

Energy Performance Benchmarking Report For:

Example NJ Office Building **100 Efficient Way** **Secaucus, New Jersey 07094**

Prepared by:



TRC Energy Services, NJCEP C&I Marketing Manager

Report Generated May 20, 2014

Table of Contents

Background	3
Building Energy Use Data	
▪ Table 1: Building Summary	4
▪ Table 2: Monthly Electricity Use & Demand	5
▪ Table 3: Monthly Natural Gas Use	5
▪ Table 4: Carbon Emissions	6
Analysis Results	
▪ U.S. EPA ENERGY STAR® Score	6
▪ Energy Benchmarks & Comparisons	7
▪ Energy Consumption & Utility Costs	8
▪ Recommendations	9
Programs & Incentives	
▪ New Jersey's Clean Energy Program	11
▪ Applicable Programs By Building Type	11
▪ SmartStart Building Program	11
▪ Local Government Energy Audit Program (LGEA)	12
▪ Direct Install Program	13
▪ Pay For Performance Program	14

Please note this report is based on self-reported data, interpreted at a high level and prepared to disseminate valuable information on how energy is used, potential for energy saving and guidance on applying for relevant NJCEP incentives.

Be aware the metrics and scores shown in this report are based upon applicant supplied utility and building information only. Any information not provided to TRC by the applicant will not be represented in the following pages. In addition, to receive recognition for EPA scores above a 75 a site visit conducted by a licensed professional engineer would be required.

This is not an engineering report or an investment grade audit.

Background

New Jersey's Clean Energy Program, administered by the New Jersey Board of Public Utilities, supports building owners and facility managers in their pursuit of energy efficiency and sustainability.

This benchmarking assessment is designed to help you:

- Understand how energy is consumed and cost trends at each building.
- When possible, if there is sufficient comparative data, see how these building(s) compare to other similar buildings.
- Identify opportunities for improving operations, reducing costs and participating in relevant Clean Energy incentive programs.

The analysis was based on the information provided on the *Building Data Request Form* submitted, which included building, energy supplier and other information. The building's utility bills were also used to assess its electricity and heating fuel consumption for the year(s) provided. A summary table of your building's energy use and cost information is provided in Table 1.

If your building type fits either the EPA's ENERGY STAR® Portfolio Manager or EPA EPI models, then its energy performance was compared to national data for similar buildings. The five major benchmarks used to analyze building performance include: electricity use; heating fuel use; weather-normalized heating fuel use; total cost; and total cost per resident, all of which have been normalized for comparison by square footage and weather. If an ENERGY STAR benchmark was conducted, a more detailed description of your building's specific score is available in the Analysis Results section of this report.

Not all buildings fall within a well-represented peer group nor are all buildings able to receive a benchmarking comparative rating. Buildings for which no model was available will still receive an energy performance analysis and recommendations for improvements to lower energy use and increase building operations. Please note all information provided to this program is confidential.

Tables 2 and 3 track your facility's monthly electricity use, electricity demand and natural gas use figures. Although the monthly usage graphs do not include comparisons with other similar buildings in New Jersey or nationwide, they give you a clear picture of how your building consumes energy over the course of a year. Monthly figures are useful for anyone who is interested in conducting an onsite energy audit. Table 4 presents the building's carbon footprint.

The last two sections of this report include some recommended next steps and information on other offerings available through the New Jersey Clean Energy Program to support your energy efficiency projects both technically and financially.

Building Energy Use Data

Table 1: Building Summary

Building Data			
Weather Zone	Newark, NJ	Building Name	NJ Office Building
City	Secaucus	Zip Code	07094
Year Built	1985	Floor Area (sq.ft.)	130,000
No. of Employees	390	Number of PCs	390
Weekly Operating Hours	50	Months Used	12
Percentage Heated	100%	Percentage Cooled	100%

Utility Data			
Data End Point	4/30/2012	Total Cost (\$)	\$471,289.89
Electricity Usage (kWh)	2,904,251	Electricity Cost (\$)	\$402,142.67
Natural Gas Usage (therms)	51,413	Natural Gas Cost (\$)	\$69,147.22
Fuel Oil Usage (gal)	N/A	Fuel Oil Cost (\$)	N/A

Energy Usage			
EPA Score	39	Electric Usage (kWh/sq.ft.)	22.3
Natural Gas Usage (kBtu/sq.ft.)	39.5	Weather Adjusted Natural Gas Usage (Btu/sq.ft./HDD)	10.6
Site Energy (kBtu/sq.ft.)	115.8	Source Energy (kBtu/sq.ft.)	296.0

Environmental Impact Indicators			
Carbon Emissions			
Last Year Natural Gas MtCO _{2e} (tons)	273.5	Last Year Total MtCO _{2e} (tons)	1,676.7
Last Year Electricity MtCO _{2e} (tons)	1,403.2	Efficiency Savings Over Previous Year MtCO _{2e} (tons)	220.7

Table 2: Monthly Electricity Use & Demand

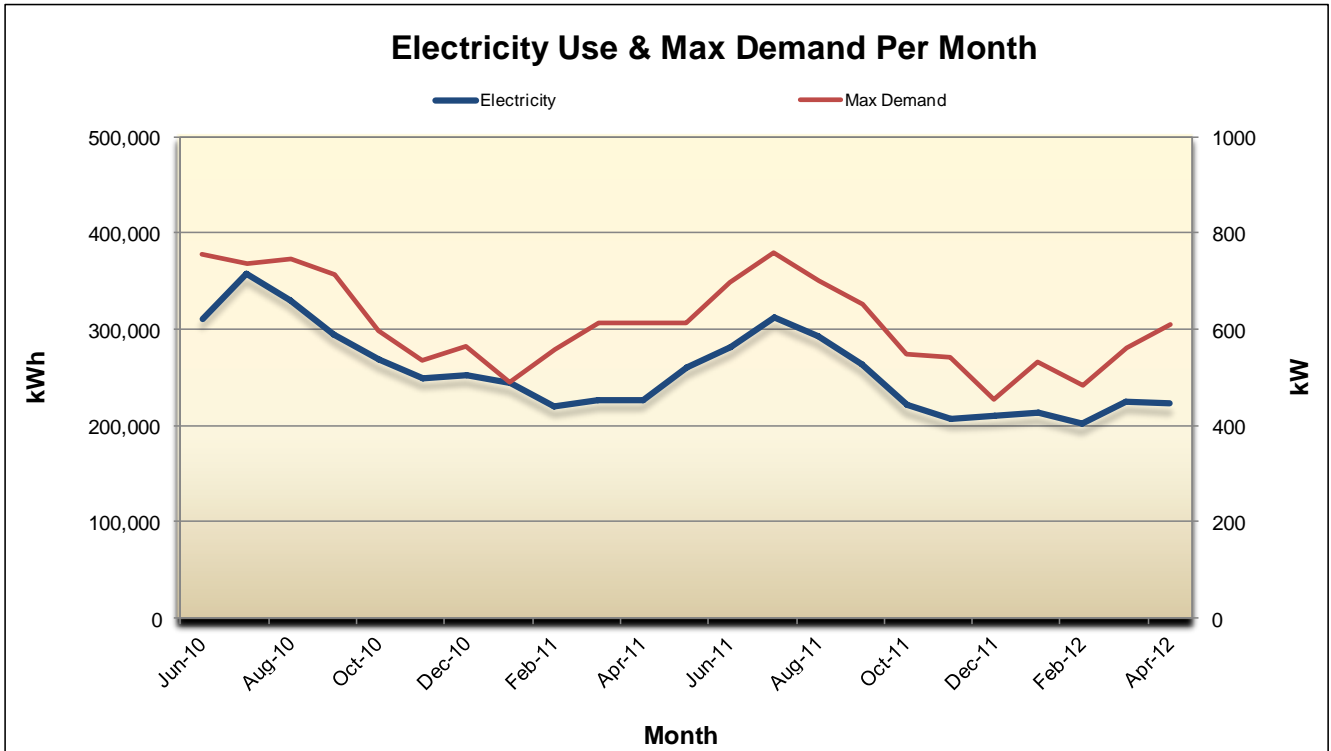


Table 3: Monthly Natural Gas Use

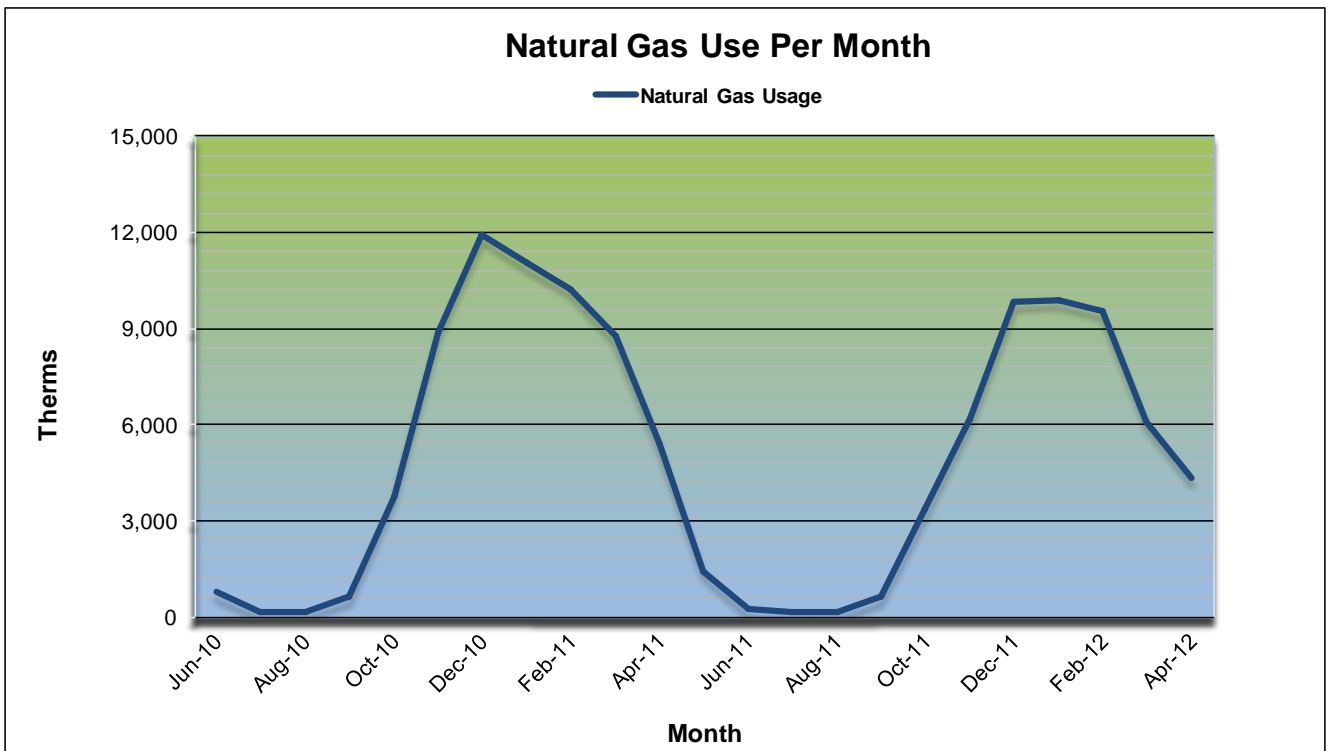
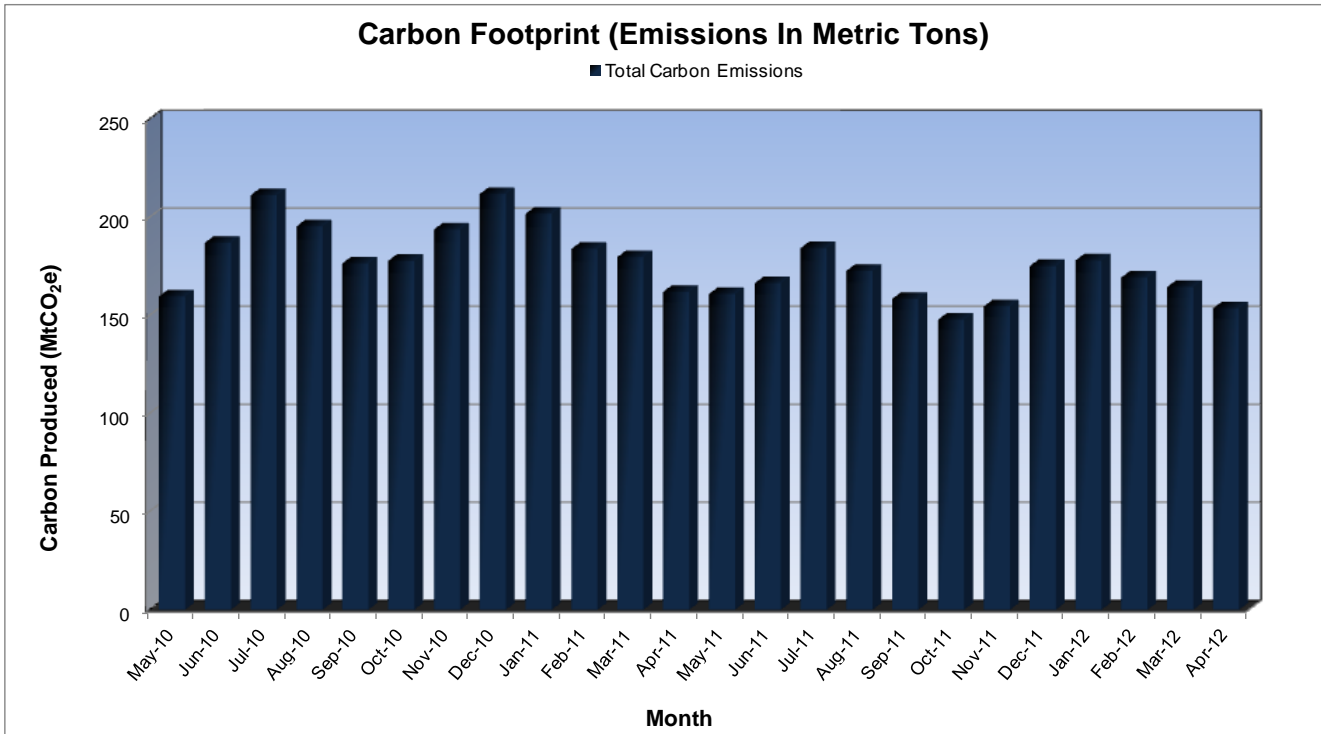


Table 4: Carbon Emissions



Analysis Results

U.S. EPA ENERGY STAR Score:

Your building was benchmarked using the U.S. Environmental Protection Agency's, *Portfolio Manager* software for similar facilities. The score is provided by the EPA ENERGY STAR® Program. The impact of factors outside of your control (such as location, occupancy, and operating hours) are removed, providing a 1-100 ranking of a building's energy performance relative to the national building market. A score of 50 represents the national average, and a score of 100 is best. Buildings that achieve a score of 75 or higher are eligible for EPA's ENERGY STAR® Building Label, the national symbol for protecting the environment through energy efficiency.



The Example NJ Office Building received an EPA benchmark score of 39. EPA *Portfolio Manager* recognizes this facility as an office building considering that over 50% of your facility is used for that purpose. Using the U.S. Environmental Protection Agency's building type guidelines, this score is below average when compared to other office buildings in the United States.

Energy Benchmarks & Comparisons:

As stated on the previous page, the Example NJ Office Building was benchmarked using the U.S. Environmental Protection Agency's *Portfolio Manager*. Energy intensities, emissions and national average comparisons are calculated using this software.

Energy Intensity	Your Building	National Average Office Building
EPA ENERGY STAR Score	39	50
Site Energy Intensity (kBtu/ft ²)	115.8	103.0
Source Energy Intensity (kBtu/ft ²)	296.0	263.0

Site Energy Intensity score is a measure of a building's annual energy utilization per square foot. The Site Energy Intensity score calculated for the Example NJ Office Building is 115.8 kBtu/ft². This calculation is completed by converting the fuel usage consumed by the building for one year, to British thermal units (Btu) and dividing this number by the square footage of the building. Site Energy Intensity score is a good measure of a building's energy use and is utilized regularly for comparison of energy performance for similar building types.

$$\text{Building Site Energy Intensity} = \frac{(\text{Electric Usage in kBtu} + \text{Natural Gas in kBtu})}{\text{Building Square Footage (ft}^2\text{)}}$$

The estimated average Site Energy Intensity score for a building of similar square feet, type and usage is 103.0 kBtu/ft². Therefore, the Example NJ Office Building is performing slightly below average when compared to similar office buildings in the United States.

Source Energy Intensity score is a combination of the building's energy usage in addition to the transmission, delivery and production losses, this calculation is an estimated complete assessment of energy required to operate the building.

$$\text{Building Source Energy Intensity} = \frac{(\text{Electric Usage in kBtu} \times \text{SS Ratio} + \text{Natural Gas in kBtu} \times \text{SS Ratio})}{\text{Building Square Footage (ft}^2\text{)}}$$

The Source Energy Intensity score calculated for the Example NJ Office Building is 296.0 kBtu/ft². The estimated average source energy intensity score for a building of similar square feet, type and usage is 263.0 kBtu/ft². Therefore the Example NJ Office Building is below average in regard to the complete assessment of the energy required to operate the building.

The results convey that the Example NJ Office Building is less efficient when compared to similar facilities nationwide. This is mostly due to the high electric use within this facility. Although improvement is needed, both Site and Source Energy Intensities are within reasonable range for a facility of this size. If the Example NJ Office Building could conserve 10% of energy through its electric consumption, it may be enough to bring this facility to above average status. Additionally a 10% reduction in electric use would result in approximately \$40,000 in cost savings.

Energy Consumption & Utility Cost:

For the Example NJ Office Building, the electrical usage per square foot was calculated to be 22.3 kWh. This means that over the course of the past year, the facility consumed 22.3 kWh per square foot in electricity. This amount of electricity usage is high for an office building. If not already in use, ENERGY STAR® products, LED and other lighting technologies would reduce the power demand needed and lower monthly electricity bills.

Further analysis of the facility does show the property's electricity rate is less than the State average. Therefore, it most likely would not be beneficial to contact your electricity provider or a third-party provider to discuss rate options.

Electricity Usage & Cost	Your Building
Annual Cost (\$)	\$402,142.67
Annual Usage (kWh)	2,904,251
Annual Surface Area Usage (kWh/ft ²)	22.3
Average Annual Cost (\$/kWh)	\$0.14
NJ Average Electricity Price (\$/kWh)	\$0.17

For the Example NJ Office Building facility, the natural gas usage per square foot was calculated to be 39.5 kBtu. This means that over the course of the past year, this facility consumed 39.5 kBtu per square foot in natural gas. Reviewing these indicators is relatively straightforward. If your building's natural gas use is much higher than average, an audit of your heating system along with your building envelope - doors, windows, roof - is recommended. Fortunately, your annual natural gas usage is low compared to other facilities of this size in the same weather conditions.

Using the data as provided to us, analysis does show the property's natural gas rate to be higher than the State average. Therefore, it may be beneficial to contact your natural gas provider or a third-party provider to discuss rate options.

Natural Gas Usage & Cost	Your Building
Annual Cost (\$)	\$69,147.22
Annual Usage (therm)	51,413
Annual Surface Area Usage (kBtu/ft ²)	39.5
Average Annual Cost (\$/therm)	\$1.34
NJ Average Natural Gas Price (\$/therm)	\$1.03

Even with the higher than average natural gas rate, total energy cost is calculated to be \$3.63 per square foot. With the utility information given (shown above), The Example NJ Office Building performs close to average in regard to energy *cost* compared to other facilities in the New Jersey utility territory. Improvements could be seen in the amount of electricity consumed however. Reducing the amount of electricity consumed would, in turn, significantly reduce cost.

Recommendations:

Energy efficiency is a critical need as utility prices continue to rise. Since the inception of the New Jersey Clean Energy Program in 2003, the price of natural gas has nearly doubled in New Jersey, driving similar increases in electricity prices, while oil prices have been wide ranging and extremely volatile. New Jersey's Clean Energy Program is designed to help building owners save energy by providing significant financial and technical support. Accordingly, buildings that have participated in energy benchmarking programs in other States have shown a decrease in overall energy use of approximately 20%. We hope the following recommendations will help you reduce your energy consumption as well.

The Example NJ Office Building is performing below average when compared to similar office facilities nationwide through the EPA's *Portfolio Manager* building rating system. A reduction of the site energy usage at this facility of 39.7 kBtu/square foot would be needed to achieve ENERGY STAR® Building Label recognition. Based on the results, the following program and associated systems and equipment upgrades are suggested:

Recommended NJ Clean Energy Program	Systems & Equipment Covered
Pay for Performance Program	<ul style="list-style-type: none">• Lighting Upgrades• Lighting Controls• Refrigeration Controls• HVAC & Boiler Upgrades• Variable Frequency Drives (VFDs) & Controls

The *Pay for Performance Program* helps building owners and facility managers take a comprehensive, whole-building approach to saving energy and earning incentives that are directly linked to savings.

In addition to the program recommendation above, following are several steps that can be implemented to reduce energy consumption at *no-cost* to the Example NJ Office Building:

- Reducing set point temperatures for periods when the building will be unoccupied, such as nights weekends and holidays. Typically for each degree setback 1-3% energy savings are realized, 8 to 10 degrees is the recommended set-back for unoccupied periods.
- Educate employees to turn off lights when rooms are unoccupied. Turning things off seems simple, but remember that for every 1,000 kWh that you save by turning things off, you save more than \$100.00 on your utility bill.
- It has been noted that Example NJ Office Building has over 35 computers. The EPA offers free computer power management software which can save as much as \$50 per computer per year, http://www.energystar.gov/index.cfm?c=power_mgt.pr_power_mgt_low_carbon_join.

Saving energy helps protect the environment. Every 1,000 kilowatt-hours of electricity saved reduces the amount of carbon dioxide (a greenhouse gas) from entering the atmosphere by 1,000 pounds per year. It also has a dramatic effect on your company's bottom line. For every extra dollar your company spends on energy costs, your company needs to generate \$10.00 worth of revenue (assuming your company operates on a 10% profit margin).

Office equipment uses a substantial amount of energy. This is why turning equipment off when it is not needed and purchasing energy efficient ENERGY STAR[®] equipment is so important. Studies have shown that 30% of office workers leave their computers on at night. If you have difficulty getting workers to cooperate, provide reminders such as putting up posters, including reminders in newsletters or sending group emails.

Lighting consumes approximately 40% of the energy used in an office building. Fortunately there are excellent technologies that have been developed to reduce the amount of energy needed to light an office building. Adding occupancy and photo sensors ensures that the lights are never left on when they are not needed. Occupancy sensors can reduce lighting runtime by 2/3's leading to significant savings. Occupancy sensors should be installed in all areas that are not continuously occupied and/or are not frequently used such as libraries, conference rooms, gymnasiums, cafeterias, restrooms, etc.

HVAC systems typically account for 33% of a buildings energy load. We recommend ensuring that your HVAC system is properly tuned. A poorly tuned HVAC system can cause the ventilation system of a building to work against the heating system by over ventilating the building. Introducing such measures as Demand Control Ventilation and Economizers cause the HVAC system to run only when building occupancy and indoor air quality levels require ventilation, reducing energy loads. If these measures are already being used in this facility it is important that they are routinely maintained to ensure proper operation of these systems. Routine maintenance of these systems prolongs their life and reduces costs. Check air-conditioning temperatures, with a thermometer, check the temperature of the return air going to your air conditioner and then check the temperature of the air coming out of the register that is nearest the air-conditioning unit. If the temperature difference is less than 14 degrees or more than 22 degrees, have a licensed technician inspect your air-conditioning unit. Change the filters, filters should be changed on a monthly basis and more often if you are located next to a highway, construction site or other site where the air is dirtier than usual. Check the cabinet panels on a quarterly basis, make sure the panels to your rooftop air-conditioning unit are fully attached, with all screws in place and all gaskets intact so that no air leaks out of the cabinet. Chilled air leaking out can cost \$100 per rooftop unit per year in wasted energy. Clean the condenser coils, check the condenser coils quarterly for either man-made or natural debris that can collect in them and at the beginning and end of the cooling season, thoroughly wash the coils.

If you could conservatively reduce your total energy use by 10%, the Example NJ Office Building located at 100 Efficient Way could save up to **\$47,100** each year.

These suggestions should be helpful in making informed decisions on how to proceed with improvements to your building. However, remote benchmarking analysis is not a substitute for onsite building energy auditing. Please call us at **866-NJ-SMART (866-657-6278)** or log on to www.NJCleanEnergy.com/ssb to find out how NJCEP programs can help you save money and improve building energy performance.

Programs & Incentives

New Jersey's Clean Energy Program:

New Jersey's Clean Energy Program (NJCEP) promotes increased energy efficiency and the use of clean, renewable sources of energy including solar, wind, geothermal, and sustainable biomass. The results for New Jersey are a stronger economy, less pollution, lower costs, and reduced demand for electricity. NJCEP offers financial incentives, programs, and services for residential, commercial, and municipal customers. The following pages contain current options available under the program.

New Jersey's Applicable Programs By Building Type:

Program				
C&I Building Type	SmartStart Buildings	LGEA	Pay for Performance	Direct Install
Small Business	✓			✓
Large Business	✓		✓	
K-12 Education	✓	✓	✓	✓
Higher Education	✓	✓	✓	✓
Small Industrial	✓			✓
Large Industrial	✓		✓	
Hospital/Healthcare	✓		✓	✓
Multifamily	✓		✓	✓
Hospitality	✓		✓	✓
Local Government	✓	✓	✓	✓

New Jersey's SmartStart Buildings Programs:

NJ SmartStart Buildings provides generous and easy to access financial incentives, for energy efficient measures including high-efficiency lighting and lighting controls, heating and cooling equipment, water heating, motors and variable frequency drives. The program is available to address the new construction and renovation needs of businesses, schools, municipalities, multifamily buildings, and other commercial and industrial facilities.



For large projects (over 50,000 sq. ft.) that are in the conceptual stage, a program representative will work with your design engineering team to implement an integrated approach that maximizes facility quality and energy efficiency. This three-step process incorporates design incentives to offset project engineering fees related to the analysis of premium-efficiency alternatives.

Incentives: Financial incentives for qualifying equipment are available through NJ SmartStart Buildings in either *Prescriptive Incentives* or *Custom Incentives*. These incentives were developed to help our customers offset some of the added cost to purchase qualifying energy-efficient equipment, which provides significant long-term energy savings.

- **Prescriptive Incentives** - Provides preset incentives to install energy-efficient equipment. Eligible gas and electric equipment incentives include: lighting and controls, Unitary HVAC, differential enthalpy economizer controls, motors, variable speed drives, furnaces and hot water heaters, and more.
- **Custom Incentives** - Custom measures allows program participants the opportunity to receive technical assistance to qualify and receive an incentive for unique energy-efficiency measures that are not on the Prescriptive Equipment Incentive list, but are project/facility specific.

Qualifying equipment (depending on type, size and efficiency) include: electric chillers, gas cooling, HVAC, ground source heat pumps, gas heating, variable frequency drives, natural gas water heating, premium motors, prescriptive and performance lighting, and custom gas and electric projects.

For additional information on the SmartStart Building program visit www.NJCleanEnergy.com/SSB, email NJSSB@njcleanenergy.com, or call 1-866-NJSMART.

New Jersey's Local Government Energy Audit Program:

All across New Jersey, residents and business owners are looking for ways to save energy and the environment. Now local governments, as well as NJ State Colleges and Universities, and certain non-profit agencies can take a leadership role by participating in the **Local Government Energy Audit (LGEA) Program** offered as part of New Jersey's Clean Energy Program.



Eligibility: The LGEA Program targets municipal and local government owned facilities including, but not limited to, offices, courtrooms, town halls, police and fire stations, sanitation buildings, transportation structures, schools and community centers. All municipalities and other local governments located in New Jersey are eligible as well as 501 (c)(3) non-profit agencies. The Program requires that participating local government agencies pass a resolution enabling submittal of the program application. Facilities as described above, with a peak electric demand higher than 150 kW in any of the preceding twelve months are eligible to participate in LGEA.

Incentives: The Program will subsidize 100% of the audit cost, subject to an annual \$100,000 incentive cap. When your audit is complete, you'll have a list of recommended, cost-effective energy efficiency measures and facility upgrades that will reduce operating expenses and, in many cases, improve the health and productivity of the buildings' occupants. Of course, most of those measures will be eligible for additional incentives available through the NJ SmartStart Buildings Program, Direct Install or Pay for Performance.

For additional information on the LGEA program visit www.NJCleanEnergy.com/LGEA, email LGEA@njcleanenergy.com, or call 1-866-NJSMART.

New Jersey's Direct Install Program:

Sometimes, the biggest challenge to improving energy efficiency is knowing where to start and how to get through the process. Created specifically for existing small to medium-sized facilities, the **Direct Install Program** is a turnkey solution that makes it easy and affordable to upgrade to high efficiency equipment. Direct Install is designed to cut your facility's energy costs by replacing lighting, HVAC and other outdated operational equipment with energy efficiency alternatives. The program pays up to 70% of retrofit costs, dramatically improving your payback on the project.



The benefits of the Direct Install Program include: **Minimal Cost**, your share of the project's cost will be approximately 30%, the program pays the remaining 70%. With incentives so dramatic, your upgrade project can very quickly pay for itself. **Fast Turnaround Time**, project installations are typically completed within 90 days from the time of scheduling your energy assessment. **Ongoing Savings**, your new energy-efficient equipment will provide savings for years to come through reduced energy costs on your monthly utility bills.

Eligibility: Facilities with a peak electric demand that did not exceed 150 kW in any of the preceding twelve months are eligible to participate in Direct Install. Facilities must be located in New Jersey and served by one of the state's public, regulated electric or natural gas utility companies. Equipment categories eligible for incentives include: lighting, HVAC, natural gas, refrigeration and variable frequency drives. Specific equipment eligible in these categories must be listed on the program's eligible measure lists and also qualify based on the cost-effectiveness of energy savings versus cost as determined by the energy assessment. Boilers may not exceed 500,000 Btuh and furnaces may not exceed 140,000 Btuh. Limitations on packaged HVAC, motors and other equipment also apply. Larger capacity equipment may be eligible for financial incentives through [NJ SmartStart Buildings](#).

Incentives: Contractors will perform energy assessments and equipment inventories using program software to identify energy efficiency measures eligible for incentives and will then install qualifying measures according to an installation agreement signed by you, the customer. The program pays up to 70% of retrofit costs. There is a \$75,000 incentive cap on each project.

A limited number of participating contractors have been selected through a competitive bidding process and specially trained and equipped to provide turn-key, start-to-finish program services, which include helping you complete the application/agreement, performing the energy assessment to identify eligible equipment replacements, and then replacing the equipment. A list of these contractors located within your area can be found on the New Jersey Clean Energy website.

For additional information on the Direct Install program visit www.NJCleanEnergy.com/DI, email DirectInstall@njcleanenergy.com, or call 1-866-NJSMART.

New Jersey's Pay for Performance Program:

The **Pay for Performance Program** helps building owners and facility managers take a comprehensive, whole-building approach to saving energy and earn incentives that are directly linked to savings. The Pay for Performance Program is supported by a network of Partners, under direct contract with you. Acting as your energy expert, your Partner will develop an Energy Reduction Plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for funding the energy efficient measures and an installation schedule.



Eligibility: Existing commercial, industrial and institutional buildings with an average annual peak demand over 100 kW are eligible to participate including schools, hospitals, hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, shopping malls and restaurants, and 501(c)(3) non-profits of any size can participate. Your energy reduction plan must define a comprehensive package of measures capable of reducing the energy consumption of your existing building by 15% or more. The New Construction component is designed for new commercial, industrial and multifamily buildings with 50,000 square feet or more of planned space. Construct your building to achieve energy costs 15% below the current energy code with the help of our approved partners and receive incentives.

Incentives: Pay for Performance incentives for existing buildings are awarded upon completion of three program milestones and may cover up to 50% of total project cost, or \$2 million, whichever is less. Incentive 1 - Submittal of a complete Energy Reduction Plan prepared by an approved program partner contingent on moving forward. Incentive 2 - Installation of all recommended measures. Incentive 3 - Completion of post-construction benchmarking report. Pay for Performance incentives for new construction projects include Incentive 1 - Submittal of a complete draft Energy Reduction Plan prepared by an approved program partner. Incentive 2 - Submittal of a complete proposed Energy Reduction Plan. Incentive 3 - Submittal of complete as-built Energy Reduction Plan. Incentives cover up to 75% of total project incremental cost or \$2 million, whichever is less.

ENERGY STAR Portfolio Manager: Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all of their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings. You can then assess energy management goals over time, identify strategic opportunities for savings and receive EPA recognition for superior energy performance.

Energy Efficiency Revolving Loan Fund (EE RLF): New Jersey-based entities (including 501(c)(3) organizations) that have received an approved energy reduction plan under Pay for Performance may be eligible for supplemental financing through the EE RLF. The financing, in the form of low-interest loans, can be used to support up to 80% of total eligible project costs, not to exceed \$2.5 million or 100% of total eligible project costs from all public state funding sources.

For additional information on the Pay for Performance program visit www.NJCleanEnergy.com/P4P, email P4P@njcleanenergy.com, or call 1-866-NJSMART.