Sustainable Jersey

How Energy Efficiency Helps Schools and Districts Save Money and Energy

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Summary: Energy Actions in SJ for Schools program

Energy Efficiency actions	Climate Mitigation & Renewable Energy actions
• **Energy Tracking & Management** • **Energy Audit** • **Sustainable Energy Transition Plan** • **Building Efficiency Measures**	• **School Carbon Footprint** • **Buy Renewable Energy** • **Collaborate with Municipality on Government Energy Aggregation Program** • **Onsite Renewable Generation System – Solar** • **Onsite Renewable Generation System – Geothermal**

- Not everyone has to do every action
- Program structure purposefully defines a sequence of events for EE actions that allows districts to choose most appropriate path
- Recognizes the variability between school districts
- Multi-point structure: varies by impact and degree of difficulty
- In most cases, you can make use of projects completed in the recent past

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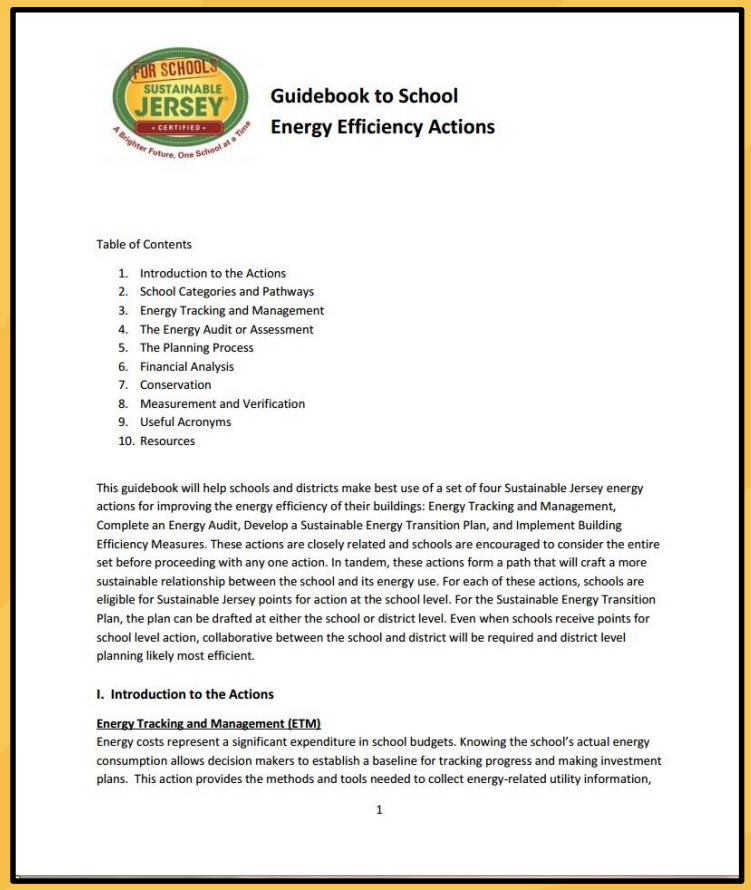
Basic Concepts

- Multi-point actions
- Priority Actions
- Submission requirements
- Resources
- Guidebook for Energy Efficiency actions

We are here to help you succeed – please call us if you need assistance at any point!



Guidebook to School
Energy Efficiency Actions

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This guidebook will help schools and districts make best use of a set of four Sustainable Jersey energy actions for improving the energy efficiency of their buildings: Energy Tracking and Management, Complete an Energy Audit, Develop a Sustainable Energy Transition Plan, and Implement Building Efficiency Measures. These actions are closely related and schools are encouraged to consider the entire set before proceeding with any one action. In tandem, these actions form a path that will craft a more sustainable relationship between the school and its energy use. For each of these actions, schools are eligible for Sustainable Jersey points for action at the school level. For the Sustainable Energy Transition Plan, the plan can be drafted at either the school or district level. Even when schools receive points for school level action, collaborative between the school and district will be required and district level planning likely most efficient.

I. Introduction to the Actions

Energy Tracking and Management (ETM)

Energy costs represent a significant expenditure in school budgets. Knowing the school's actual energy consumption allows decision makers to establish a baseline for tracking progress and making investment plans. This action provides the methods and tools needed to collect energy-related utility information,

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Energy Tracking and Management

- **Concept**: Establish historical energy use baselines, tracking and management systems, and ongoing reporting processes. Intended to serve as an important first step in an overall sustainable energy initiative.

- **Points**: Two tier structure (can do first or both levels):
  - ✓ 10 Points: must draft a full building inventory, collect twelve months of complete utility data for each building in the inventory, and enter that information into an Energy Tracking and Management (ET&M) system to establish a historical baseline (and share data if possible).
  - ✓ Additional 10 points: must complete performance benchmarking* and put an ongoing tracking and reporting system into place to monitor energy usage long-term.

**** - Free energy benchmarking is available through the NJ Clean Energy Program!***

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Energy Audit

- **Concept**: Complete a comprehensive audit of school building energy use, and identify opportunities for improvement. This action will recognize a variety of methods for completing an audit, but will focus on a) the use of the NJ CEP ***LGEA program*,*** and b) use of the DI-walkthrough as an audit for smaller school facilities. Intended to serve, along with ET&M, as an important starting point for an overall sustainable energy initiative.

- This is a **PRIORITY ACTION**

- **Points**: Three tier structure depending on the completeness of the audit:

  - ✓ 5 Points: Complete a simple walk-through audit (Direct Install energy assessment or private ASHRAE Level 1) on at least one school building (preferably more)
  - ✓ **OR** 10 points: Complete an in-depth audit (Local Government Energy Audit or private ASHRAE Level 2 audit) on at least one school building (preferably more)
  - ✓ Additional 10 points: if all buildings included in the audit

**** The Local Government Energy Audit program is 100% free and available for school districts through the New Jersey Clean Energy Program!***

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Implement Efficiency Measures

- **Concept**: This action is the culmination of other energy actions focused on data collection and planning, and translates previous preparatory work into improved building performance. Most of the work done under this action will make use of incentives provided by the New Jersey Clean Energy Program (NJ CEP).

- **Prerequisite:** *completion of the Energy Audit action is strongly recommended but is no longer a prerequisite for this action.* Sustainable Jersey also strongly recommends, but does not require, completion of the Energy Tracking and Management action.

- **Points**: Multi-tier structure depending on project impact:
  - ✓ 5 Points: <10% decrease in energy use
  - ✓ 10 Points: between 10% and 20% decrease in energy use
  - ✓ 20 Points: between 20% and 30% decrease in energy use
  - ✓ 30 Points: > 30% decrease in energy use

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Opportunity: Flexible Financing & Repayment Option

Commercial 0% APR On-Bill Repayment Program (OBRP)

Small to Mid-Sized Commercial, Industrial and Local Government Buildings
Incentives Available up to 100% for Energy-Efficiency Upgrades*

Direct Install offered through NJCEP pays up to 70% of the cost of your project. Plus, NJNG customers can finance up to 30% of the remaining balance at 0% APR

Sometimes, the biggest challenge to improving energy efficiency is knowing where to start and how to get through the process. Direct Install is a turnkey solution that makes it easy and affordable to upgrade to high-efficiency equipment. The program is designed to cut your facility's energy costs by replacing lighting, heating, cooling and ventilation (HVAC) and other outdated operational equipment with energy-efficiency alternatives. Through Direct Install you will receive a FREE energy assessment and the contractor assigned to your area will work with you to complete the program application and participation agreement.

Currently NJCEP is reviewing its agreements with the contractors and refreshing the measures that can be installed (included) under the program. This will ensure that you receive the latest technologies and competitive prices for all of the eligible measures, to make certain that you are getting the best energy solutions for your facility. If you are interested in participating or would like more information, please contact Jerry at 732-378-4920 or jryan@njng.com to learn when the program is ready to start scheduling assessments again.

For school districts in the New Jersey Natural Gas service territory, there is a new option available that provides flexibility and cost savings when doing facility upgrades through the Direct Install program.

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Case Study: Readington School District

Jodi Bettermann, Energy Efficiency Coordinator
Readington School District

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Calculating Energy Use Intensity

Project:	Readington Middle School, Readington, NJ										
School area in square feet	121,536										
Source EUI kbtu/sf/yr	**154.4**										
2012-13	Enter your grid purchased electricity (kWh) in this column	kwh converted to kbtu	Enter your natural gas (therms) in this column	therms converted to kbtu	Enter your oil (gallons) in this column	gallons converted to kbtu	Enter your propane (gallons) into this column	gallons converted to kbtu	Enter your on-site generated electricity (kWh) into this column	kWh converted to kbtu	total kbtu per month
July	92,311	989,280	181	18,974		0		0		0	1,008,254
August	61,410	658,120	176	18,438		0		0		0	676,558
September	109,093	1,169,130	337	35,406		0		0		0	1,204,536
October	83,433	894,136	1,652	173,408		0		0		0	1,067,544
November	99,663	1,068,070	3,599	377,937		0		0		0	1,446,007
December	126,528	1,355,978	9,704	1,018,920		0		0		0	2,374,898
January	142,544	1,527,618	10,364	1,088,220		0		0		0	2,615,838
February	123,238	1,320,719	10,238	1,074,990		0		0		0	2,395,709
March	118,747	1,272,590	8,942	938,910		0		0		0	2,211,500
April	109,901	1,177,789	4,628	485,940		0		0		0	1,663,729
May	89,132	955,212	1,442	151,410		0		0		0	1,106,622
June	86,706	929,213	647	67,935		0		0		0	997,148
Annual totals	1,242,706		51,909		0		0		0		18,768,344
	kwh		therms		gallons		gallons		kwh		kbtu

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Calculating Energy Use Intensity

Project:	Readington Middle School Window Replacement, Readington, NJ										
School area in square feet	121,536										
Source EUI kbtu/sf/yr	**150.1**										
2014-15	Enter your grid purchased electricity (kWh) in this column	kwh converted to kbtu	Enter your natural gas (therms) in this column	therms converted to kbtu	Enter your oil (gallons) in this column	gallons converted to kbtu	Enter your propane (gallons) into this column	gallons converted to kbtu	Enter your on-site generated electricity (kWh) into this column	kWh converted to kbtu	total kbtu per month
July	82,876	888,167	202	21,210		0		0		0	909,377
August	62,531	670,133	229	24,045		0		0		0	694,178
September	91,677	982,486	471	49,455		0		0		0	1,031,941
October	97,618	1,046,155	1,726	181,230		0		0		0	1,227,385
November	106,369	1,139,937	5,651	593,355		0		0		0	1,733,292
December	114,294	1,224,868	9,274	973,770		0		0		0	2,198,638
January	121,542	1,302,544	11,522	1,209,810		0		0		0	2,512,354
February	127,659	1,368,099	11,887	1,248,135		0		0		0	2,616,234
March	100,070	1,072,432	7,508	788,340		0		0		0	1,860,772
April	93,351	1,000,426	4,542	476,910		0		0		0	1,477,336
May	99,394	1,065,188	735	77,175		0		0		0	1,142,363
June	73,622	788,994	496	52,080		0		0		0	841,074
Annual totals	1,171,003		54,243		0		0		0		18,244,943
	kwh		therms		gallons		gallons		kwh		kbtu

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Calculating Energy Use Intensity - Cherry Hill Public Schools

		Baseline Energy Data from Energy Audit							Baseline Energy Data from Energy Audit							
Building	**Building area in square feet**	**Enter your grid purchased electricity (kWh) in this column**	**Enter your natural gas (therms) in this column**	**Enter your oil (gallons) in this column**	**Enter your propane (gallons) into this column**	**Enter your on-site generated electricity (kWh) into this column**	**total kbtu per month**	**Baseline EUI**	**Enter potential electricity savings from ECMs (kWh) in this column**	**Enter potential natural gas savings from ECMs (therms) in this column**	**Enter potential oil savings from ECMs (gallons) in this column**	**Enter potential propane savings from ECMs (gallons) in this column**	**Enter potential on-site generated electricity from ECMs (kWh) in this column**	**total kbtu per month after energy upgrades**	**EUI after Energy Upgrades**	**% Change EUI in Facility**
A. Russell Knight Elementary School	43,000	187,243	17,999				3,896,532	90.6	38,731	3,347				3,130,024	72.8	-19.7%
Alternative High School	41,240	341,460	26,605				6,452,934	156.5	54,610	5,889				5,249,344	127.3	-18.7%
Barclay School	32,300	153,760	22,855				4,047,628	125.3	17,953	3,347				3,503,794	108.5	-13.4%
Bret Harte Elementary School	56,600	272,910	27,529				5,815,295	102.7	42,570	4,582				4,877,973	86.2	-16.1%
Cherry Hill High-East High School	369,000	2,516,956	265,838				54,886,769	148.7	474,257	89,548				40,401,702	109.5	-26.4%
Cherry Hill High-West High School	272,580	2,320,200	136,246				39,170,984	143.7	257,291	20,959				34,212,948	125.5	-12.7%
Clara Barton Elementary School	50,100	262,560	22,763				5,203,975	103.9	-91,315	22,851				3,783,226	75.5	-27.3%
Henry C. Beck Middle School	119,504	936,480	55,922				15,907,935	133.1	63,127	13,736				13,789,135	115.4	-13.3%
Horace Mann Elementary School	41,000	221,490	11,956				3,629,048	88.5	63,951	1,547				2,781,262	67.8	-23.4%
James F. Cooper Elementary School	49,850	204,660	22,436				4,549,061	91.3	19,243	5,864				3,727,118	74.8	-18.1%
James Johnson Elementary School	51,550	244,284	23,034				5,036,565	97.7	29,938	3,367				4,362,190	84.6	-13.4%
John A. Carusi Middle School	129,552	778,400	59,343				14,572,983	112.5	154,950	7,555				12,119,137	93.5	-16.8%
Joseph D. Sharp Elementary School	44,434	284,895	20,054				5,158,786	116.1	38,688	2,737				4,456,789	100.3	-13.6%
Joyce Kilmer Elementary School	55,942	263,610	44,860				7,535,400	134.7	25,416	5,731				6,661,266	119.1	-11.6%
Kingston Elementary School	44,000	212,460	31,592				5,594,083	127.1	61,519	7,887				4,106,660	93.3	-26.6%
Richard Stockton Elementary School	54,655	365,220	34,293				7,514,718	137.5	44,437	4,343				6,582,480	120.4	-12.4%
Rosa International Middle School	88,737	514,600	49,531				10,715,636	120.8	60,426	6,228				9,414,121	106.1	-12.1%
Thomas Paine Elementary School	51,866	229,545	25,013				5,086,398	98.1	50,514	6,543				3,858,034	74.4	-24.1%
Woodcrest Elementary School	53,185	374,160	21,701				6,288,382	118.2	69,696	1,852				5,347,003	100.5	-15.0%

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School Carbon Footprint

- **Concept**: A School Carbon Footprint measures the amount of greenhouse gas (GHG) emissions produced by the school as a result of its operations in a given year. Completing a School Carbon Footprint requires an accounting-like inventory of all the sources of GHG in your buildings, fleet, and operations. Most of this GHG footprint results from the schools' energy use profile, although other sources are also considered.

- ***Recommended* prerequisite**: Although not required, the collection of energy usage data either through the Energy Tracking and Management action or the Audit action makes this action much easier to complete .

- **Points**: 10 Points

- Great starting point action. Once done for the first time, can be a good opportunity for student engagement

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Buy Renewable Energy

- **Concept**: Most school districts are already familiar with purchasing electricity through a third-party supply contract, and as motivated by this action, can augment that purchase with a request for renewable content as part of the contract. ***The contract must include at least 20% of the supply from renewable sources*** (absolute fraction), inclusive of the fraction that is compliant with the NJ Renewable Portfolio Standard in force at the time of submission.

- **Important Considerations**: There are a variety of energy buying pools already in place, including those offered by commercial entities, and some organized as cooperatives (at the county level, for example). Schools should evaluate these options and select the one that meets their needs.

- **Points**: 10 Points

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Onsite Renewable Generation System – Solar

- **Concept**: This Action awards points for schools that install Photovoltaic (PV) solar systems to generate clean, renewable electricity on their site. That system will typically offset a fraction of the electricity the school currently buys from the utility or third party supplier, and, as a result, reduces the use of traditional fuels and their associated impacts.

- **Points**: Multi-tier structure depending on displacement of utility purchase:
  - ✓ 5 points: for displacement <10%
  - ✓ **OR** 10 points for displacement >10% and <20%
  - ✓ **OR** 20 points for displacement >20% and <30%
  - ✓ **OR** 30 points: for displacement > 30%

  - ✓ **AND** Additional 10 points: if the solar system is upgraded to include islanding and energy storage to enable on-site operation during a grid outage.

Onsite Renewable Generation System - Geothermal

- **Concept**: This action requires the school or district to install a geothermal energy system to provide space heat and/or cooling for the school. Geothermal technologies draw upon the energy stored in the earth to control school building temperatures. As a result, geothermal systems require 25% to 70% less energy than a conventional heating system, generating substantial long-term savings on energy purchases. Geothermal systems also reduce the school's carbon footprint. Reductions in purchases of energy from fossil fuels lower the school district's contributions to greenhouse gas emissions and reduce the school's contribution to Climate Change.

- **Points**: 10 points

Collaborate with Municipality on Government Energy Aggregation Program

- **Concept**: This action recognizes schools that partner with the municipality as the municipality implements a renewable energy purchase program. This can be accomplished by providing events for community education and involvement. By helping to implement an R-GEA program in the town, the school is making renewable energy more accessible to the community, at a lower cost, and with less hassle.

- **Prerequisite:** Schools can only pursue this action ***if their municipality is implementing a renewable energy purchase program***, referred to as Renewable Government Energy Aggregation (R-GEA); see the related Sustainable Jersey R-GEA municipal action.

- **Points**: 10 points

Sustainable Energy Transition Plan

- **Concept**: The Sustainable Energy Transition Plan (SETP) is a document that outlines a prioritized set of building upgrades to be done, identifies how they will be implemented (including NJCEP incentive use, financing strategies, and procurement approaches), and includes a formal commitment for implementation. It is usually only needed in larger, more complicated cases (e.g. ESIPs or projects done through Pay for Performance program)

- **Prerequisite:** Complete an Energy Audit action prior to, or at the same time as, completing this action (given the complexity of a typical SETP, a full Local Government Energy Audit (LGEA), or equivalent, is recommended).

- **Points**: Two tier structure, depending on plan completeness:
  - ✓ 10 Points: SETP implements at least 30% of the efficiency upgrades recommended in the audit
  - ✓ 20 points: SETP implements at least 70% of the efficiency upgrades recommended in the audit, and includes factors beyond building efficiency (conservation, procurement, renewables, and resiliency)

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Question & Answer Period

Questions???

Follow Up Questions

If you have any questions, feel free to reach out to the Energy team:

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