed Building Permit application form. Include the proposed PV system capacity in watts, and whether system is a stand-alone, grid-tied, or hybrid system.
- A deposit (the balance of fees is due at the time of permit issuance).
- Electronic PDF files are to be submitted to Building Safety & Inspection Services through the Online Application Submittals webpage at www.boco.org/_CPP-application-submittal. Minimum drawing scale is 1/4" per foot.

For roof mounted residential systems:

- A completed EZBP application form.
- Electronic PDF files are to be submitted to Building Safety & Inspection Services through the Online Application Submittals webpage at www.boco.org/_CPP-application-submittal. Minimum drawing scale is 1/4" per foot.

Site Plan - Equipment Outside a Building

- Show the location of all disconnects.
- Show the location of all batteries.
- Show the location of inverters.
- Show the location and connection of all grounding electrode conductors.
- Show the clearances around all equipment.
- Show dimensions between equipment and structures.
- Show dimensions between equipment and property lines.
- Show the layout of all the arrays and the required minimum access and pathways per section R324 of the Boulder County Building Code Amendments.

Note: See the Pole or Ground Mounted Panels section on page 2 for additional site plan requirements.

Floor Plan - Equipment Within a Building

- Show the location of all disconnects.
- Show the location of all batteries.
- Show the location of inverters.
- Show the location and connection of all grounding electrode conductors.
- Show location of all equipment within structures.
- Label the use of the room in which the equipment is placed.
- Show clearances of the equipment.

Plan Submittal Requirements continued on page 2

Wiring Requirements

- Provide a one-line diagram that includes the following information:
- Label whether the system is stand-alone, grid-tied, or hybrid.
- Conductor sizes.
- Conductor insulation types (i.e., THHN, THWN, direct burial cable, etc.).
- Conductor material (i.e., copper/aluminum).
- Conduit sizes.
- Conduit material (i.e., non-metallic, EMT, etc.).
- Over current device ratings.
- Existing and new panel amperage ratings (buss ratings).
- Series and parallel configuration of the module connections.

Equipment Requirements

- Provide product listing sheets for all equipment with the following information:
- Module short circuit current ratings.
- Module open circuit voltage ratings.
- Module series fuse ratings.
- Inverter output circuit current rating.
- Inverter UL listings.
- All associated documentation (i.e., batteries, inverters, disconnects, modules, charge controllers, over-current devices etc.).
- Method of grounding for modules and array.
- Projected kWh/year for the system.

Note: Voltage correction factor is based on 125% (2020 NEC Table 690.7).

Panels

Roof Mounted Panels

Provide the following information:

- An Engineer's evaluation regarding the dead-load capability of the existing roof structure and its ability to support the added weight of the solar photovoltaic system. The Engineer must reference the required wind and snow load for the site. If the panels project above the ridge line of the roof, this must also be part of engineers evaluation.
- For flat roof installations provide method of repair for roof penetrations.

Pole or Ground Mounted Panels

Provide the following information:

- Site Plan to include the following:
 - Location of panel(s) on property.
 - Dimensions from panel(s) to property lines.
 - Dimensions from panel(s) to other structures on the property and property easements.
- Engineered footing design.

Rough Solar PV Inspections

Beginning Feb. 1, 2011, Boulder County began doing rough solar PV inspections. This inspection should be scheduled after the installation of the solar PV racking system, grounding, and no more than 50% of the PV modules. Roof mounted junction boxes or DC combiner boxes shall also be installed and wires terminated. In addition to the rough inspection, at the completion of the work, Building Safety and Inspection Services will conduct a final inspection.

If you have questions, contact Boulder County Building Safety & Inspection Services at 720-564-2640, or email building@bouldercounty.org.

APPENDIX

5

DIRECT INSTALL BROCHURE



Unlock Direct Installation Energy Savings for Your Facility

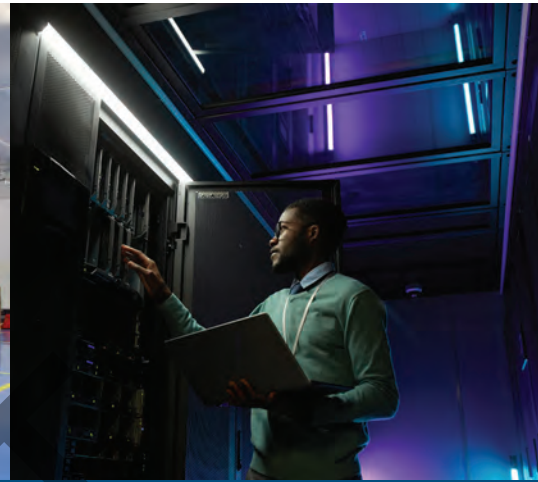
The **PSE&G Direct Install Program** is designed to deliver comprehensive, cost-effective, energy efficiency equipment for eligible PSE&G business customers, with 12-month individual facility electricity average peak demand usage of less than 200 kW. PSE&G can help businesses identify energy saving opportunities as part of the PSE&G Business Energy Saver Program.

Financial incentives are available to reduce the upfront cost of installing energy-saving equipment. In addition, customers can opt for repayment of the project costs with no interest, spread over a five-year period, with payment billed on your monthly PSE&G bill.

PSE&G's Direct Install Program can help uncover hidden facility energy savings that can cut energy costs by as much as 30%. When the work is complete, customers repay as little as 20% of the total project cost—interest-free—over 60 months on their PSE&G bill (or in one lump-sum payment, if preferred).



The PSE&G Business Energy Saver Program incentives help to ensure low equipment installation costs, short payback periods, and reduced energy use, leaving more money in your pocket. Savings realized through energy efficiency improvements can provide businesses with greater opportunity to invest in their business, developing or enhancing products and services that can be revenue generators.



The US Department of Energy estimates that lighting accounts for 40% of energy consumption in commercial facilities. Of that total, **30% is used in unoccupied areas.**

How the program works:

- + The Direct Install Program team will verify customer eligibility.
- + A PSE&G authorized contractor will perform an energy assessment at no-cost for participating customer facilities.
- + The contractor will generate a proposal outlining costs, project details and participation agreements, and obtain all approvals and signatures.
- + The customer reviews the proposal and signs off on the proposed work.
- + The PSE&G authorized contractor submits final paperwork for processing and project initiation.
- + PSE&G performs a post-installation inspection.
- + PSE&G provides final approval process and final payment notification.

The Direct Install Program benefits customers by:

- + Paying for 100% of up-front costs.
- + Providing a free on-site energy audit and detailed project cost estimate.
- + Recommending energy efficiency upgrades.
- + Executing all work through PSE&G authorized contractors.
- + Lowering energy costs by installing energy-efficient equipment.
- + Helping to increase facility operational efficiencies.
- + Creating the foundation for business facility operational efficiency.
- + Creating a safer and more comfortable workplace for employees.
- + Helping meet customer environmental goals by reducing the use of outdated and inefficient equipment and supporting lower carbon footprint standards.



For additional information scan this QR code or visit bizsave.PSEG.com

APPENDIX

6

BUSINESS ENERGY SAVER PROGRAM GUIDE



PSEG



Business Energy Saver Program

Prescriptive and Custom Incentive Guide

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General Eligibility Requirements

- The table below contains eligibility requirements and expected incentive values. Actual incentives may vary based on other program requirements and guidelines.
- Eligible products must be installed and used in accordance with their rated condition.
- All installations must be installed in accordance with all applicable local, state and national codes and ordinances.
- Program approval is required prior to purchase and installation for custom measures.

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- All new lighting fixtures, retrofit kits and components must carry the appropriate designated Underwriters Laboratory (UL) or Electrical Testing Laboratory (ETL) label.
- All installations shall be designed and installed in accordance with best practices such as the Illuminating Engineering Society of North America (IESNA) Lighting Handbook.
- DesignLights Consortium® categories are listed under the Eligibility Criteria. Installed fixtures must be listed under that category to qualify for incentives.
- If the proposed equipment does not meet the eligibility requirements or is not listed below, the applicant may still may be eligible for a Custom Incentive. Contact a PSE&G representative for more details.

LIGHTING

Interior Fixtures & Retrofit Kits	Classification	Incentive	Unit	Eligibility Criteria
1 x 4 LED integrated retrofit kit		\$50	per fixture	Eligible fixtures must be listed on DesignLights Consortium® with DLC Primary Use Designation as shown and DLC Category: Indoor Luminaires
1 x 4 LED new luminaire rated		\$50	per fixture	
2 x 2 LED integrated retrofit kit		\$30	per fixture	
2 x 2 LED new luminaire		\$40	per fixture	
2 x 4 LED integrated retrofit kit		\$50	per fixture	
2 x 4 LED new luminaire		\$50	per fixture	
LED direct linear ambient retrofit kit	2 ft.	\$15	per fixture	
	4 ft.	\$15	per fixture	
	8 ft.	\$25	per fixture	
LED direct/indirect linear ambient new luminaire	2 ft.	\$30	per fixture	
	3 ft.	\$30	per fixture	
	4 ft.	\$60	per fixture	
	6 ft.	\$75	per fixture	
	8 ft.	\$100	per fixture	
LED Track or Mono-point Directional Lighting Fixtures		\$30	per fixture	Eligible fixtures must be listed on DesignLights Consortium® with DLC Primary Use Designation as shown and DLC Category: Indoor Luminaires
LED Wall-Wash Luminaires		\$30	per fixture	
High Bay LED	5000 - 9,999 Lumens	\$100	per fixture	
	10,000 to 19,999 Lumens	\$150	per fixture	
	20,000 to 29,999 Lumens	\$200	per fixture	
	30,000 to 39,999 Lumens	\$300	per fixture	



LIGHTING

LIGHTING				
Interior Fixtures & Retrofit Kits	Classification	Incentive	Unit	Eligibility Criteria
High Bay LED	≥40,000 Lumens	\$400	per fixture	Eligible fixtures must be listed on DesignLights Consortium® with DLC Primary Use Designation as shown and DLC Category: Indoor Luminaires
Low Bay LED	5,000 to 9,999 Lumens	\$100	per fixture	
	10,000 to 19,999 Lumens	\$150	per fixture	
	20,000 to 29,999 Lumens	\$200	per fixture	
	30,000 to 39,999 Lumens	\$300	per fixture	
	≥40,000 Lumens	\$400	per fixture	
LED Stairwell and Passageway Luminaires	All Lumens	\$50	per fixture	
Exterior LED Fixtures	Classification	Incentive	Unit	Eligibility Criteria
LED Architectural Flood and Spot Luminaires	up to 4,999 Lumens	\$50	per fixture	DLC Primary Use Designation as shown and DLC Category: Outdoor Luminaires
	5,000 - 9,999 Lumens	\$150		
	10,000 to 19,999 Lumens	\$250		
	20,000 to 29,999 Lumens	\$300		
	30,000 to 39,999 Lumens	\$400		
	above 40,000 Lumens	\$525		
LED Landscape/Accent Flood and Spot Luminaires LED Parking Garage Luminaires	up to 4,999 Lumens	\$50	per fixture	DLC Primary Use Designation as shown and DLC Category: Outdoor Luminaires
	5,000 - 9,999 Lumens	\$150		
	10,000 to 19,999 Lumens	\$300		
	20,000 to 29,999 Lumens	\$350		
	30,000 to 39,999 Lumens	\$450		
	above 40,000 Lumens	\$400		
LED Bollard Fixtures	up to 4,999 Lumens	\$50	per fixture	DLC Primary Use Designation as shown and DLC Category: Outdoor Luminaires
	5,000 - 9,999 Lumens	\$150		
	10,000 to 19,999 Lumens	\$175		
	20,000 to 29,999 Lumens	\$225		



LIGHTING

Exterior LED Fixtures	Classification	Incentive	Unit	Eligibility Criteria
LED Bollard Fixtures	30,000 to 39,999 Lumens	\$275	per fixture	DLC Primary Use Designation as shown and DLC Category: Outdoor Luminaires
	above 40,000 Lumens	\$350		
LED Fuel Pump Canopy LED Outdoor Pole/Arm- Mounted Area and Roadway Luminaires LED Outdoor Wall-Mounted Area Luminaires	up to 4,999 Lumens	\$50	per fixture	DLC Primary Use Designation as shown and DLC Category: Outdoor Luminaires
	5,000 - 9,999 Lumens	\$150		
	10,000 to 19,999 Lumens	\$300		
	20,000 to 29,999 Lumens	\$300		
	30,000 to 39,999 Lumens	\$450		
	above 40,000 Lumens	\$400		
Other LED Fixtures	Classification	Incentive	Unit	Eligibility Criteria
Accent Light Line Voltage Bath Vanity Cove Mount	up to 1,499 Lumens	\$15	per fixture	ENERGY STAR Certified Light Fixtures
	1,500 - 2,999 Lumens	\$30		
	≥3,000 Lumens	\$45		
Ceiling Mount Pendant (Downlight, Decorative, etc.) Recessed Downlight Wall Sconces	up to 1,499 Lumens	\$10	per fixture	ENERGY STAR Certified Light Fixtures
	1,500 - 2,999 Lumens	\$15		
	≥3,000 Lumens	\$20		
Linear Strip Solid State Retrofit	up to 1,499 Lumens	\$5	per fixture	ENERGY STAR Certified Light Fixtures
	1,500 - 2,999 Lumens	\$10		
	≥3,000 Lumens	\$15		
Outdoor (Various Types) Outdoor Pole-Mount	up to 1,499 Lumens	\$30	per fixture	ENERGY STAR Certified Light Fixtures
	1,500 - 2,999 Lumens	\$30		
	≥3,000 Lumens	\$40		
Wrapped Lens	up to 1,499 Lumens	\$5	per fixture	ENERGY STAR Certified Light Fixtures
	1,500 - 2,999 Lumens	\$20		
	≥3,000 Lumens	\$30		

LIGHTING

Security	up to 1,499 Lumens	\$20	per fixture	ENERGY STAR Certified Light Fixtures
	1,500 - 2,999 Lumens	\$30		
	≥3,000 Lumens	\$40		
Under Cabinet	up to 1,499 Lumens	\$11	per fixture	ENERGY STAR Certified Light Fixtures
	1,500 - 2,999 Lumens	\$16.50		
	≥3,000 Lumens	\$22		
LED Lamps	Classification	Incentive	Unit	Eligibility Criteria
LED Linear Replacement Lamps	2 ft.	\$4	per lamp	DLC General Application as shown and DLC Category: Linear Replacement Lamps
	3 ft.	\$6		
	4 ft.	\$6		
	8 ft.	\$6		
High Output LED Linear Replacement Lamp	4 ft.	\$6		
LED U-Bend Lamp		\$5		
LED 2G11 Base Lamps		\$8.50	per lamp	DLC General Application as shown and DLC Category: Four Pin-Base Replacement Lamps for CFLs
LED Horizontally-Mounted Lamps		\$8.50		
LED Vertically-Mounted Lamps		\$8.50		
LED HID Replacement Lamps	Classification	Incentive	Unit	Eligibility Criteria
LED Replacement for HID Lamps	≤125W	\$50	per lamp	DLC Category: Mogul (E39) Screw-base Replacements for HID Lamps
	>125W - ≤250W	\$75		
	>250W	\$100		
LED Bulbs	Classification	Incentive	Unit	Eligibility Criteria
A Lamp		\$10	per bulb	ENERGY STAR Certified Light Bulbs
BR30		\$3		
BR40		\$3		
G16.5		\$3		
G25		\$3		
G30		\$3		
G40		\$3		



LIGHTING

LED Bulbs	Classification	Incentive	Unit	Eligibility Criteria
PAR16		\$5	per bulb	ENERGY STAR Certified Light Bulbs
PAR20		\$5		
PAR30		\$8		
R14		\$5		
R16		\$5		
R20		\$8		
Other		\$2.50		
LED Exit Sign	Classification	Incentive	Unit	Eligibility Criteria
LED Exit Sign		\$15	per sign	
LED Refrigerated Case Lighting	Classification	Incentive	Unit	Eligibility Criteria
Refrigerated Case Lighting	4 ft.	\$50	per fixture	DLC Primary Use Designation as shown and DLC Category: Indoor Luminaires
	5 ft.	\$50		
	6 ft.	\$50		

LIGHTING CONTROLS

Standalone Lighting Controls	Classification	Incentive	Unit	Eligibility Standard
Dual daylight & occupancy sensor (DOS)-integrated into fixture	20w to 149w controlled	\$30	per fixture	UL or other OSHA-approved Nationally Recognized Testing Laboratory in accordance with applicable US standards
Dual daylight & occupancy sensor (DOS)-integrated into fixture	≥150w controlled	\$50	per fixture	
Daylight continuous dimming control - integrated into fixture	20w to 149w controlled	\$20	per fixture	
Daylight continuous dimming control - integrated into fixture	≥150w controlled	\$40	per fixture	
Interior Occupancy/Vacancy Sensor - Remote Mounted		\$25	per control	
Interior Occupancy/Vacancy Sensor - Wall Mounted		\$25	per control	
Interior Occupancy/Vacancy Sensor - Integrated		\$30	per control	
Interior Occupancy Dimming Control - Integrated		\$15	per control	
Interior Occupancy Sensor for Highbay - Remote Mounted		\$25	per control	

LIGHTING

Network Lighting Controls	Classification	Incentive	Unit	Eligibility Standard
Networked lighting control system controlling efficient luminaires		\$0.60	per Watt controlled	DLC listed. UL or other OSHA-approved Nationally Recognized Testing Laboratory in accordance with applicable US standards
Luminaire level lighting control - with local or cloud server	20W - 149W Controlled	\$30	per fixture	
Luminaire level lighting control - with local or cloud server	≥150W Controlled	\$60	per fixture	

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- Efficiency requirements to comply with ASHRAE.
- An AHRI Certificate is required for new electric HVAC units. AHRI Certificates can be downloaded from <http://www.ahridirectory.org>.
- Manufacturers Specification Sheet Required

HVAC

Packaged Terminal Units	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard
PTHP	≥5,000, < 7,000 Btu	12.875 EER 3.48964 COP	\$100	per ton	ASHRAE 90.1 2016; Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers
	≥7,000, < 8,000 Btu	12.1025 EER 3.4093 COP	\$100	per ton	
	≥8,000, < 9,000 Btu	11.7935 EER 3.35574 COP	\$100	per ton	
	≥9,000, < 10,000 Btu	11.4845 EER 3.30218 COP	\$100	per ton	
	≥10,000, < 11,000 Btu	11.1755 EER 3.24862 COP	\$100	per ton	
	≥11,000, < 12,000 Btu	10.8665 EER 3.19506 COP	\$100	per ton	
	≥12,000, < 13,000 Btu	10.5575 EER 3.1415 COP	\$100	per ton	
	≥13,000, < 14,000 Btu	10.2485 EER 3.08794 COP	\$100	per ton	
	≥14,000, < 15,000 Btu	9.9395 EER 3.03438 COP	\$100	per ton	
≥15,000 Btu	9.785 EER 3.0076 COP	\$100	per ton		
PTAC	≥5,000, < 7,000 Btu	12.875 EER	\$100	per ton	ASHRAE 90.1 2016; Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers
	≥7,000, < 8,000 Btu	12.1025 EER	\$100	per ton	
	≥8,000, < 9,000 Btu	11.7935 EER	\$100	per ton	
	≥9,000, < 10,000 Btu	11.4845 EER	\$100	per ton	



HVAC

Packaged Terminal Units	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard
PTAC	≥10,000, < 11,000 Btu	11.1755 EER	\$100	per ton	ASHRAE 90.1 2016; Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers
	≥11,000, < 12,000 Btu	10.8665 EER	\$100	per ton	
	≥12,000, < 13,000 Btu	10.5575 EER	\$100	per ton	
	≥13,000, < 14,000 Btu	10.2485 EER	\$100	per ton	
	≥14,000, < 15,000 Btu	9.9395 EER	\$100	per ton	
	≥15,000 Btu	9.785 EER	\$100	per ton	
Single Package Vertical Systems	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard
Single Package Vertical Heat Pumps - Tier 1	≤ 5.4 tons	10.2 EER 3.1 COP	\$80	per ton	ASHRAE 90.1 2016; Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers
Single Package Vertical Heat Pumps - Tier 2	≤ 5.4 tons	10.7 EER 3.2 COP	\$160	per ton	
Single Package Vertical Heat Pumps - Tier 1	> 5.4 and ≤ 11.25 tons	10.2 EER 3.1 COP	\$80	per ton	
Single Package Vertical Heat Pumps - Tier 2	> 5.4 and ≤ 11.25 tons	10.7 EER 3.2 COP	\$160	per ton	
Single Package Vertical Heat Pumps - Tier 1	> 11.25 and ≤ 20 tons	10.2 EER 3.1 COP	\$80	per ton	
Single Package Vertical Heat Pumps - Tier 2	> 11.25 and ≤ 20 tons	10.7 EER 3.2 COP	\$160	per ton	
Single Package Vertical AC - Tier 1	≤ 5.4 tons	10.2 EER	\$75	per ton	ASHRAE 90.1 2016; Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers
Single Package Vertical AC - Tier 2	≤ 5.4 tons	10.7 EER	\$100	per ton	
Single Package Vertical AC - Tier 1	> 5.4 and ≤ 11.25 tons	10.2 EER	\$45	per ton	
Single Package Vertical AC - Tier 2	> 5.4 and ≤ 11.25 tons	10.7 EER	\$90	per ton	
Single Package Vertical AC - Tier 1	> 11.25 and ≤ 20 tons	10.2 EER	\$45	per ton	
Single Package Vertical AC - Tier 2	> 11.25 and ≤ 20 tons	10.7 EER	\$90	per ton	



HVAC

Air Source Heat Pumps	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard	
Single Package - Tier 1	≤ 5.4 tons	14.3 SEER 8.2 HSPF	\$75	per ton	ASHRAE 90.1 2016; Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers	
Single Package - Tier 2	≤ 5.4 tons	15.5 SEER 8.5 HSPF	\$100	per ton		
Split System - Tier 1	≤ 5.4 tons	14.3 SEER 8.4 HSPF	\$75	per ton		
Split System - Tier 2	≤ 5.4 tons	15.5 SEER 8.5 HSPF	\$100	per ton		
Split and Single Package - Tier 1	> 5.4 and ≤ 11.25 tons	11.5 SEER 12.2 IEER 3.4 COP	\$80	per ton		
Split and Single Package - Tier 2	> 5.4 and ≤ 11.25 tons	12.1 SEER 12.8 IEER 3.5 COP	\$100	per ton		
Split and Single Package - Tier 1	> 11.25 and ≤ 20 tons	11.5 SEER 11.6 IEER 3.3 COP	\$80	per ton		
Split and Single Package - Tier 2	> 11.25 and ≤ 20 tons	11.7 SEER 15.0 IEER 3.3 COP	\$100	per ton		
Split and Single Package - Tier 1	> 20 tons	9.5 SEER 10.6 IEER 3.2 COP	\$80	per ton		
Split and Single Package - Tier 2	> 20 tons	9.7 SEER 12.0 IEER 3.2 COP	\$100	per ton		
Ductless, Mini Split Air Conditioners or Heat Pumps	All Sizes	15.5 SEER 8.5 HSPF	\$125	per ton		
Ductless, Mini Split Air Conditioners	All Sizes	15.5 SEER	\$125	per ton		
Ground And Water Heat Pumps	Classification	Qualifying Efficiency	Incentive	Unit		Eligibility Standard
Water Source Heat Pump - Tier 1	≤ 1.4 tons	12.4 EER 4.0 COP	\$50	per ton		ASHRAE 90.1 2016; Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers
Water Source Heat Pump - Tier 2	≤ 1.4 tons	14.0 EER 4.8 COP	\$100	per ton		
Water Source Heat Pump - Tier 1	> 1.4 and ≤ 5.4 tons	13.3 EER 4.3 COP	\$50	per ton		
Water Source Heat Pump - Tier 2	> 1.4 and ≤ 5.4 tons	15.0 EER 4.5 COP	\$100	per ton		
Water Source Heat Pump - Tier 1	> 5.4 and ≤ 11.25 tons	13.3 EER 4.3 COP	\$50	per ton		



HVAC

Ground And Water Heat Pumps	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard
Water Source Heat Pump - Tier 2	> 5.4 and ≤11.25 tons	15.0 SEER 4.5 COP	\$100	per ton	ASHRAE 90.1 2016; Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers
Ground Water Source Heat Pump - Tier 1	≤ 11.25 tons	18.4 EER 3.7 COP	\$100	per ton	
Ground Water Source Heat Pump - Tier 2	≤ 11.25 tons	22.0 EER 3.9 COP	\$500	per ton	
Ground Source Heat Pump - Tier 1	≤ 11.25 tons	14.4 EER 3.2 COP	\$100	per ton	
Ground Source Heat Pump - Tier 2	≤ 11.25 tons	18.0 EER 3.6 COP	\$500	per ton	
Air Cooled - Unitary HVAC	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard
Single Package - Tier 1	≤ 5.4 tons	14.3 SEER	\$75	per ton	ASHRAE 90.1 2016; Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers
Single Package - Tier 2	≤ 5.4 tons	16.0 SEER	\$100	per ton	
Split System - Tier 1	≤ 5.4 tons	14.0 SEER	\$75	per ton	
Split System - Tier 2	≤ 5.4 tons	16.0 SEER	\$100	per ton	
Split and Single Package - Tier 1	> 5.4 and ≤11.25 tons	11.5 EER 13.0 IEER	\$80	per ton	
Split and Single Package - Tier 2	> 5.4 and ≤11.25 tons	12.5 EER 14.0 IEER	\$100	per ton	
Split and Single Package - Tier 1	> 11.25 and ≤ 20 tons	11.5 EER 12.4 IEER	\$80	per ton	
Split and Single Package - Tier 2	> 11.25 and ≤ 20 tons	12.0 EER 14.0 IEER	\$100	per ton	
Split and Single Package - Tier 1	> 20 and ≤ 63.33 tons	10.5 EER 11.6 IEER	\$80	per ton	
Split and Single Package - Tier 2	> 20 and ≤ 63.33 tons	11.0 EER 12.5 IEER	\$100	per ton	
Central DX Air Conditioner - Tier 1	> 63 tons	9.7 EER 11.2 IEER	\$80	per ton	
Central DX Air Conditioner - Tier 2	> 63 tons	10.0 EER 12.0 IEER	\$80	per ton	



VARIABLE FREQUENCY DRIVERS

Variable Frequency Drives (VFD) Measures	Classification	Incentive	Unit	Eligibility Standard
Supply Air Fan VFD Return Air Fan VFD Chilled Water or Condenser Water Pump VFD Heating Hot Water Pump VFD Water Source Heat Pump VFD Cooling Tower Fan VFD Boiler Feedwater Pump VFD	≤ 2 HP	\$500	per drive	Horsepower (HP) refers to nameplate HP of the motor controlled by the drive. Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory.
	3 HP	\$600	per drive	
	4 HP	\$700	per drive	
	5 HP	\$800	per drive	
	7.5 HP	\$1,150	per drive	
	10 HP	\$1,400	per drive	
	15 HP	\$1,750	per drive	
	20 HP	\$2,000	per drive	
	25 HP	\$2,500	per drive	
	30 HP	\$3,000	per drive	
	40 HP	\$3,500	per drive	
	50 HP	\$4,000	per drive	
	60 HP	\$4,500	per drive	
	75 HP	\$5,000	per drive	
100 HP	\$6,000	per drive		
	101 HP to 200 HP	\$50	per HP	
Ventilation Measures	Classification	Incentive	Unit	Eligibility Criteria
90% TE Make-up Air Unit - Gas Only		\$8	per kbtu/hr	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
High Speed Fan	24" - 35"	\$50	per unit	
	36" - 47"	\$75	per unit	
	48" - 61"	\$100	per unit	
EC Motors - HVAC Blower Fan		\$150	per motor	
High Volume Low Speed Fan (HVLS)	16'	\$400	per unit	
	18'	\$450	per unit	

Ventilation Measures	Classification	Incentive	Unit	Eligibility Criteria
High Volume Low Speed Fan (HVLS)	20'	\$500	per unit	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
	22'	\$550	per unit	
	24'	\$600	per unit	
HVAC - Other	Classification	Incentive	Unit	Eligibility Criteria
Dual Enthalpy Economizer	≤ 5 tons	\$250	per control	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
	> 5 tons	\$250	per control	
Motel Room Guest Occupancy Sensor - Electric Only		\$75	per unit	
Hotel Guest Room Occupancy Sensor - Electric Only		\$75	per unit	
Smart Thermostat Electric AC & Heat		\$100	per unit	
Smart Thermostat Electric AC & Gas Heat		\$100	per unit	
EC Motors - Hydronic Pump	< 1HP	\$150	per unit	
	1 HP	\$150	per unit	
	2 HP	\$175	per unit	
	3 - 5 HP	\$250	per unit	
	6 - 10 HP	\$500	per unit	
	11+ HP	\$750	per unit	



- Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers.

HEATING

Gas Furnace & Unit Heater	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard
Gas Furnace	< 225 kBtu	95% AFUE	\$800	per unit	ENERGY STAR
	< 225 kBtu	97% AFUE	\$1,000	per unit	
	≥ 225 kBtu	95% AFUE	\$800	per unit	
	≥ 225 kBtu	97% AFUE	\$1,000	per unit	
Condensing Unit Heater	All Sizes	90% AFUE	\$750	per unit	
Gas Heater	Classification	Incentive	Unit	Eligibility Criteria	
Gas Infrared Heater	≤ 100 Mbtu/h	\$750	per unit	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)	
	> 100 Mbtu/h	\$500	per unit		
Tune Ups - Gas Only	Classification	Incentive	Unit	Eligibility Criteria	
Boiler Tune-up	All Sizes	\$1	per kBtu	Before / After Combustion Analysis Results Required	
Furnace Tune Up	All Sizes	\$150	per Furnace		
Economizer	Classification	Incentive	Unit	Eligibility Criteria	
Fuel Use Economizer		\$1,200	per unit		



PSE&G

Water Heating & Boilers

- Equipment must meet or exceed the qualifying efficiency listed for the applicable classification tiers

WATER HEATING & BOILERS

Gas Condensing Boilers	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard
Hot water, condensing boiler - Tier 1	< 300 MBH	90% AFUE	\$750	per Boiler	CEE Tier 1
	≥ 300 to ≤ 2500 MBH	88% TE	\$3	per MBH	
	> 2500 to ≤ 4000 MBH	81% TE	\$3	per MBH	
Hot water, condensing boiler - Tier 2	< 300 MBH	95% AFUE	\$850	per Boiler	ENERGY STAR
	≥ 300 to ≤ 2500 MBH	94% TE	\$3.50	per MBH	
	> 2500 to ≤ 4000 MBH	88% TE	\$3.50	per MBH	
Gas Non-Condensing Boilers	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Criteria
Hot water, non-condensing boiler	< 300 MBH	85% AFUE	\$1.50	per MBH	
	≥ 300 to ≤ 1500 MBH	85% TE	\$1.75	per MBH	
	> 1500 to ≤ 2500 MBH	85% TE	\$1.50	per MBH	
	> 2500 to ≤ 4000 MBH	85% CE	\$1.50	per MBH	
Steam, all except natural draft, non-condensing boiler	< 300 MBH	82% AFUE	\$2	per MBH	
	≥ 300 to ≤ 2500 MBH	81% TE	\$2	per MBH	
	> 2500 to ≤ 4000 MBH	81% CE	\$2	per MBH	
Steam, natural draft, non-condensing boiler	< 300 MBH	82% AFUE	\$2	per MBH	
	≥ 300 to ≤ 2500 MBH	82% TE	\$1	per MBH	
	2500 to ≤ 4000 MBH	82% CE	\$1	per MBH	
Gas Water Heaters	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard
DHW, Instant, Gas-Fired	≤ 200,000 Btuh	> 90% TE	\$750	per unit	ENERGY STAR
	> 200,000 Btuh	> 90% TE	\$1,000	per unit	



PSE&G

Water Heating & Boilers

Gas Water Heaters	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Standard
DHW Storage, Gas-Fired	< 75,000 Btuh	> 0.67 EF or 0.64 UEF	\$350	per unit	ENERGY STAR
	< 75,000 Btuh	> 0.81 UEF	\$500	per unit	
	> 75,000 to < 105,000 Btuh	> 82% TE	\$500	per unit	
	> 75,000 to < 105,000 Btuh	> 94% TE	\$750	per unit	
	> 105,000 Btuh	> 82% TE	\$500	per unit	
	> 105,000 Btuh	> 94% TE	\$750	per unit	
Condensing Integrated Boiler and Water Heater	≤ 300 MBH	92% AFUE	\$1,300	per unit	
	> 300 MBH	94% TE	\$1,500	per unit	
Electric Water Heaters	Classification	Qualifying Efficiency	Incentive	Unit	Eligibility Criteria
Heat Pump Electric Storage Water Heater	size > 55 gallons		\$1,000	per unit	Equipment must be qualified by the current version of ENERGY STAR
	size ≤ 55 gallons		\$750	per unit	
Water Heating - Other	Classification	Incentive	Unit	Eligibility Standard	
Boiler Outside Air Reset Control	Gas	\$1	per kBtu		
Hot Water Recirculating system with demand control/temperature modulation - Dormitory	Gas	\$20	per Dwelling Unit		
Hot Water Recirculating system with demand control/temperature modulation - Multi Family	Gas	\$40	per Dwelling Unit		



REFRIGERATION

REFRIGERATION				
Refrigeration Motors, Controls, & Compressors	Classification	Incentive	Unit	Eligibility Criteria
Anti-Sweat Heater Control / Door Heater Control	Cooler/Medium Temp Door	\$50	per Door	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
	Freezer/Low Temp Door	\$50	per Door	
Floating Head Pressure Controls		\$75	per Ton	
EC Motors for Evaporator Fans	replacing shaded pole motor	\$75	per Motor	
	replacing PSC	\$75	per Motor	
Variable Speed Refrigeration Compressor		\$1,000	per Compressor	ASHRAE 90.1 2013; Equipment must exceed the standard
Refrigeration Gaskets, Doors & Strips	Classification	Incentive	Unit	Eligibility Criteria
Automatic Door Closer	Cooler	\$50	per Door	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
	Freezer	\$75	per Door	
Door Gasket	Cooler Reach-in	\$4	per Linear ft	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
	Freezer Reach-in	\$4	per Linear ft	
	Cooler Walk-in	\$4	per Linear ft	
	Freezer Walk-in	\$4	per Linear ft	
Strip Curtains	Cooler, Convenience Store	\$5	per Sq. ft.	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
	Cooler, Restaurant	\$5	per Sq. ft.	
	Cooler, Supermarket	\$5	per Sq. ft.	
	Freezer, Convenience Store	\$5	per Sq. ft.	
	Freezer, Restaurant	\$5	per Sq. ft.	
	Freezer, Supermarket	\$5	per Sq. ft.	
	Freezer, Refrigerated Warehouse	\$5	per Sq. ft.	
Night Cover	Low temp (-32°F to 0°F)*	\$20	per Linear ft.	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
	Medium Temp, case temperature (> 0°F to ≤ 32°F)*	\$15	per Linear ft.	

Refrigeration Gaskets, Doors & Strips	Classification	Incentive	Unit	Eligibility Criteria
Night Cover	High Temp case temperature (> 32F° to 55°F)*	\$10	per Linear ft.	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
Refrigeration Display Case Doors on Open Display Case*		\$75	per Linear ft.	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
Walk-in or Reach-in Cooler/Freezer Evaporator Fan Motor Control		\$75	per Motor	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)

*Incentive is capped at \$500 per cover/case.

DRAFT



FOOD SERVICE

Ovens, Fryers, Steamers & Griddles	Classification	Incentive	Unit	Eligibility Criteria	
Combination Oven/Steamer	Gas	\$2,000	per Oven	Equipment must be qualified by the current version of ENERGY STAR or CEE	
	Electric	\$1,200			
Convection Oven	Gas	\$750	per Oven		
	Electric	\$350			
Standard Vat Fryer	Electric	\$200	per Fryer		
Steam Cooker	Gas	\$200	per Pan		
	Electric	\$150			
Griddle	Gas	\$500	per Griddle		
	Electric	\$300			
Rack Oven	Single - Gas	\$1,000	per Oven		
	Double - Gas	\$1,000			
Commercial Conveyor Oven	Gas	\$1,500	per Oven		
Commercial Fryer	Gas	\$750	per Fryer		
Dishwashers	Classification	Incentive	Unit		Eligibility Criteria
Commercial Dishwasher - Under Counter - Electric	Low Temperature	\$75	per Dishwasher		Equipment must be qualified by the current version of ENERGY STAR or CEE
	High Temperature	\$400			
Commercial Dishwasher - Under Counter - Gas	Low Temperature	\$50			
	High Temperature	\$400			
Commercial Dishwasher - Door Type - Electric	Low Temperature	\$800			
	High Temperature	\$600			
Commercial Dishwasher - Door Type - Gas	Low Temperature	\$400			
	High Temperature	\$700			
Commercial Dishwasher - Single Tank Conveyor - Electric	Low Temperature	\$400			
	High Temperature	\$1,000			
Commercial Dishwasher - Single Tank Conveyor - Gas	Low Temperature	\$200			
	High Temperature	\$1,000			
Commercial Dishwasher - Multiple Tank Conveyor - Electric	Low Temperature	\$1,000			
	High Temperature	\$1,500			

Dishwashers	Classification	Incentive	Unit	Eligibility Criteria
Commercial Dishwasher - Multiple Tank Conveyor - Gas	Low Temperature	\$200	per Dishwasher	Equipment must be qualified by the current version of ENERGY STAR or CEE
	High Temperature	\$1,500		
Refrigerators & Freezers	Classification	Incentive	Unit	Eligibility Criteria
Commercial Glass Door Refrigerator	≤ 15 ft ³	\$75	per Refrigerator	Equipment must be qualified by the current version of ENERGY STAR or CEE
	> 15 to ≤ 30 ft ³	\$100		
	> 30 to < 50 ft ³	\$150		
	≥ 50 ft ³	\$150		
Commercial Solid Door Refrigerator	≤ 15 ft ³	\$100	per Refrigerator	Equipment must be qualified by the current version of ENERGY STAR or CEE
	> 15 to ≤ 30 ft ³	\$100		
	> 30 to < 50 ft ³	\$200		
	≥ 50 ft ³	\$225		
Commercial Glass Door Freezer	≤ 15 ft ³	\$200	per Freezer	Equipment must be qualified by the current version of ENERGY STAR or CEE
	> 15 to ≤ 30 ft ³	\$250		
	> 30 to < 50 ft ³	\$300		
	≥ 50 ft ³	\$300		
Commercial Solid Door Freezer	≤ 15 ft ³	\$100	per Freezer	Equipment must be qualified by the current version of ENERGY STAR or CEE
	> 15 to ≤ 30 ft ³	\$200		
	> 30 to < 50 ft ³	\$300	per Freezer	Equipment must be qualified by the current version of ENERGY STAR or CEE
	≥ 50 ft ³	\$500		
Commercial Ice Machine Measures	Classification	Incentive	Unit	Eligibility Standard
Commercial Ice Machines - Tier 1	0-100 lbs/day	\$75	per Ice Machine	Tier 1: ENERGY STAR Certified Commercial Ice Machines
	101-200 lbs/day	\$75		
	201-300 lbs/day	\$150		
	301-400 lbs/day	\$100		
	401-500 lbs/day	\$100		
	501-1000 lbs/day	\$150		
	1001-1500 lbs/day	\$200		
	> 1500 lbs/day	\$200		

Commercial Ice Machine Measures	Classification	Incentive	Unit	Eligibility Standard
Commercial Ice Machines - Tier 2	0-100 lbs/day	\$100	per Ice Machine	Tier 2: CEE Commercial Kitchens Ice Machines
	101-200 lbs/day	\$100		
	201-300 lbs/day	\$200		
	301-400 lbs/day	\$150		
	401-500 lbs/day	\$150		
	501-1000 lbs/day	\$200		
	1001-1500 lbs/day	\$300		
Other Food Service	Classification	Incentive	Unit	Eligibility Criteria
Pre Rinse Spray Valve	Electric Water Heating	\$35	per Spray Valve	Maximum flow rate of 1.28 gpm
	Gas Water Heating	\$25	per Spray Valve	
Hot Food Holding Cabinet	1/2 Size	\$300	per Cabinet	Equipment must be qualified by the current version of ENERGY STAR or CEE
	3/4 Size	\$350		
	Full Size	\$400		



AGRICULTURE

Agriculture	Classification	Incentive	Unit	Eligibility Criteria
Engine Block Heater Timer		\$25	per Heater	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
Auto Milker Takeoff		\$90	per unit	
Dairy Scroll Compressor		\$1,000	per unit	
Heat Reclaimers		\$1,000	per unit	
Livestock Waterer		\$60	per unit	
Dairy Vac Pump VSD Controls		\$1,000	per unit	
Low Pressure Irrigation	Agriculture	\$100	per Acre	
	Golf Course	\$100	per Acre	
Dairy Refrigeration Tune-Up		\$200	per unit	

PLUG LOADS

Plug Loads	Classification	Incentive	Unit	Eligibility Standard
Advanced Power Strip	Tier 1	\$15	per strip	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
	Tier 2	\$25		
Monitors	C&I	\$10	per unit	ENERGY STAR
Computers	C&I	\$10	per unit	
Imaging	C&I	\$20	per unit	
Uninterruptible Power Supply (UPS)	C&I	\$40	per kVA	
Small Network PC Controller		\$15	per PC controlled	
Vending Machine & Control	Classification	Incentive	Unit	Eligibility Standard
Vending Machine Control	Non-Refrigerated	\$50	per Controller	Product must be UL Listed, or listed by equivalent OSHA Nationally Recognized Testing Laboratory (NRTL)
	Refrigerated	\$125	per Controller	
Glass Front Refrigerated Cooler Control		\$100	per Controller	
Beverage Vending Machine	Class A	\$75	per unit	Equipment must be qualified by the current version of ENERGY STAR or CEE



RESIDENTIAL APPLIANCES

Residential Appliances in Commercial Settings	Classification	Incentive	Unit	Eligibility Criteria
Clothes Washer - Tier 1	Electric	\$100	per unit	ENERGY STAR
	Gas	\$150	per unit	
Clothes Washer - Tier 2	Electric	\$100	per unit	ENERGY STAR Most Efficient
	Gas	\$200	per unit	
Clothes Dryer - Tier 1 (with Moisture Sensor)	Electric	\$50	per unit	ENERGY STAR
	Gas	\$150	per unit	
Clothes Dryer - Tier 2	Electric	\$50	per unit	ENERGY STAR Most Efficient
	Gas	\$200	per unit	
Refrigerators	Tier 1 Electric	\$100	per unit	ENERGY STAR
	Tier 2 Electric	\$100	per unit	
Freezer	Electric	\$50	per unit	
Dehumidifier	Electric	\$25	per unit	
Room Air Conditioner	Electric	\$25	per unit	
Water Cooler	Electric	\$50	per unit	

MISCELLANEOUS

Residential Appliances in Commercial Settings	Classification	Incentive	Unit	Eligibility Criteria
Indoor Pool Cover	Gas	\$1	per Sqft	
Outdoor Pool Cover	Gas	\$0.75	per Sqft	
Commercial Clothes Washer - Tier 1	Electric	\$100	per unit	ENERGY STAR
	Gas	\$100	per unit	
Commercial Clothes Washer - Tier 2	Electric	\$200	per unit	ENERGY STAR Most Efficient
	Gas	\$200	per unit	



- Projects are required to provide the total energy savings of the measure(s). Energy savings analysis must be supported by existing and proposed facility data, such as operating schedules, EMS/BMS data, etc.; standard assumptions and baseline must be set in cases where EMS/BMS data is unavailable.
- In absence of energy analysis or model, Pre and post installation M&V may be required. Adjusted savings calculations may be required depending on the results of the metering.
- The energy savings calculations must only include the energy savings related to the custom measure(s).
- **Certain measures may require pre and post install M&V for savings validation. In such cases, data points essential to analyzing the savings will be communicated and depending on the SOW, pre and post data measurement timeframe will be set; in case acceptable EMS/BMS data is unavailable, a separate M&V will be required for the set timeframe.**
- Proposed measures will not be eligible for Custom Measure incentives if a Prescriptive incentive is available. Proposed measures must meet or exceed mandated/industry standards & codes where applicable. Applicability of codes & standards will be determined by PSE&G's engineering staff during the application review process.
- **State energy code is ASHRAE 90.1-2016. In cases where ASHRAE 90.1-2016 does not apply, other applicable industry standards will be used, such as the Consortium for Energy Efficiency (CEE), EPA ENERGY STAR, Design Lights Consortium, NEMA, Federal Title 10 or other established resources such as: current New Jersey baseline studies and other market research; experience of the New Jersey utilities; or utility/public program experience from other comparable jurisdictions.**
- Final rebate/incentive payment is based upon installed equipment specifications, operating data, and final energy savings, and may be lower than preapproved amount.
- Program approval is required prior to purchase and installation for custom measures.
- Custom project incentives are **capped at 50% of total project cost.**
- Customer/Contractor must complete and submit Data Collection Forms (DCF) for measures as communicated by PSE&G engineering team. Note that DCFs are available for most measures mentioned in the below table. Anywhere a DCF is not available or developed, customer/contractor must submit supporting information detailing the measure parameters required for energy savings analysis.

CUSTOM

Common Custom Measures	Classification	Incentive	Unit	Eligibility Criteria
HVAC/Chillers HVAC/VRF HVAC Controls & Chiller Plant Optimization Compressed Air Systems Refrigeration Data Center Equipment/Servers Motors/VFD - Large Building Improvements Process Improvements Agricultural Lighting/Process Custom Lighting Other Non Prescriptive	Electric Savings	\$0.16	per kWh	Measures/equipment must not be prescriptive measures and meet mandated/industry standards & codes where applicable. Analysis and documents supporting the energy savings must be submitted with the application, including measure Data Collection Forms (DCF) as applicable.
	Gas Savings	\$3.50	per Therm	



APPENDIX

7

SAMPLE GREEN POLICY RESOLUTIONS

Green Design – Commercial & Residential Buildings Resolution

This Green Building Policy/Resolution action is a pre-requisite and must be completed before points will be awarded for additional GREEN DESIGN actions.

RESOLUTION ENDORSING THE ADOPTION OF GREEN BUILDING PRACTICES FOR CIVIC, COMMERCIAL AND RESIDENTIAL BUILDINGS

WHEREAS, buildings account for 39% of CO2 emissions – more than either the transportation or industrial sectors. In addition, buildings account for nearly 12% of potable water use, 65% of waste output, and 71% of electricity consumption in the U.S. (U.S. Green Building Council).

WHEREAS, green building – also referred to as sustainable or high-performance building -- is a collection of better design, construction, and operating practices that have the potential to reduce or eliminate the negative impacts of development on the environment and on human health. There are many examples of green building programs and guidelines that have been propagated at national, state, and municipal levels. They commonly address energy efficiency and carbon emissions reduction, water conservation, waste reduction, healthy and sustainably produced materials, indoor air quality, occupant productivity and health, and other components of green building and sustainable development.

WHEREAS, the purpose of this resolution is to enhance the public welfare and assure that commercial, residential and civic development is consistent with the (identify name of municipality) desire to create a more sustainable community by incorporating green building measures into the design, construction, operation and maintenance of buildings.

WHEREAS, the City additionally wishes to support green building in the private sector through a combination of voluntary actions (e.g., including a green building scorecard as a discussion item within the Site Plan approval process), actions that may be required in the future although not at the time of the adoption of this resolution (e.g., amending the Site Plan approval checklist to directly incorporate those green building standards available to a municipality), and educational actions (e.g., making available

information on green building programs, guidelines, rebates etc to residents of the municipality).

NOW, THEREFORE, BE IT RESOLVED that the (Name of Municipality) hereby implements a Green Building Policy that:

will encourage green design for commercial and residential buildings.

BE IT FURTHER RESOLVED,

CERTIFICATION

I, _____, Clerk of the (Name of Municipality), in the County of (Name of County), do hereby certify that the foregoing is a true and correct copy of a resolution duly adopted by the Township Council at a regular meeting held on the __ day of ____ 2009.

IN WITNESS WHEREOF I have hereunto set my hand and affixed the seal of said Township this __ day of ____ 2009.

Green Design –Municipal Buildings Resolution

This Green Building Policy/Resolution action is a pre-requisite and must be completed before points will be awarded for additional GREEN DESIGN actions.

RESOLUTION ENDORSING THE ADOPTION OF GREEN BUILDING PRACTICES FOR CIVIC, COMMERCIAL AND RESIDENTIAL BUILDINGS

WHEREAS, buildings account for 39% of CO2 emissions – more than either the transportation or industrial sectors. In addition, buildings account for nearly 12% of potable water use, 65% of waste output, and 71% of electricity consumption in the U.S. (U.S. Green Building Council).

WHEREAS, green building – also referred to as sustainable or high-performance building -- is a collection of better design, construction, and operating practices that have the potential to reduce or eliminate the negative impacts of development on the environment and on human health. There are many examples of green building programs and guidelines that have been propagated at national, state, and municipal levels. They commonly address energy efficiency and carbon emissions reduction, water conservation, waste reduction, healthy and sustainably produced materials, indoor air quality, occupant productivity and health, and other components of green building and sustainable development.

WHEREAS, the purpose of this resolution is to enhance the public welfare and assure that commercial, residential and civic development is consistent with the (identify name of municipality) desire to create a more sustainable community by incorporating green building measures into the design, construction, operation and maintenance of buildings.

WHEREAS, the City desires to set a leadership example in the area of green building through the implementation of energy efficiency audits and upgrades to the municipal building stock, continued procurement practices...etc. (e.g. improve water conservation, reduce light pollution, increase construction waste recycling).

NOW, THEREFORE, BE IT RESOLVED that the (Name of Municipality) hereby implements a Green Building Policy that:

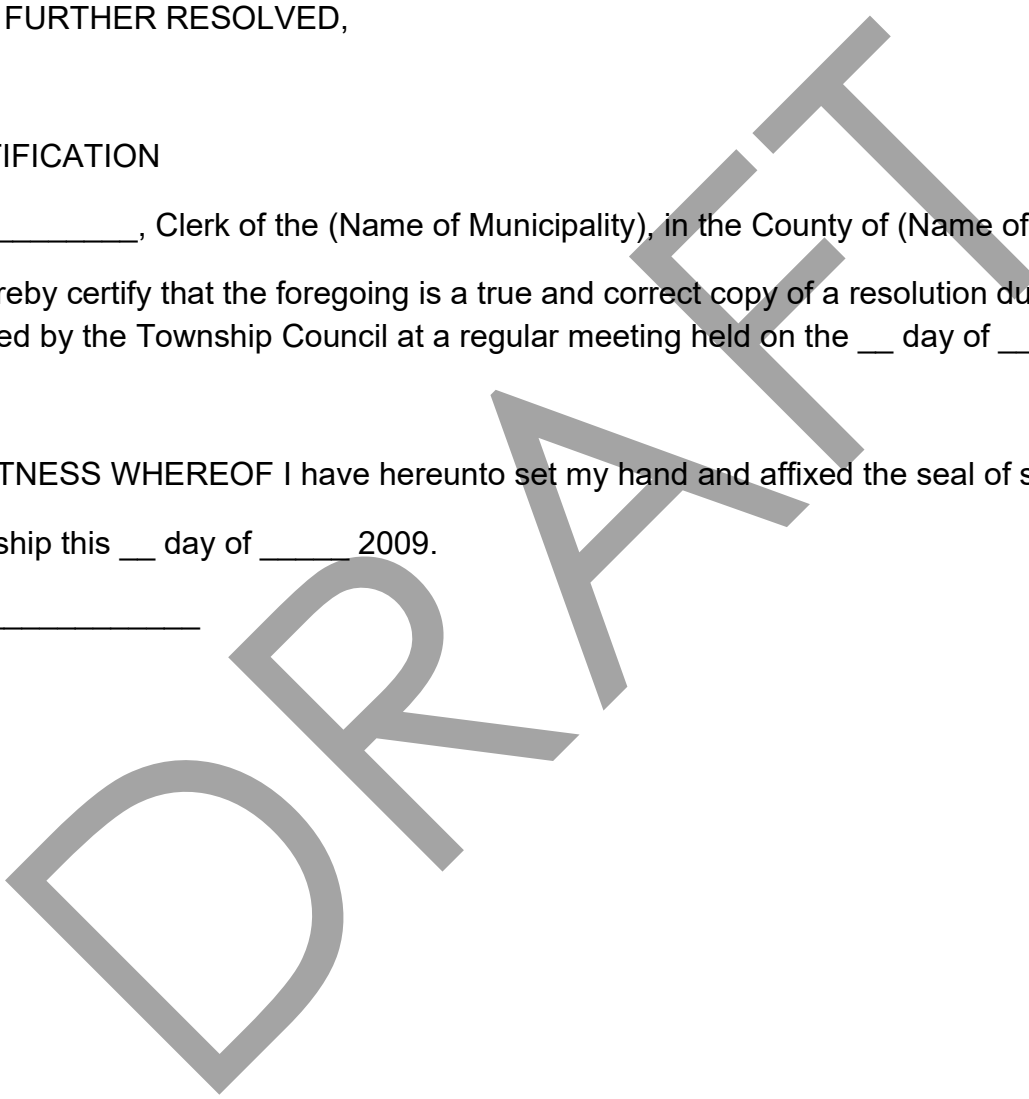
will consider opportunities to incorporate green building measures into the design, construction, operation and maintenance of municipal buildings and facilities.

BE IT FURTHER RESOLVED,

CERTIFICATION

I, _____, Clerk of the (Name of Municipality), in the County of (Name of County), do hereby certify that the foregoing is a true and correct copy of a resolution duly adopted by the Township Council at a regular meeting held on the __ day of ____ 2009.

IN WITNESS WHEREOF I have hereunto set my hand and affixed the seal of said Township this __ day of ____ 2009.



Green Design – Combined

(Commercial & Residential Buildings AND Municipal Buildings)

Green Building Policy/ Resolution

This Green Building Policy/Resolution action is a pre-requisite and must be completed before points will be awarded for additional GREEN DESIGN actions.

RESOLUTION ENDORSING THE ADOPTION OF GREEN BUILDING PRACTICES FOR CIVIC, COMMERCIAL AND RESIDENTIAL BUILDINGS

WHEREAS, buildings account for 39% of CO2 emissions – more than either the transportation or industrial sectors. In addition, buildings account for nearly 12% of potable water use, 65% of waste output, and 71% of electricity consumption in the U.S. (U.S. Green Building Council).

WHEREAS, green building – also referred to as sustainable or high-performance building - is a collection of better design, construction, and operating practices that have the potential to reduce or eliminate the negative impacts of development on the environment and on human health. There are many examples of green building programs and guidelines that have been propagated at national, state, and municipal levels. They commonly address energy efficiency and carbon emissions reduction, water conservation, waste reduction, healthy and sustainably produced materials, indoor air quality, occupant productivity and health, and other components of green building and sustainable development.

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WHEREAS, the City desires to set a leadership example in the area of green building through the implementation of energy efficiency audits and upgrades to the municipal building stock, continued procurement practices...etc. (e.g. improve water conservation, reduce light pollution, increase construction waste recycling).

WHEREAS, the City additionally wishes to support green building in the private sector through a combination of voluntary actions (e.g., including a green building scorecard as a discussion item within the Site Plan approval process), actions that may be required in the future although not at the time of the adoption of this resolution (e.g., amending the Site Plan approval checklist to directly incorporate those green building standards available to a municipality), and educational actions (e.g., making available information on green building programs, guidelines, rebates etc to residents of the municipality).

NOW, THEREFORE, BE IT RESOLVED that the (Name of Municipality) hereby implements a Green Building Policy that:

will consider opportunities to incorporate green building measures into the design, construction, operation and maintenance of municipal buildings and facilities.

will encourage green design for commercial and residential buildings.

BE IT FURTHER RESOLVED,

CERTIFICATION

I, _____, Clerk of the (Name of Municipality), in the County of (Name of County),

do hereby certify that the foregoing is a true and correct copy of a resolution duly adopted by the Township Council at a regular meeting held on the __ day of ____ 2009.

IN WITNESS WHEREOF I have hereunto set my hand and affixed the seal of said

Township this __ day of ____ 2009.

APPENDIX

8

SAMPLE GREEN DEVELOPMENT CHECKLIST



Green Development Checklist

Revised August 2015

MODEL GREEN DEVELOPMENT CHECKLIST

This Model Green Development Checklist has been prepared to assist communities in encouraging and reviewing planning submittals for sustainable green design aspects of development projects. Current planning criteria frequently do not address these issues; therefore, they may not be considered in the formal approval process. However, it is beneficial for reviewers of a proposed development to have a comprehensive understanding of the development's potential to incorporate green design, increasing the site's sustainability and its impact on the community. The checklist is organized by scale from regional context, to individual site, to the structures on the site:

1. First, it addresses the site within its regional and local context, looking at its physical location, development status, connectivity to infrastructure (transportation, community, green space) and beneficial and detrimental impacts within the regional or local context.
2. Second, it addresses the site itself, looking at the beneficial or detrimental impacts of the development on site.

3. Third, it addresses the structures on the site, again looking at beneficial or detrimental impacts.

As mentioned earlier, many green design aspects overlap. The handling of rainwater impacts the regional water supply and treatment; the onsite supply’s usage and treatment, and the water usage and treatment in the building. Each aspect must be considered at each scale.

Sustainable Jersey provides many tools to assist in the implementation of green design which should be reviewed to further the understanding and use of this review.

Also, some of the topics below are hyperlinked to other Sustainable Jersey actions, which can serve as resources for further information on those topics.

Items that are in **bold** are **required** in order to receive points toward Sustainable Jersey certification.

1. Context

Connectivity to existing neighborhoods may have many benefits to the health and safety of residents, the economy and diversity of the area, and the surrounding environment. To ensure a proposed development provides the optimum level of connectivity to existing neighborhoods, the following checklist questions are meant to:

1. Encourage development within and near existing communities and public transit infrastructure
2. Encourage improvement and redevelopment of existing cities, suburbs, and towns while limiting the expansion of the development footprint in the region to appropriate circumstances.
3. Reduce vehicle trips and vehicle distance travelled.
4. Reduce the incidence of obesity, heart disease, and hypertension by encouraging daily physical activity associated with walking and bicycling.

CONTEXT	YES	NO	DESCRIPTION
Is the site a redevelopment, brownfield or infill location?			
Is the site served by public transit, pedestrian and bicycle networks?			
Is there train service within ½ mile or bus service within ¼ mile?			
Are the roads within the development designed as “Complete Streets?”			
Does the development include historic preservation or adaptive reuse of existing facilities?			

Does the development include historic preservation, or adaptive reuse onsite? Does the site's location, scale or use support any historic building conditions off site within its context?			
Does the development provide or increase the following:			
A mix of land use types? Please list.			
Housing diversity by type and income?			
Civic and public spaces (or have proximity to them)?			
Recreation facilities and green space/parks (or have proximity to them) and is it part of an integrated ecological network?			
Land use densities greater than the current zoning or surrounding context?			
Alternative parking designs such as reduced parking ratios, a percentage of compact stalls, banked parking, shared parking, priority parking for low emission vehicles and provisions for bicycle storage?			
Local food production, access to off-site facilities or opportunities for Community Supported Agriculture (CSA) or farmers' markets ?			
A plan for promoting and educating people on green features?			
Open space?			
Natural features?			
Regional stormwater management?			
Is the site part of a district energy or water infrastructure?			

2. Site development

Green Design strategies for Site Development generally refer to how to “design with nature” or build on an individual site so that disturbance to the site is minimal to none. It is important that the design considers short term resiliency and long term sustainability solutions. This can be accomplished using some or below all of the strategies.

In general, does the design provide for the following?

SITE DEVELOPMENT	YES	NO	DESCRIPTION
Minimum site disturbance during construction?			
Increased Erosion and Sedimentation Control (beyond county or municipal requirements)?			
Low Impact Design features?			

Bio-swales			
Rain gardens			
Green Roofs			
Pervious pavements			
Green Walls			
Trees			
Indigenous species (non-invasive species, low maintenance landscaping)?			
Onsite management of vegetative waste?			
Regenerative Design?			
Habitat, wetlands or water body conservation or conservation management strategies			
Habitat, wetlands or water body restoration			
Does the site minimize heat island effects through reduced paving, landscaping or other methods?			
Does the site provide alternatives to single occupancy vehicles such as van spaces, bike storage and changing facilities, and alternative energy vehicle parking?			
Does the development include historic preservation or adaptive reuse of existing facilities?			
Does the site include public art and opportunities for civic events?			
Does the site include Light Pollution Reduction and energy efficient site lighting and controls?			
Does the site consider landscape and stormwater maintenance specifications that employ integrated pest management post-bond to assure implementation for five years after occupancy?			

3. Green Building

“Green buildings” utilize a sensitivity to the environment in their design by incorporating strategies like energy and water efficiency, high indoor air quality, and sustainably sourced (or recycled) materials. Green buildings are the foundation for a sustainable neighborhood and should be considered where new developments are planned.

This checklist lists important green building design aspects in the areas of Water Reduction, Energy, Indoor Air Quality, Materials, and Social features. Communities and developers should use this checklist to identify features to incorporate into their site plan or subdivision planning.

GREEN BUILDING	YES	NO	DESCRIPTION
Does the building(s) meet the criteria for a Certified Green Building ?			
Is the building oriented to maximize benefits of daylighting, viewsheds and energy and to minimize detrimental impacts on surrounding sites?			
Does the building respect the scale of the context through its design?			
Water Reduction			
Does the building provide a 20% or greater reduction of water use beyond the minimum water efficiency standards set by the EPA or local government, whichever is greater?			
Does the building employ water conservation features – including low-flow fixtures, waterless urinals, and/or sensor-controlled faucets?			
Does the building incorporate rainwater, gray water + stormwater capture and re-use?			
Is wastewater treated on site and recharged to the ground?			
Energy			
Does the building reduce energy usage through efficient heating and cooling, geothermal technology, enhanced daylighting, efficient lighting, occupant controls and an efficient building envelope?			
Does the project incorporate Energy Star-labeled building products?			
Does the building include onsite energy generation?			
What is the anticipated energy savings?			
What are the anticipated carbon emission reductions?			
Indoor Air Quality			
Is natural ventilation and efficient use of outdoor air during heating and cooling periods utilized?			
Are other measures being used to improve indoor air quality? Please describe			
Materials			
Is an existing building being reused? 100%, 75%, 50%?			
Are there construction waste management plans in place?			

Are there solid waste management plans in place?			
Are building materials reused?			
Do building materials contain recycled content?			
Are building materials sourced within the region (within a 500 mile radius)?			
Social			
Does the site implement indigenously inspired art in the landscape? (i.e. sculpture; garden; mural/ relief; artistic site furnishing, etc.) - one application per building or per 300 residential units.			

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APPENDIX

9

MODEL ENERGY STORAGE ORDINANCE, CHECKLIST, AND PERMIT

Battery Energy Storage System Model Law

For local governments to utilize when drafting local laws and regulations for battery energy storage systems.

DRRAFT



NYSERDA

Battery Energy Storage System Guidebook for Local Governments
NYSERDA 17 Columbia Circle Albany, NY 12203

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- 2. Model Law7

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Overview

The Model Law is intended to help local government officials and AHJs adopt legislation and regulations to responsibly accommodate battery energy storage systems in their communities. The Model Law lays out procedural frameworks and substantive requirements for residential, commercial, and utility-scale battery energy storage systems.

The workable version of this document can be found at nyserra.ny.gov/Energy-Storage-Guidebook, under Battery Energy Storage System Model Law tab.

1. Instructions

1. This Model Law can be adopted by the governing board of cities, towns, and villages (hereinafter “local governments” or “municipalities”) to regulate the installation, operation, maintenance, and decommissioning of battery energy storage systems. The Model Law is intended to be an “all-inclusive” local law, regulating the subject of battery energy storage systems under typical zoning and land use regulations and it includes the process for compliance with the State Environmental Quality Review Act. Municipalities should review this Model Law, examine their local laws and regulations and the types, size range and number of battery energy storage system projects proposed, and adopt a local law addressing the aspects of battery energy storage system development that make the most sense for each municipality, deleting, modifying, or adding other provisions as appropriate.
2. This Model Law references a “Battery Energy Storage System Model Permit” that is available as part of NYSERDA’s Battery Energy Storage Guidebook. The Model Permit is intended to help local government officials and AHJs establish the minimum submittal requirements for electrical and structural plan review that are necessary when permitting residential and small commercial battery energy storage systems.
3. In some cases, there may be multiple approaches to regulate a certain aspect of battery energy storage systems. The word “OR” has been placed in the text of the model law to indicate these options. Municipalities should choose the option that works best for their communities. The content provided in brackets and highlighted is optional. Depending on local circumstances, a municipality may want to include this content or choose to adopt a different standard.
4. The Model Law is not intended for adoption precisely as it is written. It is intended to be advisory only, and users should not rely upon it as legal advice. A municipality is not required to adopt this Model Law. Municipal officials are urged to seek legal advice from their attorneys before enacting a battery energy storage system law. Municipalities must carefully consider how the language in this Model Law may be modified to suit local conditions, comprehensive plans, and existing land use and zoning provisions.

5. Before enacting this Model Law, a comprehensive plan outlining the goals and policies for the installation, operation, maintenance, and decommissioning of battery energy storage systems must be adopted by the local governing board (city or common council, town board, village board of trustees). Some local governing boards can satisfy this requirement by updating an existing comprehensive plan while others must adopt a new comprehensive plan. Suggestions on how local governing boards can develop and adopt in their existing or new comprehensive plans battery energy storage system friendly policies and plans that provide local protection are listed below:
- A. Adopt a resolution or policy statement that outlines a strategy for municipal-wide battery energy storage system development. The chief executive officer of a local government (like a town supervisor or city or village mayor) may choose to issue in accordance with its local charter or other valid local law or regulations an executive order, proclamation or other declaration to advance battery energy storage system development.
 - B. Appoint a Battery Energy Storage Task Force (“Task Force”) that represents all interested stakeholders, including residents, businesses, interested non-profit organizations, the battery energy storage industry, utilities, and relevant municipal officials and staff to prepare an action plan, adopt or amend a comprehensive plan to include battery energy storage system planning goals and actions, and develop local laws and/or other regulations to ensure the orderly development of battery energy storage system projects.
 - C. Charge the Task Force with conducting meetings on a communitywide basis to involve all key stakeholders, gather all available ideas, identify divergent groups and views, and secure support from the entire community. The Task Force should also conduct studies and determine whether existing policies, plans, and land use regulations require amendments to remove barriers to and facilitate battery energy storage system development goals.
 - D. Establish a training program for local staff and land use boards. Municipalities are encouraged to utilize State and Federal technical assistance and grants for training programs when available.
 - E. Partner with adjacent communities to adopt compatible policies, plan components, and zoning provisions for battery energy storage system projects. County or regional planning agencies may also advise participating local governments on locally addressing these issues.

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2. Model Law

1. Authority

This Battery Energy Storage System Law is adopted pursuant to Article IX of the New York State Constitution, §2(c)(6) and (10), New York Statute of Local Governments, § 10 (1) and (7); [Select one: sections 261-263 of the Town Law / sections 7-700 through 7-704 of the Village Law / sections 19 and 20 of the City Law and section 10 of the Municipal Home Rule Law] of the State of New York, which authorize the [Village/Town/City] to adopt zoning provisions that advance and protect the health, safety and welfare of the community.

2. Statement of Purpose

This Battery Energy Storage System Law is adopted to advance and protect the public health, safety, welfare, and quality of life of [Village/Town/City] by creating regulations for the installation and use of battery energy storage systems, with the following objectives:

- A. To provide a regulatory scheme for the designation of properties suitable for the location, construction and operation of battery energy storage systems;
- B. To ensure compatible land uses in the vicinity of the areas affected by battery energy storage systems;
- C. To mitigate the impacts of battery energy storage systems on environmental resources such as important agricultural lands, forests, wildlife and other protected resources; and
- D. To create synergy between battery energy storage system development and [other stated goals of the community pursuant to its Comprehensive Plan].

3. Definitions

As used in this [Article/Chapter], the following terms shall have the meanings indicated:

ANSI: American National Standards Institute

BATTERY(IES): A single cell or a group of cells connected together electrically in series, in parallel, or a combination of both, which can charge, discharge, and store energy electrochemically. For the purposes of this law, batteries utilized in consumer products are excluded from these requirements.

BATTERY ENERGY STORAGE MANAGEMENT SYSTEM: An electronic system that protects energy storage systems from operating outside their safe operating parameters and disconnects electrical power to the energy storage system or places it in a safe condition if potentially hazardous temperatures or other conditions are detected.

BATTERY ENERGY STORAGE SYSTEM: One or more devices, assembled together, capable of storing energy in order to supply electrical energy at a future time, not to include a stand-alone 12-volt car battery or an electric motor vehicle. A battery energy storage system is classified as a Tier 1 or Tier 2 Battery Energy Storage System as follows:

- A. Tier 1 Battery Energy Storage Systems have an aggregate energy capacity less than or equal to 600kWh and, if in a room or enclosed area, consist of only a single energy storage system technology.
- B. Tier 2 Battery Energy Storage Systems have an aggregate energy capacity greater than 600kWh or are comprised of more than one storage battery technology in a room or enclosed area.

CELL: The basic electrochemical unit, characterized by an anode and a cathode, used to receive, store, and deliver electrical energy.

COMMISSIONING: A systematic process that provides documented confirmation that a battery energy storage system functions according to the intended design criteria and complies with applicable code requirements.

DEDICATED-USE BUILDING: A building that is built for the primary intention of housing battery energy storage system equipment, is classified as Group F-1 occupancy as defined in the International Building Code, and complies with the following:

- 1) The building's only use is battery energy storage, energy generation, and other electrical grid-related operations.
- 2) No other occupancy types are permitted in the building.
- 3) Occupants in the rooms and areas containing battery energy storage systems are limited to personnel that operate, maintain, service, test, and repair the battery energy storage system and other energy systems.
- 4) Administrative and support personnel are permitted in areas within the buildings that do not contain battery energy storage system, provided the following:
 - a. The areas do not occupy more than 10 percent of the building area of the story in which they are located.
 - b. A means of egress is provided from the administrative and support use areas to the public way that does not require occupants to traverse through areas containing battery energy storage systems or other energy system equipment.

ENERGY CODE: The New York State Energy Conservation Construction Code adopted pursuant to Article 11 of the Energy Law, as currently in effect and as hereafter amended from time to time.

FIRE CODE: The fire code section of the New York State Uniform Fire Prevention and Building Code adopted pursuant to Article 18 of the Executive Law, as currently in effect and as hereafter amended from time to time.

NATIONALLY RECOGNIZED TESTING LABORATORY (NRTL): A U.S. Department of Labor designation recognizing a private sector organization to perform certification for certain products to ensure that they meet the requirements of both the construction and general industry OSHA electrical standards.

NEC: National Electric Code.

NFPA: National Fire Protection Association.

NON-DEDICATED-USE BUILDING: All buildings that contain a battery energy storage system and do not comply with the dedicated-use building requirements.

NON-PARTICIPATING PROPERTY: Any property that is not a participating property.

NON-PARTICIPATING RESIDENCE: Any residence located on non-participating property.

OCCUPIED COMMUNITY BUILDING: Any building in Occupancy Group A, B, E, I, R, as defined in the International Building Code, including but not limited to schools, colleges, daycare facilities, hospitals, correctional facilities, public libraries, theaters, stadiums, apartments, hotels, and houses of worship.

PARTICIPATING PROPERTY: A battery energy storage system host property or any real property that is the subject of an agreement that provides for the payment of monetary compensation to the landowner from the battery energy storage system owner (or affiliate) regardless of whether any part of a battery energy storage system is constructed on the property.

UNIFORM CODE: the New York State Uniform Fire Prevention and Building Code adopted pursuant to Article 18 of the Executive Law, as currently in effect and as hereafter amended from time to time.

4. Applicability

- A. The requirements of this Local Law shall apply to all battery energy storage systems permitted, installed, or modified in [Village/Town/City] after the effective date of this Local Law, excluding general maintenance and repair.
- B. Battery energy storage systems constructed or installed prior to the effective date of this Local Law shall not be required to meet the requirements of this Local Law.
- C. Modifications to, retrofits or replacements of an existing battery energy storage system that increase the total battery energy storage system designed discharge duration or power rating shall be subject to this Local Law.

5. General Requirements

- A. A building permit and an electrical permit shall be required for installation of all battery energy storage systems.
- B. Issuance of permits and approvals by the [Reviewing Board] shall include review pursuant to the State Environmental Quality Review Act [ECL Article 8 and its implementing regulations at 6 NYCRR Part 617 (“SEQRA”).
- C. All battery energy storage systems, all Dedicated Use Buildings, and all other buildings or structures that (1) contain or are otherwise associated with a battery energy storage system and (2) subject to the Uniform Code and/or the Energy Code shall be designed, erected, and installed in accordance with all applicable provisions of the Uniform Code, all applicable provisions of the Energy Code, and all applicable provisions of the codes, regulations, and industry standards as referenced in the Uniform Code, the Energy Code, and the [Village/Town/City] Code.

6. Permitting Requirements for Tier 1 Battery Energy Storage Systems

Tier 1 Battery Energy Storage Systems shall be permitted in all zoning districts, subject to the Uniform Code and the “Battery Energy Storage System Permit,” and exempt from site plan review.

7. Permitting Requirements for Tier 2 Battery Energy Storage Systems

Tier 2 Battery Energy Storage Systems are permitted through the issuance of a [special use permit] within the [XXXXXXXXXXXXXXXX, XXXXXXXXXXXX, XXXXXXXXXXXX] zoning districts, and shall be subject to the Uniform Code and the site plan application requirements set forth in this Section.

- A. Applications for the installation of Tier 2 Battery Energy Storage System shall be:
 - 1) reviewed by the [Code Enforcement/Zoning Enforcement Officer or Reviewing Board] for completeness. An application shall be complete when it addresses all matters listed in this Local Law including, but not necessarily limited to, (i) compliance with all applicable provisions of the Uniform Code and all applicable provisions of the Energy Code and (ii) matters relating to the proposed battery energy storage system and Floodplain, Utility Lines and Electrical Circuitry, Signage, Lighting, Vegetation and Tree-cutting, Noise, Decommissioning, Site Plan and Development, Special Use and Development, Ownership Changes, Safety, and Permit Time Frame and Abandonment. Applicants shall be advised within [10] business days of the completeness of their application or any deficiencies that must be addressed prior to substantive review.
 - 2) subject to a public hearing to hear all comments for and against the application. The [Reviewing Board] of the [Village/Town/City] shall have a notice printed in a newspaper of general circulation in the [Village/Town/City] at least [5] days in advance of such hearing. Applicants shall have delivered the notice by first class mail to adjoining landowners or landowners within [200] feet of the property at least [10] days prior to such a hearing. Proof of mailing shall be provided to the [Reviewing Board] at the public hearing.
 - 3) referred to the [County Planning Department] pursuant to General Municipal Law § 239-m if required.
 - 4) upon closing of the public hearing, the [Reviewing Board] shall take action on the application within 62 days of the public hearing, which can include approval, approval with conditions, or denial. The 62-day period may be extended upon consent by both the [Reviewing Board] and Applicant.
- B. Utility Lines and Electrical Circuitry. All on-site utility lines shall be placed underground to the extent feasible and as permitted by the serving utility, with the exception of the main service connection at the utility company right-of-way and any new interconnection equipment, including without limitation any poles, with new easements and right-of-way.

C. Signage.

- 1) The signage shall be in compliance with ANSI Z535 and shall include the type of technology associated with the battery energy storage systems, any special hazards associated, the type of suppression system installed in the area of battery energy storage systems, and 24-hour emergency contact information, including reach-back phone number.
- 2) As required by the NEC, disconnect and other emergency shutoff information shall be clearly displayed on a light reflective surface. A clearly visible warning sign concerning voltage shall be placed at the base of all pad-mounted transformers and substations.

D. Lighting. Lighting of the battery energy storage systems shall be limited to that minimally required for safety and operational purposes and shall be reasonably shielded and downcast from abutting properties.

E. Vegetation and tree-cutting. Areas within [10] feet on each side of Tier 2 Battery Energy Storage Systems shall be cleared of combustible vegetation and other combustible growth. Single specimens of trees, shrubbery, or cultivated ground cover such as green grass, ivy, succulents, or similar plants used as ground covers shall be permitted to be exempt provided that they do not form a means of readily transmitting fire. Removal of trees should be minimized to the extent possible.

F. Noise. The [1-hour] average noise generated from the battery energy storage systems, components, and associated ancillary equipment shall not exceed a noise level of [60] dBA as measured at the outside wall of any non-participating residence or occupied community building. Applicants may submit equipment and component manufacturers noise ratings to demonstrate compliance. The applicant may be required to provide Operating Sound Pressure Level measurements from a reasonable number of sampled locations at the perimeter of the battery energy storage system to demonstrate compliance with this standard.

G. Decommissioning.

- 1) Decommissioning Plan. The applicant shall submit a decommissioning plan, developed in accordance with the Uniform Code, to be implemented upon abandonment and/or in conjunction with removal from the facility. The decommissioning plan shall include:
 - a. A narrative description of the activities to be accomplished, including who will perform that activity and at what point in time, for complete physical removal of all battery energy storage system components, structures, equipment, security barriers, and transmission lines from the site;
 - b. Disposal of all solid and hazardous waste in accordance with local, state, and federal waste disposal regulations;
 - c. The anticipated life of the battery energy storage system;
 - d. The estimated decommissioning costs and how said estimate was determined;
 - e. The method of ensuring that funds will be available for decommissioning and restoration;
 - f. The method by which the decommissioning cost will be kept current;
 - g. The manner in which the site will be restored, including a description of how any changes to the surrounding areas and other systems adjacent to the battery energy storage system, such as, but not limited to, structural elements, building penetrations, means of egress, and required fire detection suppression systems, will be protected during decommissioning and confirmed as being acceptable after the system is removed; and
 - h. A listing of any contingencies for removing an intact operational energy storage system from service, and for removing an energy storage system from service that has been damaged by a fire or other event.
- 2) Decommissioning Fund. The owner and/or operator of the energy storage system, shall continuously maintain a fund or bond payable to the [Village/Town/City], in a form approved by the [Village/Town/City] for the removal of the battery energy storage system, in an amount to be determined by the [Village/Town/City], for the period of the life of the facility. This fund may consist of a letter of credit from a State of New York licensed-financial institution. All costs of the financial security shall be borne by the applicant.

H. Site plan application. For a Tier 2 Battery Energy Storage System requiring a Special Use Permit, site plan approval shall be required. Any site plan application shall include the following information:

- 1) Property lines and physical features, including roads, for the project site.
- 2) Proposed changes to the landscape of the site, grading, vegetation clearing and planting, exterior lighting, and screening vegetation or structures.
- 3) A [one- or three-line] electrical diagram detailing the battery energy storage system layout, associated components, and electrical interconnection methods, with all National Electrical Code compliant disconnects and over current devices.
- 4) A preliminary equipment specification sheet that documents the proposed battery energy storage system components, inverters and associated electrical equipment that are to be installed. A final equipment specification sheet shall be submitted prior to the issuance of building permit.
- 5) Name, address, and contact information of proposed or potential system installer and the owner and/or operator of the battery energy storage system. Such information of the final system installer shall be submitted prior to the issuance of building permit.
- 6) Name, address, phone number, and signature of the project Applicant, as well as all the property owners, demonstrating their consent to the application and the use of the property for the battery energy storage system.
- 7) Zoning district designation for the parcel(s) of land comprising the project site.
- 8) Commissioning Plan. Such plan shall document and verify that the system and its associated controls and safety systems are in proper working condition per requirements set forth in the Uniform Code. Where commissioning is required by the Uniform Code, Battery energy storage system commissioning shall be conducted by a New York State (NYS) Licensed Professional Engineer after the installation is complete but prior to final inspection and approval. A corrective action plan shall be developed for any open or continuing issues that are allowed to be continued after commissioning. A report describing the results of the system commissioning and including the results of the initial acceptance testing required in the Uniform Code shall be provided to [Code Enforcement/Zoning Enforcement Officer or Reviewing Board] prior to final inspection and approval and maintained at an approved on-site location.
- 9) Fire Safety Compliance Plan. Such plan shall document and verify that the system and its associated controls and safety systems are in compliance with the Uniform Code.
- 10) Operation and Maintenance Manual. Such plan shall describe continuing battery energy storage system maintenance and property upkeep, as well as design, construction, installation, testing and commissioning information and shall meet all requirements set forth in the Uniform Code.
- 11) Erosion and sediment control and storm water management plans prepared to New York State Department of Environmental Conservation standards, if applicable, and to such standards as may be established by the Planning Board.
- 12) Prior to the issuance of the building permit or final approval by the [Reviewing Board], but not required as part of the application, engineering documents must be signed and sealed by a NYS Licensed Professional Engineer.
- 13) Emergency Operations Plan. A copy of the approved Emergency Operations Plan shall be given to the system owner, the local fire department, and local fire code official. A permanent copy shall also be placed in an approved location to be accessible to facility personnel, fire code officials, and emergency responders. The emergency operations plan shall include the following information:
 - a. Procedures for safe shutdown, de-energizing, or isolation of equipment and systems under emergency conditions to reduce the risk of fire, electric shock, and personal injuries, and for safe start-up following cessation of emergency conditions.
 - b. Procedures for inspection and testing of associated alarms, interlocks, and controls.
 - c. Procedures to be followed in response to notifications from the Battery Energy Storage Management System, when provided, that could signify potentially dangerous conditions, including shutting down equipment, summoning service and repair personnel, and providing agreed upon notification to fire department personnel for potentially hazardous conditions in the event of a system failure.

- d. Emergency procedures to be followed in case of fire, explosion, release of liquids or vapors, damage to critical moving parts, or other potentially dangerous conditions. Procedures can include sounding the alarm, notifying the fire department, evacuating personnel, de-energizing equipment, and controlling and extinguishing the fire.
- e. Response considerations similar to a safety data sheet (SDS) that will address response safety concerns and extinguishment when an SDS is not required.
- f. Procedures for dealing with battery energy storage system equipment damaged in a fire or other emergency event, including maintaining contact information for personnel qualified to safely remove damaged battery energy storage system equipment from the facility.
- g. Other procedures as determined necessary by the [Village/Town/City] to provide for the safety of occupants, neighboring properties, and emergency responders.
- h. Procedures and schedules for conducting drills of these procedures and for training local first responders on the contents of the plan and appropriate response procedures.

I. Special Use Permit Standards.

- 1) Setbacks. Tier 2 Battery Energy Storage Systems shall comply with the setback requirements of the underlying zoning district for principal structures.
- 2) Height. Tier 2 Battery Energy Storage Systems shall comply with the building height limitations for principal structures of the underlying zoning district.
- 3) Fencing Requirements. Tier 2 Battery Energy Storage Systems, including all mechanical equipment, shall be enclosed by a [7-foot-high] fence with a self-locking gate to prevent unauthorized access unless housed in a dedicated-use building and not interfering with ventilation or exhaust ports.
- 4) Screening and Visibility. Tier 2 Battery Energy Storage Systems shall have views minimized from adjacent properties to the extent reasonably practicable using architectural features, earth berms, landscaping, or other screening methods that will harmonize with the character of the property and surrounding area and not interfering with ventilation or exhaust ports.

J. Ownership Changes. If the owner of the battery energy storage system changes or the owner of the property changes, the special use permit shall remain in effect, provided that the successor owner or operator assumes in writing all of the obligations of the special use permit, site plan approval, and decommissioning plan. A new owner or operator of the battery energy storage system shall notify the [Code Enforcement/Zoning Enforcement Officer] of such change in ownership or operator within [30] days of the ownership change. A new owner or operator must provide such notification to the [Code Enforcement/Zoning Enforcement Officer] in writing. The special use permit and all other local approvals for the battery energy storage system would be void if a new owner or operator fails to provide written notification to the [Code Enforcement/Zoning Enforcement Officer] in the required timeframe. Reinstatement of a void special use permit will be subject to the same review and approval processes for new applications under this Local Law.

8. Safety

A. System Certification. Battery energy storage systems and equipment shall be listed by a Nationally Recognized Testing Laboratory to UL 9540 (Standard for battery energy storage systems and Equipment) or approved equivalent, with subcomponents meeting each of the following standards as applicable:

- 1) UL 1973 (Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power and Light Electric Rail Applications),
- 2) UL 1642 (Standard for Lithium Batteries),
- 3) UL 1741 or UL 62109 (Inverters and Power Converters),
- 4) Certified under the applicable electrical, building, and fire prevention codes as required.
- 5) Alternatively, field evaluation by an approved testing laboratory for compliance with UL 9540 (or approved equivalent) and applicable codes, regulations and safety standards may be used to meet system certification requirements.

B. Site Access. Battery energy storage systems shall be maintained in good working order and in accordance with industry standards. Site access shall be maintained, including snow removal at a level acceptable to the local fire department and, if the Tier 2 Battery Energy Storage System is located in an ambulance district, the local ambulance corps.

C. Battery energy storage systems, components, and associated ancillary equipment shall have required working space clearances, and electrical circuitry shall be within weatherproof enclosures marked with the environmental rating suitable for the type of exposure in compliance with NFPA 70.

9. Permit Time Frame and Abandonment

- A. The Special Use Permit and site plan approval for a battery energy storage system shall be valid for a period of [24] months, provided that a building permit is issued for construction [and/or] construction is commenced. In the event construction is not completed in accordance with the final site plan, as may have been amended and approved, as required by the [Reviewing Board], within [24] months after approval, [Village/Town/City] may extend the time to complete construction for [180] days. If the owner and/or operator fails to perform substantial construction after [36] months, the approvals shall expire.
- B. The battery energy storage system shall be considered abandoned when it ceases to operate consistently for [more than one year]. If the owner and/or operator fails to comply with decommissioning upon any abandonment, the [Village/Town/City] may, at its discretion, enter the property and utilize the available bond and/or security for the removal of a Tier 2 Battery Energy Storage System and restoration of the site in accordance with the decommissioning plan.

10. Enforcement

Any violation of this Battery Energy Storage System Law shall be subject to the same enforcement requirements, including the civil and criminal penalties, provided for in the zoning or land use regulations of [Village/Town/City].

11. Severability

The invalidity or unenforceability of any section, subsection, paragraph, sentence, clause, provision, or phrase of the aforementioned sections, as declared by the valid judgment of any court of competent jurisdiction to be unconstitutional, shall not affect the validity or enforceability of any other section, subsection, paragraph, sentence, clause, provision, or phrase, which shall remain in full force and effect.

Questions?

If you have any questions about the Battery Energy Storage System Model Law, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/Energy-Storage-Guidebook. The NYSERDA team looks forward to partnering with communities across the State.

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Battery Energy Storage System Model Permit

Understanding the permitting requirements of residential and small commercial battery energy storage systems.

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NYSERDA

Battery Energy Storage System Guidebook for Local Governments
NYSERDA 17 Columbia Circle Albany, NY 12203

Section Contents

1. Battery Energy Storage System Model Permit 17

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Overview

The Model Permit is intended to help local government officials and AHJs establish the minimum submittal requirements for electrical and structural plan review that are necessary when permitting residential and small commercial battery energy storage systems.

Additionally, battery energy storage systems shall comply with all applicable provisions of the codes, regulations, and industry standards as referenced in the New York State Uniform Fire Prevention and Building Code.

The Battery Energy Storage System Model Permit is based on the 14th Edition of the National Electric Code (NEC), which is anticipated to be adopted by New York State in 2020. NYSEDA will continue to update the Guidebook as these codes and standards evolve.

The workable version of this document can be found at nyseda.ny.gov/Energy-Storage-Guidebook, under Battery Energy Storage System Model Permit tab.

PERMIT APPLICATION

Battery Energy Storage System Model Permit

Note: Language in [ALL CAPS] below indicates where local jurisdictions need to provide information specific to the jurisdiction. Language in italics indicates explanatory notes from the authors of this document that may be deleted from the distributed version.

SUBMITTAL INSTRUCTIONS

This application and the following attachments will constitute the Battery Energy Storage System Permitting Package.

- This application form, with all fields completed and bearing relevant signatures.
- Permitting fee of \$[ENTER FEE HERE], payable by [ENTER VALID PAYMENT METHODS, If checks are allowed INCLUDING WHO CHECKS SHOULD BE MADE PAYABLE TO]
- Required Construction Documents for the battery energy storage system being installed, including required attachments.

Completed permit applications can be submitted electronically to [EMAIL ADDRESS] or in person at [BUILDING DEPARTMENT ADDRESS] during business hours [INDICATE BUSINESS HOURS].

APPLICATION REVIEW TIMELINE

Permit determinations will be issued within [TIMELINE] calendar days upon receipt of complete and accurate applications. The municipality will provide feedback within [TIMELINE] calendar days of receiving incomplete or inaccurate applications.

FOR FURTHER INFORMATION

Questions about this permitting process may be directed to [MUNICIPAL CONTACT INFORMATION].

PROPERTY OWNER

Property Owner's First Name

Last Name

Title

Property Address

City

State

Zip

Section

Block

Lot Number

EXISTING USE

Residential

Commercial

PROVIDE THE TOTAL SYSTEM CAPACITY RATING

Total System Capacity Rating: _____ kWh

Power Rating: _____ kW (Select One) AC or DC

SELECT SYSTEM CONFIGURATION

AC Coupled

DC Coupled

Standalone

SELECT BATTERY TYPE

Lithium-ion, all types

Lead-acid, all types

Nickel-cadmium (Ni-Cd)

Flow batteries

Other: _____

SELECT INSTALLATION TYPE

Indoor

Outdoor

Attached/Detached/Open Garage

Rooftop

Dedicated Use Building

BATTERY ENERGY STORAGE SYSTEM INSTALLATION CONTRACTOR

Contractor Business Name

Contractor Business Address

City

State

Zip

Contractor Contact Name

Phone Number

Contractor License Number(s)

Contractor Email

Electrician Business Name

Electrician Business Address

City

State

Zip

Electrician Contact Name

Phone Number

Electrician License Number(s)

Electrician Email

Please sign below to affirm that all answers are correct and that you have met all the conditions and requirements to participate in this unified process.

Property Owner's Signature

Date

Battery Energy Storage System Company Representative Signature

Date

PERMITS AND APPROVALS REQUIRED

The following permits are the minimum requirements for battery energy storage systems installed with an aggregate energy capacity less than or equal to 600kWh and, if in a room or indoor area, where only a single energy storage system technology is provided.

1. Battery Energy Storage System Permit
2. [LIST TYPE OF PERMIT(S) REQUIRED BY THE LOCAL JURISDICTION, i.e., ELECTRICAL OR BUILDING PERMIT].

SUBMITTAL REQUIREMENTS

In order to submit a complete permit application for a new battery energy storage system, the applicant must include:

- a) Completed Application form.
- b) Construction Documents, with listed attachments. Construction Documents must be stamped and signed by a New York State Licensed Professional Engineer.

General Requirements

- Minimum plan size is 11"x17" with a minimum font of 10.
 - Include 4 full sets of plans and 2 sets of supporting documents.
- Include the applicable codes on the cover sheet for the project.
- Include the complete scope of work on the cover sheet for the project.
- All battery energy storage systems, all dedicated use buildings, and all other buildings or structures that (1) contain or are otherwise associated with a battery energy storage system and (2) subject to the NYS Uniform Fire Prevention and Building Code (Uniform Code) and/or the NYS Energy Conservation Construction Code(Energy Code) shall be designed, erected, and installed in accordance with all applicable provisions of the Uniform Code, all applicable provisions of the Energy Code, and all applicable provisions of the codes, regulations, and industry standards as referenced in the Uniform Code, the Energy Code, and the [Village/Town/City] Code.

Site Plan and Floor Plan Requirements

- Include a legend or key for the site and floor plan with equipment symbols.
- The site plan shall include:
 - The location of the structure and the location where the system is to be installed.
 - Show conduit/cable routing of battery energy storage system.
 - Include underground trench detail, if applicable.
 - Show overhead runs, if applicable.
 - Show method and location of required ventilation equipment (if required) for indoor installations.
- Identify the total number of batteries.
- The floor plan shall include:
 - New equipment for the battery energy storage system.
 - Existing equipment for interconnection.
 - Show required working clearances for all existing/new electrical equipment.
 - Show whether the equipment is to be installed indoors or outdoors.
 - Show method and location of requirement ventilation equipment (if required) for indoor installations.
 - Show method of protection from physical damage for the battery energy storage system.
 - Show means of access to battery energy storage system.
 - Denote whether conductors are routed indoors or outdoors.
- Provide an elevation drawing of the system equipment and specify elevation in relation to flood plains.
 - If the building is in a flood zone, it shall be above base flood elevation.
- Provide supporting documents from manufacturer if equipment is subject to physical damage.

Electrical

- Installations shall be in compliance with the Battery Energy Storage System Electrical Checklist. The Battery Energy Storage System Electrical Checklist provides an overview of common points of inspection for which the applicant should be prepared to show compliance.
- One or Three-Line Diagram
 - Show grounding and bonding for the battery energy storage system, including the ground return path.
 - Show method of interconnection.
 - Show overcurrent protection method and rating when required.
 - Include detailed wiring information for all new circuits, including:
 - > Conductor size/type
 - > Number of conductors
 - > Conduit size
 - > Conduit type
 - Show all disconnection means.
 - Show ratings (voltage, ampacity, environmental, etc) for new and existing service equipment.

- Specifications and installation instructions
 - Provide specification sheets and installation instructions for the following equipment:
 - > Batteries
 - > Inverter
 - > Transformer or autotransformer
 - > Transfer switch(es)
 - > ESS support or racking
 - > Converters
 - > Interconnecting cables and connectors
 - > Management system, including charge controller(s)
 - > Panelboards
 - > HVAC/thermal management system
 - > Fire rated material
 - An approved energy storage management system shall be provided for battery technologies other than lead-acid and nickel cadmium for monitoring and balancing cell voltages, currents, and temperatures within the manufacturer's specifications. The system shall transmit an alarm signal to an approved location if potentially hazardous temperatures or other conditions such as short circuits, over voltage or under voltage are detected.

Fire Requirements

- All battery energy storage systems must be designed and installed in accordance with all applicable provisions of the New York State Uniform Code. Provide documentation on how this system will meet these requirements.
 - - Most one-to-two family residential systems will be subject to Section R327 (Energy Storage Systems) of the 2020 Residential Code of New York State. . All other systems are subject to Section 1206 (Electrical Energy Storage Systems) of the 2020 Fire Code of New York State.

PLAN REVIEW

Permit applications can be submitted to [DEPARTMENT NAME] in person at [ADDRESS] and electronically through: [WEBSITE/EMAIL/FAX CONTACT INFORMATION, IF APPLICABLE].

FEES

[PROVIDE CLEAR FEE SCHEDULE]

DEPARTMENTAL CONTACT INFORMATION

Once all permits to construct the battery energy storage system installation have been issued and the system has been installed, it must be inspected before final approval is granted for the battery energy storage system. On-site inspections can be scheduled by contacting [DEPARTMENT] by telephone at [PHONE NUMBER] or electronically at [WEBSITE OR EMAIL ADDRESS].

Inspection requests received within business hours are typically scheduled for the next business day. If next business day is not available, inspection should happen within a five-day window. [IF MUNICIPALITY ACCEPTS THIRD PARTY INSPECTIONS, INDICATE THIS AND PROVIDE A LIST OF APPROVED INSPECTORS].

In order to receive final approval, the following inspection is required:

[FINAL INSPECTION] The applicant must contact [INSERT CONTACT INFORMATION] when ready for a final inspection. During this inspection, the inspector will review the complete installation to ensure compliance with codes and standards, as well as confirming that the installation matches the records included with the permit application. The applicant must have ready, at the time of inspection, the following materials and make them available to the inspector:

- Copies of as-built drawings and equipment specifications, if different than the materials provided with the application.
- Photographs of key hard to access equipment.

[MUNICIPALITY NAME] has adopted a standardized “Battery Energy Storage System Electrical Checklist”, which can be found here: [WEBSITE ADDRESS].

DEPARTMENTAL CONTACT INFORMATION

For additional information regarding this permit process, please consult our departmental website at [WEBSITE] or contact [DIVISION NAME] at [PHONE NUMBER].

Questions?

If you have any questions about the Battery Energy Storage System Model Permit, please email questions to cleanenergyhelp@nyscrda.ny.gov or request free technical assistance at nyscrda.ny.gov/Energy-Storage-Guidebook. The NYSCRDA team looks forward to partnering with communities across the State.

Battery Energy Storage System Electrical Checklist

Checklist to assist with field inspections of residential and small commercial battery energy storage systems.

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NYSERDA

Section Contents

1. Electrical Checklist25

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Overview

The Electrical Checklist is intended to be utilized as a guideline for field inspections of residential and small commercial battery energy storage systems. It can be used directly by local code enforcement officers or provided to a third-party inspection agency, where applicable.

The Battery Energy Storage System Electrical Checklist is based on the 14th Edition of the National Electric Code (NEC), which is anticipated to be adopted by New York State in 2020. NYSERDA will continue to update the Guidebook as these codes and standards evolve.

The workable version of this document can be found at nyserdera.ny.gov/Energy-Storage-Guidebook, Battery Energy Storage System Electrical Checklist tab.

1. Electrical Checklist

Applicable Codes: NEC 2017, [add any additional local codes required]

The information provided in this document is general and intended as a guide only. Each project is unique and additional requirements may be enforced as deemed appropriate.

Project Information

Permit Number	
Primary Contractor	
Project Address	
Date	

Pre-Inspection

	De-energize electrical panels prior to removing the dead-front. All equipment shall be open and ready for inspection
	The approved plans, permit, and installation instructions shall be on site at time of inspection
	Major changes, including revisions, to the installation shall be submitted to the AHJ for review and approval prior to inspection

Inspection

General

	Exact match of component product number and rating with plan
	All equipment shall bear the appropriate listing mark of a Nationally Recognized Testing Laboratory where such marking is required as part of the listing, and installed in accordance with its listing (NEC Article 110.3(B))
	Battery energy storage system includes a manual (system description, operating and safety instructions, maintenance requirements, safe battery handling requirements/recommendations)
	A personnel door(s) intended for entrance to and egress from rooms designed as BESS rooms shall open in the direction of egress and shall be equipped with listed panic hardware, (NEC 706.10(D))
	Provide sufficient working spaces and clearances for batteries. Working space shall be measured from the edge of the battery cabinet, racks, or trays, (NEC 480.9, 110.26)
	<p>Spaces about the ESS shall comply with NEC 110.26. Working space shall be measured from the edge of the ESS modules, battery cabinets, racks, or trays, (NEC 706.10(C))</p> <ul style="list-style-type: none"> • For battery racks, there shall be a minimum clearance of 1 inch between a cell container and any wall or structure on the side not requiring access for maintenance. • ESS modules, battery cabinets, racks, or trays shall be permitted to contact adjacent walls or structures, provided that the battery shelf has a free air space for not less than 90% of its length. • Pre-engineered and self-contained ESSs shall be permitted to have working space between components within the system in accordance with the manufacturer's recommendations and listing of the system.

Equipment

	Flexible Battery DC conductors are listed as hard service use and/or moisture resistant, (NEC 690.74, 706.32)
	Fine stranded flexible cables (if used) terminated in accordance with NEC 110.14, (NEC 110.14, 690.74, 706.32)
	Ungrounded conductor is not marked using white, grey, or white striped conductors to avoid confusion with grounded conductor markings, (NEC 200.7)
	Electrochemically dissimilar metals are not in direct physical contact, (NEC 110.14)
	All connections shall be secure, (NEC 110.14, 706.31)
	All metallic raceways and equipment shall be bonded and electrically continuous, (NEC 110.3(B), 250.8)
	Unused opening shall be close with protection equivalent to the wall of enclosure, (NEC 110.3(B), 408.7)
	The selected wiring methods are appropriate for the location and installed in accordance with their intended use, (NEC 310, 706)
	All live parts of batteries must be guarded regardless of voltage or battery type, (NEC 706.10(B))
	Batteries' live parts shall be guarded in accordance with (NEC 110.27, 480.10(B))
	Verify that the attachment of the battery storage unit to the wall or floor is per the approved plans. If the wall or floor construction differs from the approved plans, a revision is required prior to inspection

Grounding

	Any conductive battery racks, cases or trays must be connected to an equipment grounding conductor. (NEC 250.110)
	Equipment grounding conductor is properly identified as either bare, green, or green with continuous yellow stripe(s), (NEC 250.119)
	If there is no existing AC grounding electrode, the ESS contractor shall install (2) ground rods at the main electrical service. If there is only (1) ground rod, a second one shall be installed. Ground rods shall be a minimum of 6' apart, (NEC Exhibit 250.25, Article 250.53, 706)

Main Electric Service

	Circuit breakers shall be of the same manufacturer as the main service panel, (NEC 110.3)
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Ventilation

	Provide adequate ventilation for batteries per manufacturer's requirements. (NEC 706.10(A))
	Batteries/enclosures contain ventilation equipment to prevent excessive accumulation of gas pressure and/or gas ignition, (NEC 706.10)

Connections and Terminations

	Cell terminations have measures taken to prevent corrosion
	Electrical connections do not put mechanical strain on battery terminals, (NEC 706.31, 110.14(A))
	Overcurrent protection of ungrounded conductors shall have overcurrent protection device(s) located as close as practicable to the battery terminals in an unclassified location, (NEC 480.5, 706.7)
	Battery circuit and equipment shall be protected by overcurrent protective devices as close as practicable to the storage battery terminals in accordance with the requirements of NEC Article 240, (NEC 240.21(H), 705.65(A))
	Unless the short-circuit currents from all sources do not exceed the ampacity of the conductors, storage battery inverters shall be protected by overcurrent protective devices from all other sources, (NEC 705.65(A))
	A listed current-limiting overcurrent protective device shall be installed adjacent to the ESS for each dc output circuit, (NEC 706.21(C))
	In an ac-coupled system, the plug-in type circuit breaker connected to the output of the storage battery or multimode inverter is required to be secured, (NEC 408.36(D), 710.15(E))
	Storage battery, multimode, and utility-interactive inverter output circuit breakers that are marked "Line" and "Load" are not permitted to be back-fed, (NEC 710.15(E), 110.3(B), 705.12(B)(4))
	Single 120-volt inverter in ac coupled systems should not supply back-up loads containing multiwire branch circuit or any 240 volt outlets. Such action can overload the common neutral in such a wiring method, (NEC 710.15(C))

Monitoring and Charge Control

	Charge controllers shall be compatible with the battery or ESS manufacturer's electrical ratings and charging specifications, (NEC110.3(B))
	Charge controller is properly installed to prevent overcharging or damaging batteries, (NEC 690.72, 706.23)
	Diversionary charge controllers with utility-interactive and multimode inverters shall have a second independent controller to prevent battery overcharge in the event the diversion loads are unavailable or the diversion charge controller fails, (NEC 706.23(B)(3)(b))

Disconnecting Means

	A disconnecting means is provided for all ungrounded conductors derived from a dc stationary battery system with a voltage of over 60 volts dc, (NEC 480.7)
	A disconnecting means shall be provided for all ungrounded conductors derived from an ESS. A disconnecting means shall be readily accessible and located within sight of the ESS, (NEC 706.7(A))
	Battery circuits subject to field servicing where exceeding 240 volts nominal between conductors or to ground, shall have provisions to disconnect the series-connected strings into segments not exceeding 240 volts nominal for maintenance by qualified persons. Non-load-break bolted, or plug-in disconnects shall be permitted, (NEC 706.30(B))
	ESS exceeding 100 volts between conductors or to ground shall have a disconnecting means, accessible only to qualified persons, that disconnects ungrounded and grounded circuit conductor(s) in the electrical storage system for maintenance. This disconnecting means shall not disconnect the grounded circuit conductor(s) for the remainder of any other electrical system. A non-load-break-rated switch shall be permitted to be used as a disconnecting means, (NEC 706.30(C))
	Where battery energy storage system input and output terminals are more than 5ft from the connected equipment, or where these terminals pass through a wall or partition must comply with all of NEC 706.7(E) <ol style="list-style-type: none"> (1) A disconnecting means shall be provided at the energy storage system end of the circuit. Fused disconnecting means or circuit breakers shall be permitted to be used. (2) A second disconnecting means located at the connected equipment shall be installed where the disconnecting means required by 706.7(E)(1) is not within sight of the connected equipment. (3) Where fused disconnecting means are used, the line terminals of the disconnecting means shall be connected toward the energy storage system terminals. (4) Disconnecting means shall be permitted to be installed in energy storage system enclosures where explosive atmospheres can exist if listed for hazardous locations. (5) Where the disconnecting means in (1) is not within sight of the disconnecting means in (2), placards or directories shall be installed at the locations of all disconnecting means indicating the location of all other disconnecting means. (NEC 706.7(E))
	Where a disconnecting means, located in accordance with NEC 480.7(A) (out of sight of the battery storage system), is provided with remote controls to activate the disconnecting means and the controls for the disconnecting means are not located within sight of the stationary battery system, the disconnecting means shall be capable of being locked in the open position, (NEC 480.7(B))
	The equipment grounding lug shall be as specified by the manufacturer, (NEC 110.3(B))
	Remove any insulating finish, such as paint, under the equipment grounding lug prior to installation (NEC 250.8, 250.12)
	Maximum height requirements for disconnects applies to integrated disconnect (e.g., Tesla PowerWalls or similar applications)

Interconnection

	The interconnection methods comply with NEC Article 705.12 (if connected to other energy sources)
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Signage

	<p>The signage shall be in compliance with ANSI Z535 and shall include the following information</p> <ol style="list-style-type: none"> 1. Labeled “Energy Storage Systems” with symbol of lightning bolt in a triangle 2. Type of technology associated with the ESS 3. Special hazards associated 4. Type of suppression system installed in the area of the ESS 5. Emergency contact information
	<p>A permanent plaque or directory denoting the location of all electric power source disconnecting means on or in the premises shall be installed at each service equipment location and at the location(s) of the system disconnect(s) for all electric power production sources capable of being interconnected. The marking shall comply with NEC 110.21(B) (NEC 706.11)</p>
	<p>Equipment containing overcurrent devices in circuits supplying power to a busbar or conductors supplied from multiple sources shall be marked to indicate the presence of all sources. (NEC 705.12(B)(3))</p>
	<p>PV system output circuit conductors shall be marked to indicate the polarity where connected to battery energy storage systems. (NEC 690.55)</p>
	<p>DC system conductors of 4 AWG or larger shall be identified using colored marking tape, (NEC 210.5(C)(2))</p>
	<p>Where controls to activate the disconnecting means of a battery are not located within sight of a stationary battery system, the location of the controls shall be field marked on the disconnecting means. (NEC 480.7(B))</p>
	<p>Where controls to activate the disconnecting means of an ESS are not located within sight of the system, the disconnecting means shall be capable of being locked in the open position, in accordance with 110.25, and the location of the controls shall be field marked on the disconnecting means. (NEC 706.7(B))</p>
	<p>Where the sum of the ampere ratings of all overcurrent devices on panelboards, both load and supply devices, excluding the rating of the overcurrent device protecting the busbar, shall not exceed the ampacity of the busbar. The rating of the overcurrent device protecting the busbar shall not exceed the rating of the busbar. Permanent warning labels shall be applied to distribution equipment displaying the following or equivalent wording: (NEC 705.12(B)(2)(3)(c)):</p> <p style="text-align: center;">WARNING: THIS EQUIPMENT FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL OVERCURRENT DEVICES, EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE, SHALL NOT EXCEED AMPACITY OF BUSBAR</p>
	<p>Where two sources, one a primary power source and the other another power source, are located at opposite ends of a busbar that contains loads, the sum of 125 percent of the power source(s) output circuit current and the rating of the overcurrent device protecting the busbar shall not exceed 120 percent of the ampacity of the busbar. The busbar shall be sized for the loads connected in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment adjacent to the back-fed breaker from the power source that displays the following or equivalent wording: (NEC 705.12(B)(2)(3)(b)):</p> <p style="text-align: center;">WARNING: INVERTER OUTPUT CONNECTION; DO NOT RELOCATE THIS OVERCURRENT DEVICE.</p>
	<p>All battery and battery management equipment and associated switchgear are marked and labeled according to all applicable codes including arc flash incident calculations for the safety of operation and maintenance personnel required by the National Electrical Code and OSHA: (NEC 110.16)</p>
	<p>If a battery dc disconnecting means is not provided at the batteries, the disconnecting means shall be legibly marked in the field. The marking shall be of sufficient durability to withstand the environment involved and shall include the following (NEC 480.7(D)):</p> <ul style="list-style-type: none"> • Nominal battery voltage • Maximum available short-circuit current derived from the stationary battery system • Date the calculation was performed for the value above • The battery disconnecting means shall be marked in accordance with 110.16

Questions?

If you have any questions about the Battery Energy Storage System Electrical Checklist, please email questions to cleanenergyhelp@nyserda.ny.gov or request free technical assistance at nyserda.ny.gov/Energy-Storage-Guidebook. The NYSERDA team looks forward to partnering with communities across the State.

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