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February 16, 2011

## **Sussex Community College**

### **Local Government Energy Program Energy Audit Report FINAL**

**One College Hill Rd  
Newton, NJ 07860**

**Project Number: LGEA79**

# **ENERGY AUDIT REPORTS SUMMARY**

## EXECUTIVE SUMMARY

Launched in 2008, the Local Government Energy Audit (LGEA) Program provides subsidized energy audits for municipal and local government-owned facilities, including offices, courtrooms, halls, police and libraries, sanitation buildings, transportation structures, schools and community centers. The Board of Public Utilities (BPUs) Office of Clean Energy has assigned TRC Energy Services to administer the Program.

Steven Winter Associates (SWA) performed energy audits and assessment for the Health Sciences and Performing Arts building, Administration and Art Gallery building, Student Center building, Academic and Arts building, and Library and Science building. The process of the audit included benchmarking and utility bills analysis, finding suitable energy conservation measures and other recommendations for improvements.

SWA reviewed utility bills from July 2008 through July 2010 that were received from the utility companies supplying electricity and natural gas. The following table summarizes the relevant account numbers and associated third party commodity suppliers for each of the buildings:

Building		JCP&L	3rd party Electric Supplier	Elizabethtown Gas	3rd party Gas Supplier
A	Health Sciences and Performing Arts	10-00-72-9148-96	N/A	929-038-9168	N/A
B/C	Administration and Art Gallery	10-00-02-1544-07	Liberty Power	222-178-9511	Pepco
D	Student Center	10-00-02-1543-32	Liberty Power	377-115-2341	Pepco
				851-048-9511	Woodruff Energy
				38810-52341	Pepco
E	Academic and Athletics	10-00-02-1546-21	Liberty Power	95258-41551	Pepco
L	Library and Science	10-00-50-7907-14	Liberty Power	188-380-0861	Pepco

SWA considered two scenarios to ease the decision making surrounding the implementation. Both scenarios segregate low cost measures that could be implemented by the college itself. Scenario 1 further segregated the lighting, HVAC, and controls measures, while Scenario 2 only further segregates based on simple back criteria. Implementation can be carried out either by mechanical/electrical trades or by an Energy Services Company as part of a performance contract. SWA recommends Scenario 1 with the following details:

ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	total 1st year cost savings, \$	simple payback, yrs	net present value, \$	CO2 reduced, lbs/yr
<b>Less than \$1500 of installed cost, other than BMS related</b>	<b>9,990</b>	<b>595</b>	<b>9,395</b>	<b>49,259</b>	<b>1,050</b>	<b>8</b>	<b>9,949</b>	<b>0.9</b>	<b>65,355</b>	<b>99,772</b>
<b>Lighting measures</b>	<b>107,980</b>	<b>7,460</b>	<b>100,520</b>	<b>53,252</b>	<b>1,096</b>	<b>9</b>	<b>14,763</b>	<b>6.8</b>	<b>73,195</b>	<b>107,435</b>
<b>HVAC measures</b>	<b>93,247</b>	<b>1,284</b>	<b>91,963</b>	<b>29,837</b>	<b>3,704</b>	<b>15</b>	<b>9,088</b>	<b>10.1</b>	<b>53,711</b>	<b>94,252</b>
<b>Boilers replacement</b>	<b>213,100</b>	<b>9,000</b>	<b>204,100</b>	<b>0</b>	<b>11,225</b>	<b>34</b>	<b>16,528</b>	<b>12.3</b>	<b>107,929</b>	<b>123,733</b>
<b>Windows replacements</b>	<b>406,000</b>	<b>0</b>	<b>406,000</b>	<b>19,691</b>	<b>10,514</b>	<b>33</b>	<b>16,186</b>	<b>25.1</b>	<b>-96,795</b>	<b>151,153</b>
<b>Lighting measures, BMS related</b>	<b>72,600</b>	<b>6,815</b>	<b>65,785</b>	<b>133,920</b>	<b>56</b>	<b>14</b>	<b>21,764</b>	<b>3.0</b>	<b>190,314</b>	<b>240,404</b>
<b>HVAC measures, BMS related</b>	<b>30,040</b>	<b>1,203</b>	<b>28,837</b>	<b>22,163</b>	<b>5,110</b>	<b>17</b>	<b>10,024</b>	<b>2.9</b>	<b>81,185</b>	<b>96,010</b>
<b>Install a new campus wide BMS with lighting controls</b>	<b>615,000</b>	<b>0</b>	<b>615,000</b>	<b>272,963</b>	<b>11,894</b>	<b>69</b>	<b>59,454</b>	<b>10.3</b>	<b>45,018</b>	<b>619,848</b>

A new State law allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the “Energy Savings Improvement Program” (ESIP), provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources. An ESIP can be financed through energy savings obligations. The term refers to the two primary financing tools, debt and lease-purchase instruments.

There are various incentive programs that the Sussex Community College could apply for that could help lower the cost of installing the ECMs, listed as follows:

- **Direct Install 2010 Program:** Commercial buildings with peak electric demand below 200kW can receive up to 60% of installed cost of energy saving upgrades. Some lighting and HVAC equipment upgrades for buildings A, B/C, D and E may be eligible.
- **Smart Start:** Most of energy savings equipment and design measures have moderate incentives under this program. SWA considered these incentives under the ECM calculations.
- **Renewable Energy Incentive Program:** Receive up to \$0.75/Watt toward installation cost for PV panels upon available funding. For each 1,000 kWh generated by PV renewable energy, receive a credit between \$475 and \$600. Only applicable for A building solar ECM.
- **Utility Sponsored Programs:** See available programs with JCP&L [https://www.firstenergycorp.com/JCP\\_L/index.html](https://www.firstenergycorp.com/JCP_L/index.html) and Elizabethtown Gas <http://www.elizabethtowngas.com/Business/EnergySavings.aspx>  
Elizabethtown Gas provides supplemental incentives over and above the NJ SmartStart incentives for prequalified measures.
- **Energy Efficiency and Conservation Block Grant Rebate Program:** Provides up to \$20,000 per local government toward energy saving measures;  
<http://njcleanenergy.com/EECBG>

## HISTORICAL ENERGY CONSUMPTION

The following charts provide an overview of current electricity and natural gas energy usage in various buildings, along with projected savings by carrying out energy conservation measure recommendations proposed by SWA:

<b>A BUILDING</b>	<b>Electric Usage, kWh/yr</b>	<b>Gas Usage, therms/yr</b>	<b>Other fuel usage</b>	<b>Current Annual Cost of Energy, \$</b>	<b>Site Energy Use Intensity, kBtu/sq ft yr</b>	<b>Joint Energy Consumption, MMBtu/yr</b>
Current	466,062	17,060	N/A	\$98,525	110.0	3,296
Proposed	441,650	17,060	N/A	\$94,187	107.3	3,215
Savings	24,412	0	N/A	\$4,338*	2.7	81
% Savings	5.2%	0%	N/A	4.4%	2.5%	2.5%
Renewables	35,400	Includes SRECs		\$27,160	4.0	121

\*Includes operation and maintenance savings

<b>B/C BUILDING</b>	<b>Electric Usage, kWh/yr</b>	<b>Gas Usage, therms/yr</b>	<b>Annual Cost of Energy, \$</b>	<b>Site Energy Use Intensity, kBtu/sq ft yr</b>	<b>Joint Energy Consumption, MMBtu/yr</b>
Current	688,323	23,220	\$137,511	122.0	4,671
Proposed	554,251	7,542	\$92,534	69.0	2,642
Savings	134,072	15,678	\$44,977	53.0	2029
% Savings	19.5%	67.5%	32.7%	43.4%	43.4%

<b>D BUILDING</b>	<b>Electric Usage, kWh/yr</b>	<b>Gas Usage, therms/yr</b>	<b>Current Annual Cost of Energy, \$</b>	<b>Site Energy Use Intensity, kBtu/sq ft yr</b>	<b>Joint Energy Consumption, MMBtu/yr</b>
Current	402,062	27,289	\$95,370	137.0	4,101
Proposed	319,618	16,172	\$68,248	77.6	2,322
Savings	82,444	11,117	\$27,122*	59.4	1,779
% Savings	20.5%	40.7%	28.4%	43.4%	43.4%

<b>E BUILDING</b>	<b>Electric Usage, kWh/yr</b>	<b>Gas Usage, therms/yr</b>	<b>Current Annual Cost of Energy, \$</b>	<b>Site Energy Use Intensity, kBtu/sq ft yr</b>	<b>Joint Energy Consumption, MMBtu/yr</b>
Current	357,363	21,916	\$86,931	109.0	3,411
Proposed	274,623	15,247	\$61,930	64.5	2,019
Savings	82,740	6,669	\$25,001*	44.5	1,392
% Savings	23.2%	30.4%	28.8%	40.8%	40.8%

• Includes operation and maintenance savings

<b>L BUILDING</b>	<b>Electric Usage, kWh/yr</b>	<b>Gas Usage, therms/yr</b>	<b>Current Annual Cost of Energy, \$</b>	<b>Site Energy Use Intensity, kBtu/sq ft yr</b>	<b>Joint Energy Consumption, MMBtu/yr</b>
Current	445,789	20,380	\$99,948	119.0	3,559
Proposed	375,805	16,553	\$83,416	98.4	2,944
Savings	69,984	3,827	\$16,532*	20.6	615
% Savings	15.7%	18.8%	16.5%	17.3%	17.3%

\*Includes operation and maintenance savings

**SWA recommends that Sussex Community College gets the A building gas meter and its data reviewed by the utility company. All gas bills in 2010 read zeroes, and the data for 2009 was not reliable.**

The following charts show disaggregated energy use for various buildings based on utility bills for the 12 month period:

**A BUILDING**

Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	\$	% \$	\$/MMBtu
Electric Misc.	958	29%	\$48,755	49%	51
Electric For Cooling	194	6%	\$9,869	10%	51
Electric For Heating	168	5%	\$8,554	9%	51
Lighting	270	8%	\$13,721	14%	51
Domestic Hot Water (Gas)	109	3%	\$1,128	1%	10
Building Space Heating	1,597	48%	\$16,497	17%	10
<b>Totals</b>	<b>3,296</b>	<b>100%</b>	<b>\$98,525</b>	<b>100%</b>	
<b>Total Electric Usage</b>	<b>1,590</b>	<b>48%</b>	<b>\$80,899</b>	<b>82%</b>	<b>51</b>
<b>Total Gas Usage</b>	<b>1,706</b>	<b>52%</b>	<b>\$17,625</b>	<b>18%</b>	<b>10</b>
<b>Totals</b>	<b>3,296</b>	<b>100%</b>	<b>\$98,525</b>	<b>100%</b>	

**B/C BUILDING**

Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	\$	% \$	\$/MMBtu
Electric Misc.	1,496	32%	\$68,385	50%	46
Electric For Cooling	48	1%	\$2,209	2%	46
Electric For Heating	294	6%	\$13,437	10%	46
Lighting	511	11%	\$23,347	17%	46
Domestic Hot Water (Gas)	114	2%	\$1,478	1%	13
Building Space Heating	2,208	47%	\$28,656	21%	13
<b>Totals</b>	<b>4,671</b>	<b>100%</b>	<b>\$137,511</b>	<b>100%</b>	
<b>Total Electric Usage</b>	<b>2,349</b>	<b>50%</b>	<b>\$107,378</b>	<b>78%</b>	<b>46</b>
<b>Total Gas Usage</b>	<b>2,322</b>	<b>50%</b>	<b>\$30,134</b>	<b>22%</b>	<b>13</b>
<b>Totals</b>	<b>4,671</b>	<b>100%</b>	<b>\$137,511</b>	<b>100%</b>	

**D BUILDING**

Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	\$	% \$	\$/MMBtu
Electric Misc.	727	18%	\$33,704	35%	46
Electric For Cooling	24	1%	\$1,105	1%	46
Electric For Heating	167	4%	\$7,734	8%	46
Lighting	454	11%	\$21,038	22%	46
DHW & Kitchen (Gas)	329	8%	\$3,835	4%	12
Building Space Heating	2,400	59%	\$27,955	29%	12
<b>Totals</b>	<b>4,101</b>	<b>100%</b>	<b>\$95,370</b>	<b>100%</b>	
<b>Total Electric Usage</b>	<b>1,372</b>	<b>33%</b>	<b>\$63,581</b>	<b>67%</b>	<b>46</b>
<b>Total Gas Usage</b>	<b>2,729</b>	<b>67%</b>	<b>\$31,789</b>	<b>33%</b>	<b>12</b>
<b>Totals</b>	<b>4,101</b>	<b>100%</b>	<b>\$95,370</b>	<b>100%</b>	

### E BUILDING

Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	\$	% \$	\$/MMBtu
Electric Misc.	418	12%	\$20,050	23%	48
Electric For Cooling	90	3%	\$4,326	5%	48
Electric For Heating	187	5%	\$8,980	10%	48
Lighting	525	15%	\$25,204	29%	48
Domestic Hot Water (Gas)	102	3%	\$1,323	2%	13
Building Space Heating	2,089	61%	\$27,049	31%	13
<b>Totals</b>	<b>3,411</b>	<b>100%</b>	<b>\$86,931</b>	<b>100%</b>	
<b>Total Electric Usage</b>	<b>1,219</b>	<b>36%</b>	<b>\$58,559</b>	<b>67%</b>	<b>48</b>
<b>Total Gas Usage</b>	<b>2,192</b>	<b>64%</b>	<b>\$28,372</b>	<b>33%</b>	<b>13</b>
<b>Totals</b>	<b>3,411</b>	<b>100%</b>	<b>\$86,931</b>	<b>100%</b>	

### L BUILDING

Annual Energy Consumption / Costs					
	MMBtu	% MMBtu	\$	% \$	\$/MMBtu
Electric Misc.	889	25%	\$42,457	42%	48
Electric For Cooling	179	5%	\$8,554	9%	48
Electric For Heating	123	3%	\$5,889	6%	48
Lighting	330	9%	\$15,760	16%	48
Domestic Hot Water (Gas)	109	3%	\$1,458	1%	13
Building Space Heating	1,929	54%	\$25,830	26%	13
<b>Totals</b>	<b>3,559</b>	<b>100%</b>	<b>\$99,948</b>	<b>100%</b>	
<b>Total Electric Usage</b>	<b>1,521</b>	<b>43%</b>	<b>\$72,660</b>	<b>73%</b>	<b>48</b>
<b>Total Gas Usage</b>	<b>2,038</b>	<b>57%</b>	<b>\$27,288</b>	<b>27%</b>	<b>13</b>
<b>Totals</b>	<b>3,559</b>	<b>100%</b>	<b>\$99,948</b>	<b>100%</b>	

## PROPOSED ENERGY CONSERVATION MEASURES

Energy Conservation Measures (ECMs) are recommendations determined for each of the buildings based on improvements over current conditions. ECMs have been determined for the buildings based on installed cost, as well as energy and cost-savings opportunities. SWA presents two mutually independent scenarios to ease the decision making regarding implementation, and recommends the first scenario as a better option.

**Scenario 1:** SWA separated individual energy conservation measures costing less than \$1500 for implementation for all the buildings and aggregated those for all the buildings. These measures can be carried out by the college itself as low cost measures. Please see Appendix A for individual measures for each building.

Further, SWA separated lighting measures, HVAC measures, Boilers replacement measures, and Windows replacements measures. Campus wide details of these improvements are summarized in the table below, and more details are provided in Appendix A. These measures can be implemented by mechanical or electrical trades, or alternatively, by an Energy Services Company (ESCO).

Finally, SWA separated energy conservation measures related to building operations effected through better controls systems. These measures would provide better stand alone lighting controls or stand alone HVAC controls. Alternatively, these measures could be implemented as part of a campus wide BMS improvement, which being a big ticket item, should be carried out by an Automation company, or by an ESCO. SWA recommends that the college first decide on the feasibility of implementing a full fledged BMS system; if the decision is not to proceed, then individual piecemeal lighting and HVAC controls measures could at least be carried out. Please see individual measures for each building in Appendix A, and see Appendix C for more details on the campus wide BMS.

ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	total 1st year cost savings, \$	simple payback, yrs	net present value, \$	CO2 reduced, lbs/yr
Less than \$1500 of installed cost, other than BMS related	9,990	595	9,395	49,259	1,050	8	9,949	0.9	65,355	99,772
Lighting measures	107,980	7,460	100,520	53,252	1,096	9	14,763	6.8	73,195	107,435
HVAC measures	93,247	1,284	91,963	29,837	3,704	15	9,088	10.1	53,711	94,252
Boilers replacement	213,100	9,000	204,100	0	11,225	34	16,528	12.3	107,929	123,733
Windows replacements	406,000	0	406,000	19,691	10,514	33	16,186	25.1	-96,795	151,153
Lighting measures, BMS related	72,600	6,815	65,785	133,920	56	14	21,764	3.0	190,314	240,404
HVAC measures, BMS related	30,040	1,203	28,837	22,163	5,110	17	10,024	2.9	81,185	96,010
Install a new campus wide BMS with lighting controls	615,000	0	615,000	272,963	11,894	69	59,454	10.3	45,018	619,848

**Scenario 2:** SWA separated individual energy conservation measures costing less than \$1500 for implementation for all the buildings and aggregated those for all the buildings. These measures can be carried out by the college itself as low cost measures. Please see Appendix B for individual measures for each building.

Further, SWA separated other measures based on simple payback criteria. Campus wide details of these improvements are summarized in the table below, and more details are provided in Appendix B. These measures can be implemented by mechanical or electrical trades, or alternatively, by an Energy Services Company (ESCO).

ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	total 1st year cost savings, \$	simple payback, yrs	net present value, \$	CO2 reduced, lbs/yr
<b>Less than \$1500 installed costs</b>	<b>18,975</b>	<b>1,615</b>	<b>17,360</b>	<b>67,906</b>	<b>1,055</b>	<b>10</b>	<b>13,106</b>	<b>1.3</b>	<b>94,540</b>	<b>133,214</b>
<b>Less than 5 yr. payback</b>	<b>78,097</b>	<b>5,963</b>	<b>72,134</b>	<b>141,738</b>	<b>5,625</b>	<b>31</b>	<b>30,727</b>	<b>2.3</b>	<b>281,511</b>	<b>315,785</b>
<b>Less than 10 yr. payback</b>	<b>117,142</b>	<b>7,904</b>	<b>109,238</b>	<b>44,488</b>	<b>4,057</b>	<b>18</b>	<b>14,865</b>	<b>7.3</b>	<b>92,417</b>	<b>124,378</b>
<b>Greater than 10 yr payback</b>	<b>1,333,743</b>	<b>10,875</b>	<b>1,322,868</b>	<b>326,954</b>	<b>33,913</b>	<b>140</b>	<b>99,058</b>	<b>13.4</b>	<b>51,443</b>	<b>959,230</b>

## OPTIONS FOR FINANCING

A new State law allows government agencies to make energy related improvements to their facilities and pay for the costs using the value of energy savings that result from the improvements. Under the recently enacted Chapter 4 of the Laws of 2009 (the law), the “Energy Savings Improvement Program” (ESIP), provides all government agencies in New Jersey with a flexible tool to improve and reduce energy usage with minimal expenditure of new financial resources.

The law provides the framework to use energy savings obligations to finance energy improvements. The provisions of the law can only be used when energy savings obligations are used to finance improvements. Nothing in the law prevents a local unit from designing, implementing, and financing energy improvements through traditional contracting and debt authorization procedures.

There are three general issues that are important to developing and implementing an ESIP; public bidding of construction work, developing of an energy services plan, and use of state approved contractors for all ESIP work.

The law also recognizes there may be cases where making some energy improvements may lead to a desire to make improvements that do not reduce energy use. An example may be an older school building that can have its boiler and ventilating system replaced, and have a digital control system installed. While these may reduce energy use, the Board of Education may also want to add air conditioning, an improvement that does not reduce energy use, but may be a useful and efficient improvement for the facility. In this example, the law permits “energy-related capital improvements” that do not reduce energy usage to be included in an energy savings improvement program. **The cost of the improvements, however, cannot be financed through energy savings obligations, but must be paid for through other appropriations (i.e., bonds or capital improvement funds).** It is not the intent of the law to prevent financing of such capital improvements through otherwise authorized means.

An ESIP can be financed through energy savings obligations. The term refers to the two primary financing tools, debt and lease-purchase instruments.

### Debt Issuance

The law specifically authorizes municipalities, school districts, counties, and fire districts to issue refunding bonds as a general obligation, backed with full faith and credit of the local unit to finance the ESIP. Because an ESIP does not effectively authorize new costs or taxpayer obligations, the refunding bond is appropriate and proper, as it does not affect debt limits, or in the case of a board of education, voter approval. The routine procedures for refunding bonds found in the Local Bond Law and Public School Bond Law would be followed for issuance of debt, along with any required Bond Anticipation Notes as authorized pursuant to law.

### Lease Purchase Financing

A local unit can enter into a lease-purchase agreement to implement an ESIP with a single investor lease or certificates of participation. The agreement can be entered into directly by the local unit, with ESCO, other private financing party, or through a county improvement authority or the New Jersey Economic Development Authority. When a local unit enters into a lease with a private party that is not a governmental entity, or with the ESCO it has selected through

competitive contracting, it must be done in accordance with a competitive process as required under the local unit's procurement law.

Other incentive programs offered by BPU are as follows:

### **New Jersey Clean Energy Pay for Performance**

The NJ Clean Energy Pay for Performance (P4P) Program relies on a network of Partners who provide technical services to clients. LGEA participating clients who are not receiving Direct Energy Efficiency and Conservation Block Grants are eligible for P4P. SWA is an eligible Partner and can develop an Energy Reduction Plan for each project with a whole-building traditional energy audit, a financial plan for funding the energy measures and an installation construction schedule.

The Energy Reduction Plan must define a comprehensive package of measures capable of reducing a building's energy consumption by 15+%. P4P incentives are awarded upon the satisfactory completion of three program milestones: submittal of an Energy Reduction Plan prepared by an approved Program Partner, installation of the recommended measures and completion of a Post-Construction Benchmarking Report. The incentives for electricity and natural gas savings will be paid based on actual savings, provided that the minimum 15% performance threshold savings has been achieved.

For further information, please see: <http://www.njcleanenergy.com/commercial-industrial/programs/pay-performance/existing-buildings> .

### **Direct Install 2010 Program\***

Direct Install is a division of the New Jersey Clean Energy Programs' Smart Start Buildings. It is a turn-key program for small to mid-sized facilities to aid in upgrading equipment to more efficient types. It is designed to cut overall energy costs by upgrading lighting, HVAC and other equipment with energy efficient alternatives. The program pays **up to 60%** of the retrofit costs, including equipment cost and installation costs.

Eligibility:

- Existing small and mid-sized commercial and industrial facilities with peak electrical demand **below 200 kW** within 12 months of applying
- Must be located in New Jersey
- Must be served by one of the state's public, regulated or natural gas companies
  - Electric: Atlantic City Electric, Jersey Central Power & Light, Orange Rockland Electric, PSE&G
  - Natural Gas: Elizabethtown Gas, New Jersey Natural Gas, PSE&G, South Jersey Gas Service

For the most up to date information on contractors in New Jersey who participate in this program, go to: <http://www.njcleanenergy.com/commercial-industrial/programs/direct-install>

### **Smart Start**

New Jersey's SmartStart Building Program is administered by New Jersey's Office of Clean Energy. The program also offers design support for larger projects and technical assistance for

smaller projects. If your project specifications do not fit into anything defined by the program, there are even incentives available for custom projects.

There are a number of improvement options for commercial, industrial, institutional, government, and agricultural projects throughout New Jersey. Alternatives are designed to enhance quality while building in energy efficiency to save money. Project categories included in this program are New Construction and Additions, Renovations, Remodeling and Equipment Replacement.

For the most up to date information on how to participate in this program, go to:  
<http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings>.

### **Renewable Energy Incentive Program\***

The Renewable Energy Incentive Program (REIP) provides incentives that reduce the upfront cost of installing renewable energy systems, including solar, wind, and sustainable biomass. Incentives vary depending upon technology, system size, and building type. Current incentive levels, participation information, and application forms can be found at the website listed below.

Solar Renewable Energy Credits (SRECs) represent all the clean energy benefits of electricity generated from a solar energy system. SRECs can be sold or traded separately from the power, providing owners a source of revenue to help offset the cost of installation. All solar project owners in New Jersey with electric distribution grid-connected systems are eligible to generate SRECs. Each time a system generates 1,000 kWh of electricity an SREC is earned and placed in the customer's account on the web-based SREC tracking system.

For the most up to date information on how to participate in this program, go to:  
<http://www.njcleanenergy.com/renewable-energy/home/home>.

### **Utility Sponsored Programs**

Please check with your local utility companies for further opportunities that may be available.

### **Energy Efficiency and Conservation Block Grant Rebate Program**

The Energy Efficiency and Conservation Block Grant (EECBG) Rebate Program provides supplemental funding up to \$20,000 for eligible New Jersey local government entities to lower the cost of installing energy conservation measures. Funding for the EECBG Rebate Program is provided through the American Recovery and Reinvestment Act (ARRA).

For the most up to date information on how to participate in this program, go to:  
<http://njcleanenergy.com/EECBG>

### **Other Federal and State Sponsored Programs**

Other federal and state sponsored funding opportunities may be available, including BLOCK and R&D grants funding. For more information, please check <http://www.dsireusa.org/>.

\*Subject to availability. Incentive program timelines might not be sufficient to meet the 25% in 12 months spending requirement outlined in the LGEA program.

APPENDIX A: SCENARIO 1

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
A	Retrofit 1 existing vending machine with SnackMiser™ device	99	0	99	387	0.1	0	0.0	0	67	10	673	1.5	580	58	68	470	693
A	Retrofit 1 existing vending machine with	199	0	199	1,612	0.5	0	0.2	0	280	10	2,805	0.7	1,309	131	141	2,169	2,886
A	Install 67 new CFL fixtures	671	0	671	6,209	1.9	0	0.7	90	1,170	5	5,852	0.6	839	168	173	4,658	11,117
B/C	Retrofit (1) Snack Vending Machine with Snack Miser™	99	0	99	387	0.1	0	0.0	0	60	10	604	1.6	510	51	60	411	693
B/C	Retrofit (3) Beverage vending machines with Vending	597	0	597	4,836	1.0	0	0.4	0	754	10	7,544	0.8	1,164	116	126	5,773	8,659
B/C	67 New CFL fixtures to be installed	627	0	627	10,243	2.0	0	0.9	335	1,933	5	9,665	0.3	1,709	342	308	8,175	18,341
B/C	7 New bi-level fixtures to be installed with incentives	1,155	175	980	1,113	0.2	0	0.1	0	174	15	2,604	5.6	166	11	14	1,063	1,993
B/C	Replace 2 hp relief fan motor on packaged RTU with premium efficiency motor	1,411	125	1,286	1,948	0.4	0	0.2	0	304	15	4,558	4.2	254	17	21	2,290	3,488
D	Retrofit 1 existing vending machine with SnackMiser™ device	99	0	99	387	0.1	0	0.0	0	61	10	611	1.6	518	52	61	417	693
D	Retrofit 1 existing refrigerated vending machine with VendingMiser™ device	199	0	199	1,612	0.5	0	0.2	0	255	10	2,547	0.8	1,180	118	128	1,952	2,886
D	Install 40 new CFL fixtures	392	0	392	1,339	0.4	5	0.2	213	431	5	2,153	0.9	721	144	107	1,568	2,454
D	Retrofit 3 existing refrigerated chillers with CoolerMiser™ devices	597	0	597	4,836	1.5	0	0.6	0	764	10	7,641	0.8	1,180	118	128	5,855	8,659
D	Replace (2) 5HP motors on H/V units with premium efficiency motors	1,140	120	1,020	2,590	0.8	0	0.3	0	409	20	8,184	2.5	702	35	39	4,957	4,637
E	Install 1 new CFL fixture	9	0	9	28	0.0	0	0.0	0	4	5	20	2.3	122	24	34	9	50
E	Retrofit 3 existing vending machine with SnackMiser™ device	297	0	297	1,161	0.3	1,045	3.4	0	1,543	10	15,433	0.2	5,096	510	520	12,734	13,594
E	Install 7 new Bi-level fixtures with incentives	1,155	175	980	835	0.3	0	0.1	0	137	15	2,055	7.2	110	7	9	632	1,496
E	Retrofit 6 existing refrigerated vending machine with VendingMiser™ device	1,194	0	1,194	9,672	2.9	0	1.1	0	1,586	10	15,863	0.8	1,229	123	133	12,200	17,318
L	Install 6 new CFL fixtures	50	0	50	64	0.0	0	0.0	5	15	5	77	3.2	104	21	16	20	115
	<b>Less than \$1500 of installed cost, other than BMS related</b>	<b>9,990</b>	<b>595</b>	<b>9,395</b>	<b>49,259</b>	<b>12.9</b>	<b>1,050</b>	<b>8.4</b>	<b>643</b>	<b>9,949</b>		<b>88,890</b>	<b>0.9</b>	<b>17,493</b>	-	-	<b>65,355</b>	<b>99,772</b>

APPENDIX A contd.: SCENARIO 1

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
B/C	124 New T8 fixtures to be installed with incentives	21,528	1,860	19,668	8,327	1.7	0	0.7	1,791	3,090	15	46,344	6.4	272	18	11	16,687	14,910
D	Install 10 new LED exit signs with incentives	1,505	200	1,305	1,489	0.4	0	0.2	31	266	15	3,994	4.9	242	16	17	1,828	2,666
D	Install 69 new T8 fixtures with incentives	13,679	1,035	12,644	6,510	2.0	0	0.7	827	1,856	15	27,834	6.8	218	15	10	9,191	11,656
E	Install 15 new T5 fixtures with incentives	3,150	240	2,910	8,197	2.5	1,096	4.4	840	3,603	15	54,051	0.8	2,190	146	124	39,491	26,756
E	Install 10 new Pulse start metal halide fixtures with incentives	8,375	250	8,125	6,190	1.9	0	0.7	150	1,165	15	17,479	7.0	143	10	10	5,586	11,084
B/C	6 New pulse start metal halide fixtures to be installed with incentives	4,388	150	4,238	2,190	0.4	0	0.2	36	377	15	5,662	11.2	46	3	1	204	3,921
E	Install 220 new T8 fixtures with incentives	42,530	3,300	39,230	14,572	4.4	0	1.6	1,045	3,435	15	51,522	11.4	71	5	1	1,188	26,091
D	Install 17 new Pulse start metal halide fixtures with incentives	12,825	425	12,400	5,777	1.7	1	0.7	57	970	15	14,557	12.8	24	2	-1	-980	10,350
	<b>Lighting measures</b>	<b>107,980</b>	<b>7,460</b>	<b>100,520</b>	<b>53,252</b>	<b>14.9</b>	<b>1,096</b>	<b>9.2</b>	<b>4,776</b>	<b>14,763</b>		<b>221,442</b>	<b>6.8</b>	<b>3,207</b>	<b>-</b>	<b>-</b>	<b>73,195</b>	<b>107,435</b>

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
B/C	Replace 40hp supply fan motor on packaged RTU with premium efficiency motor	2,907	180	2,727	9,251	1.9	0	0.8	0	1,443	15	21,647	1.9	694	46	53	14,255	16,564
B/C	Replace 4 existing 10SEER condensing units	10,240	920	9,320	7,500	1.5	0	0.7	0	1,170	15	17,550	8.0	88	6	7	4,447	13,429
E	Replace 1 existing 10SEER condensing units	2,100	184	1,916	1,325	0.4	0	0.1	0	217	15	3,260	8.8	70	5	5	641	2,372
E	Install Heat Recovery Unit for Gymnasium	11,000	0	11,000	1,328	0.4	587	2.0	0	978	15	14,669	11.2	33	2	1	508	8,848
D	Install heat recovery units	67,000	0	67,000	10,433	3.1	3,117	11.6	0	5,280	30	158,392	12.7	136	5	-1	33,860	53,039
	<b>HVAC measures</b>	<b>93,247</b>	<b>1,284</b>	<b>91,963</b>	<b>29,837</b>	<b>7.3</b>	<b>3,704</b>	<b>15.2</b>	<b>0</b>	<b>9,088</b>		<b>215,518</b>	<b>10.1</b>	<b>1,022</b>	<b>-</b>	<b>-</b>	<b>53,711</b>	<b>94,252</b>

APPENDIX A contd.: SCENARIO 1

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
D	Replace all four boilers, add \$120,000 for steam to water system conversion extra	25,400	1,400	24,000	0	0.0	2,500	8.3	0	2,913	30	87,375	8.2	264	9	6	31,638	27,558
L	Install one condensing boilers	12,700	600	12,100	0	0.0	925	3.1	0	1,239	23	28,487	9.8	135	6	3	7,850	10,196
B/C	Replace 2 existing hot water boilers	113,000	5,250	107,750	0	0.0	5,000	13.1	1,500	7,990	30	239,700	13.5	164	5	-2	44,885	55,115
E	Replace existing hot water boilers (2)	62,000	1,750	60,250	0	0.0	2,800	9.3	1,125	4,387	30	131,610	13.7	174	6	-2	23,556	30,864
	<b>Boilers replacement</b>	<b>213,100</b>	<b>9,000</b>	<b>204,100</b>	<b>0</b>	<b>0.0</b>	<b>11,225</b>	<b>33.8</b>	<b>2,625</b>	<b>16,528</b>		<b>487,172</b>	<b>12.3</b>	<b>738</b>	<b>26</b>	<b>6</b>	<b>107,929</b>	<b>123,733</b>

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
B/C	Replace windows on 3rd Floor	130,000	0	130,000	6,305	1.3	6,305	17.1	0	9,167	30	275,024	14.2	112	4	-2	45,129	80,789
D	Replace windows throughout building (approx 138)	276,000	0	276,000	13,386	4.0	4,209	15.6	0	7,018	30	210,554	39.3	-24	-1	n/a	-141,924	70,363
	<b>Windows replacements</b>	<b>406,000</b>	<b>0</b>	<b>406,000</b>	<b>19,691</b>	<b>5.3</b>	<b>10,514</b>	<b>32.7</b>	<b>0</b>	<b>16,186</b>		<b>485,578</b>	<b>25.1</b>	<b>88</b>	<b>-</b>	<b>-</b>	<b>-96,795</b>	<b>151,153</b>

APPENDIX A contd.: SCENARIO 1

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
A	Install 5 new Daylight sensors with incentives	1,100	125	975	1,952	0.6	0	0.2	0	340	15	5,095	2.9	423	28	34	3,022	3,495
A	Install 8 new BI-level fixtures with incentives	1,320	200	1,120	954	0.3	0	0.1	0	166	15	2,490	6.7	122	8	10	833	1,708
A	Install 7 new motion sensors with incentives	1,540	140	1,400	4,718	1.4	0	0.5	0	821	15	12,314	1.7	780	52	58	8,260	8,448
A	Install 27 new Occupancy Sensors with incentives	5,940	540	5,400	8,580	2.6	0	1.0	0	1,493	15	22,394	3.6	315	21	26	12,167	15,362
B/C	2 New Daylight Sensors to be installed with incentives	440	50	390	437	0.1	0	0.0	50	118	15	1,772	3.3	547	36	29	1,000	782
B/C	6 New photocells to be installed with incentives	1,320	120	1,200	965	0.2	0	0.1	0	150	15	2,257	8.0	88	6	7	571	1,727
B/C	8 New motion sensors to be installed with incentives	1,760	160	1,600	8,195	1.6	0	0.7	0	1,278	15	19,176	1.3	1,098	73	80	13,443	14,673
B/C	76 New occupancy sensors to be installed with incentives	16,720	1,520	15,200	29,692	5.9	0	2.7	0	4,632	15	69,480	3.3	357	24	29	39,305	53,164
D	Install 3 new Daylight sensors with incentives	660	75	585	1,696	0.5	0	0.2	17	285	15	4,275	2.1	674	45	48	2,768	3,037
D	Install 11 new Motion sensors with incentives	2,420	220	2,200	8,425	2.5	0	1.0	0	1,331	15	19,967	1.7	808	54	60	13,464	15,085
D	Install 53 new Occupancy sensors with incentives	11,660	1,060	10,600	17,014	5.1	0	1.9	0	2,688	15	40,323	3.9	280	19	23	21,032	30,464
E	Install 2 new Daylight sensors with incentives	440	50	390	4,181	1.3	0	0.5	0	686	15	10,285	0.6	2,537	169	176	7,678	7,486
E	Install 5 new Photocell sensors with incentives	1,100	100	1,000	2,878	0.9	5	0.3	0	478	15	7,177	2.1	618	41	47	4,630	5,208
E	Install 16 new Motion sensors with incentives	3,520	320	3,200	10,508	3.2	51	1.3	0	1,789	15	26,842	1.8	739	49	56	17,857	19,378
E	Install 62 new Occupancy sensors with incentives	13,640	1,240	12,400	10,165	3.0	0	1.1	0	1,667	15	25,007	7.4	102	7	8	7,217	18,201
L	Install 2 new Motion sensors with incentives	440	40	400	2,000	0.8	0	0.2	0	326	15	4,890	1.2	1,123	75	81	3,436	3,581
L	Install 3 new Photocell sensors with incentives	660	60	600	2,095	0.8	0	0.2	0	341	15	5,122	1.8	754	50	57	3,418	3,751
L	Install 15 new Daylight sensors with incentives	3,300	375	2,925	2,921	1.2	0	0.3	0	476	15	7,142	6.1	144	10	12	2,678	5,230
L	Install 21 new Occupancy sensors with incentives	4,620	420	4,200	16,545	6.6	0	1.9	0	2,697	15	40,453	1.6	863	58	64	27,534	29,624
	<b>Lighting measures, BMS related</b>	<b>72,600</b>	<b>6,815</b>	<b>65,785</b>	<b>133,920</b>	<b>38.6</b>	<b>56</b>	<b>14.2</b>	<b>67</b>	<b>21,764</b>		<b>326,461</b>	<b>3.0</b>	<b>12,371</b>	-	-	<b>190,314</b>	<b>240,404</b>

APPENDIX A contd.: SCENARIO 1

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
B/C	Provide demand controlled ventilation using Carbon Dioxide sensors	12,660	0	12,660	3,513	0.7	2,740	7.5	0	4,105	12	49,255	3.1	289	24	31	27,713	36,493
D	Install programmable thermostats for HW boiler	1,800	0	1,800	0	0.0	811	2.7	0	945	15	14,172	1.9	687	46	52	9,318	8,940
D	Install programmable thermostats for RTUs	2,600	0	2,600	6,950	2.1	474	2.4	0	1,650	15	24,755	1.6	852	57	63	16,819	17,669
E	Install VFD on West wing classroom unit	2,600	1,163	1,437	3,100	0.9	0	0.3	0	508	15	7,626	2.8	431	29	34	4,545	5,551
E	Install Programmable thermostats on 5 RTUs	4,200	0	4,200	7,050	2.1	453	2.2	0	1,743	15	26,143	2.4	522	35	41	16,308	17,616
E	Install demand controlled ventilation with CO2 sensors	6,180	40	6,140	1,550	0.5	632	2.2	0	1,073	15	16,090	5.7	162	11	14	6,482	9,742
	<b>HVAC measures, BMS related</b>	<b>30,040</b>	<b>1,203</b>	<b>28,837</b>	<b>22,163</b>	<b>6.3</b>	<b>5,110</b>	<b>17.3</b>	<b>0</b>	<b>10,024</b>		<b>138,040</b>	<b>2.9</b>	<b>2,944</b>	<b>-</b>	<b>-</b>	<b>81,185</b>	<b>96,010</b>

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
B/C	Install new Building Management System	150,000	0	150,000	39,170	7.8	1,633	7.8	0	8,230	12	98,762	18.2	-34	-3	-6	-69,047	88,134
D	Install new Building Management System	100,000	0	100,000	6,950	2.1	3,597	12.8	750	6,039	12	72,463	16.6	-19	-2	-5	-40,603	52,094
E	Install new Building Management System	125,000	0	125,000	11,699	0.2	3,762	13.9	0	6,231	12	74,774	20.1	-40	-3	-7	-63,709	62,416
L	Install a new building management system	140,000	0	140,000	46,328	18.5	2,902	14.9	0	11,437	15	171,559	12.2	23	2	0	-5,417	114,939
All buildings	Lighting controls - includes motion sensors, dayligh sensors, occupancy sensors, and external lighting controls	100,000	0	100,000	168,816	67.5	0	19.2	0	27,517	15	412,755	3.6	313	21	26	223,794	302,265
	<b>Install a campus wide BMS with all lighting controls</b>	<b>615,000</b>	<b>0</b>	<b>615,000</b>	<b>272,963</b>	<b>96.2</b>	<b>11,894</b>	<b>68.6</b>	<b>750</b>	<b>59,454</b>	<b>66</b>	<b>830,313</b>	<b>10.3</b>	<b>242</b>	<b>-</b>	<b>-</b>	<b>45,018</b>	<b>619,848</b>

**APPENDIX B: SCENARIO 2**

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
A	Retrofit 1 existing vending machine with SnackMiser™ device	99	0	99	387	0.1	0	0.0	0	67	10	673	1.5	580	58	68	470	693
A	Retrofit 1 existing vending machine with	199	0	199	1,612	0.5	0	0.2	0	280	10	2,805	0.7	1,309	131	141	2,169	2,886
A	Install 67 new CFL fixtures	671	0	671	6,209	1.9	0	0.7	90	1,170	5	5,852	0.6	839	168	173	4,658	11,117
A	Install 5 new Daylight sensors with incentives	1,100	125	975	1,952	0.6	0	0.2	0	340	15	5,095	2.9	423	28	34	3,022	3,495
A	Install 8 new Bi-level fixtures with incentives	1,320	200	1,120	954	0.3	0	0.1	0	166	15	2,490	6.7	122	8	10	833	1,708
B/C	Retrofit (1) Snack Vending Machine with Snack Miser™	99	0	99	387	0.1	0	0.0	0	60	10	604	1.6	510	51	60	411	693
B/C	2 New Daylight Sensors to be installed with incentives	440	50	390	437	0.1	0	0.0	50	118	15	1,772	3.3	547	36	29	1,000	782
B/C	Retrofit (3) Beverage vending machines with Vending	597	0	597	4,836	1.0	0	0.4	0	754	10	7,544	0.8	1,164	116	126	5,773	8,659
B/C	67 New CFL fixtures to be installed	627	0	627	10,243	2.0	0	0.9	335	1,933	5	9,665	0.3	1,709	342	308	8,175	18,341
B/C	7 New bi-level fixtures to be installed with incentives	1,155	175	980	1,113	0.2	0	0.1	0	174	15	2,604	5.6	166	11	14	1,063	1,993
B/C	6 New photocells to be installed with incentives	1,320	120	1,200	965	0.2	0	0.1	0	150	15	2,257	8.0	88	6	7	571	1,727
B/C	Replace 2 hp relief fan motor on packaged RTU with premium efficiency motor	1,411	125	1,286	1,948	0.4	0	0.2	0	304	15	4,558	4.2	254	17	21	2,290	3,488
D	Retrofit 1 existing vending machine with SnackMiser™ device	99	0	99	387	0.1	0	0.0	0	61	10	611	1.6	518	52	61	417	693
D	Retrofit 1 existing refrigerated vending machine with VendingMiser™ device	199	0	199	1,612	0.5	0	0.2	0	255	10	2,547	0.8	1,180	118	128	1,952	2,886
D	Install 40 new CFL fixtures	392	0	392	1,339	0.4	5	0.2	213	431	5	2,153	0.9	721	144	107	1,568	2,454
D	Retrofit 3 existing refrigerated chillers with CoolerMiser™ devices	597	0	597	4,836	1.5	0	0.6	0	764	10	7,641	0.8	1,180	118	128	5,855	8,659
D	Install 3 new Daylight sensors with incentives	660	75	585	1,696	0.5	0	0.2	17	285	15	4,275	2.1	674	45	48	2,768	3,037
D	Replace (2) 5HP motors on H/V units with premium efficiency motors	1,140	120	1,020	2,590	0.8	0	0.3	0	409	20	8,184	2.5	702	35	39	4,957	4,637
D	Install 10 new LED exit signs with incentives	1,505	200	1,305	1,489	0.4	0	0.2	31	266	15	3,994	4.9	242	16	17	1,828	2,666

APPENDIX B contd.: SCENARIO 2

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
E	Install 1 new CFL fixture	9	0	9	28	0.0	0	0.0	0	4	5	20	2.3	122	24	34	9	50
E	Retrofit 3 existing vending machine with SnackMiser™ device	297	0	297	1,161	0.3	1,045	3.4	0	1,543	10	15,433	0.2	5,096	510	520	12,734	13,594
E	Install 2 new Daylight sensors with incentives	440	50	390	4,181	1.3	0	0.5	0	686	15	10,285	0.6	2,537	169	176	7,678	7,486
E	Install 5 new Photocell sensors with incentives	1,100	100	1,000	2,878	0.9	5	0.3	0	478	15	7,177	2.1	618	41	47	4,630	5,208
E	Install 7 new Bi-level fixtures with incentives	1,155	175	980	835	0.3	0	0.1	0	137	15	2,055	7.2	110	7	9	632	1,496
E	Retrofit 6 existing refrigerated vending machine with VendingMiser™ device	1,194	0	1,194	9,672	2.9	0	1.1	0	1,586	10	15,863	0.8	1,229	123	133	12,200	17,318
L	Install 6 new CFL fixtures	50	0	50	64	0.0	0	0.0	5	15	5	77	3.2	104	21	16	20	115
L	Install 2 new Motion sensors with incentives	440	40	400	2,000	0.8	0	0.2	0	326	15	4,890	1.2	1,123	75	81	3,436	3,581
L	Install 3 new Photocell sensors with incentives	660	60	600	2,095	0.8	0	0.2	0	341	15	5,122	1.8	754	50	57	3,418	3,751
	<b>Less than \$1500 installed costs</b>	<b>18,975</b>	<b>1,615</b>	<b>17,360</b>	<b>67,906</b>	<b>19</b>	<b>1,055</b>	<b>10</b>	<b>741</b>	<b>13,106</b>		<b>136,247</b>	<b>1.3</b>	<b>24,620</b>	<b>-</b>	<b>-</b>	<b>94,540</b>	<b>133,214</b>

**APPENDIX B contd.: SCENARIO 2**

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
A	Install 7 new motion sensors with incentives	1,540	140	1,400	4,718	1.4	0	0.5	0	821	15	12,314	1.7	780	52	58	8,260	8,448
A	Install 27 new Occupancy Sensors with incentives	5,940	540	5,400	8,580	2.6	0	1.0	0	1,493	15	22,394	3.6	315	21	26	12,167	15,362
B/C	8 New motion sensors to be installed with incentives	1,760	160	1,600	8,195	1.6	0	0.7	0	1,278	15	19,176	1.3	1,098	73	80	13,443	14,673
B/C	Replace 40hp supply fan motor on packaged RTU with premium efficiency motor	2,907	180	2,727	9,251	1.9	0	0.8	0	1,443	15	21,647	1.9	694	46	53	14,255	16,564
B/C	Provide demand controlled ventilation using Carbon Dioxide sensors	12,660	0	12,660	3,513	0.7	2,740	7.5	0	4,105	12	49,255	3.1	289	24	31	27,713	36,493
B/C	76 New occupancy sensors to be installed with incentives	16,720	1,520	15,200	29,692	5.9	0	2.7	0	4,632	15	69,480	3.3	357	24	29	39,305	53,164
D	Install programmable thermostats for RTUs	2,600	0	2,600	6,950	2.1	474	2.4	0	1,650	15	24,755	1.6	852	57	63	16,819	17,669
D	Install 11 new Motion sensors with incentives	2,420	220	2,200	8,425	2.5	0	1.0	0	1,331	15	19,967	1.7	808	54	60	13,464	15,085
D	Install programmable thermostats for HW boiler	1,800	0	1,800	0	0.0	811	2.7	0	945	15	14,172	1.9	687	46	52	9,318	8,940
D	Install 53 new Occupancy sensors with incentives	11,660	1,060	10,600	17,014	5.1	0	1.9	0	2,688	15	40,323	3.9	280	19	23	21,032	30,464
E	Install 15 new T5 fixtures with incentives	3,150	240	2,910	8,197	2.5	1,096	4.4	840	3,603	15	54,051	0.8	2,190	146	124	39,491	26,756
E	Install 16 new Motion sensors with incentives	3,520	320	3,200	10,508	3.2	51	1.3	0	1,789	15	26,842	1.8	739	49	56	17,857	19,378
E	Install Programmable thermostats on 5 RTUs	4,200	0	4,200	7,050	2.1	453	2.2	0	1,743	15	26,143	2.4	522	35	41	16,308	17,616
E	Install VFD on West wing classroom unit	2,600	1,163	1,437	3,100	0.9	0	0.3	0	508	15	7,626	2.8	431	29	34	4,545	5,551
L	Install 21 new Occupancy sensors with incentives	4,620	420	4,200	16,545	6.6	0	1.9	0	2,697	15	40,453	1.6	863	58	64	27,534	29,624
	<b>Less than 5 yr. payback</b>	<b>78,097</b>	<b>5,963</b>	<b>72,134</b>	<b>141,738</b>	<b>39</b>	<b>5,625</b>	<b>31</b>	<b>840</b>	<b>30,727</b>		<b>448,596</b>	<b>2.3</b>	<b>10,906</b>	<b>-</b>	<b>-</b>	<b>281,511</b>	<b>315,785</b>

APPENDIX B contd.: SCENARIO 2

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
B/C	124 New T8 fixtures to be installed with incentives	21,528	1,860	19,668	8,327	1.7	0	0.7	1,791	3,090	15	46,344	6.4	272	18	11	16,687	14,910
B/C	Replace 4 existing 10SEER condensing units	10,240	920	9,320	7,500	1.5	0	0.7	0	1,170	15	17,550	8.0	88	6	7	4,447	13,429
D	Install 69 new T8 fixtures with incentives	13,679	1,035	12,644	6,510	2.0	0	0.7	827	1,856	15	27,834	6.8	218	15	10	9,191	11,656
D	Replace all four boilers, add \$120,000 for steam to water system conversion extra	25,400	1,400	24,000	0	0.0	2,500	8.3	0	2,913	30	87,375	8.2	264	9	6	31,638	27,558
E	Install demand controlled ventilation with CO2 sensors	6,180	40	6,140	1,550	0.5	632	2.2	0	1,073	15	16,090	5.7	162	11	14	6,482	9,742
E	Install 10 new Pulse start metal halide fixtures with incentives	8,375	250	8,125	6,190	1.9	0	0.7	150	1,165	15	17,479	7.0	143	10	10	5,586	11,084
E	Install 62 new Occupancy sensors with incentives	13,640	1,240	12,400	10,165	3.0	0	1.1	0	1,667	15	25,007	7.4	102	7	8	7,217	18,201
E	Replace 1 existing 10SEER condensing units	2,100	184	1,916	1,325	0.4	0	0.1	0	217	15	3,260	8.8	70	5	5	641	2,372
L	Install 15 new Daylight sensors with incentives	3,300	375	2,925	2,921	1.2	0	0.3	0	476	15	7,142	6.1	144	10	12	2,678	5,230
L	Install one condensing boilers	12,700	600	12,100	0	0.0	925	3.1	0	1,239	23	28,487	9.8	135	6	3	7,850	10,196
	<b>Less than 10 yr. payback</b>	<b>117,142</b>	<b>7,904</b>	<b>109,238</b>	<b>44,488</b>	<b>12</b>	<b>4,057</b>	<b>18</b>	<b>2,768</b>	<b>14,865</b>		<b>276,566</b>	<b>7.3</b>	<b>1,599</b>	-	-	<b>92,417</b>	<b>124,378</b>

**APPENDIX B contd.: SCENARIO 2**

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
B/C	6 New pulse start metal halide fixtures to be installed with incentives	4,388	150	4,238	2,190	0.4	0	0.2	36	377	15	5,662	11.2	46	3	1	204	3,921
B/C	Replace 2 existing hot water boilers	113,000	5,250	107,750	0	0.0	5,000	13.1	1,500	7,990	30	239,700	13.5	164	5	-2	44,885	55,115
B/C	Replace windows on 3rd Floor	130,000	0	130,000	6,305	1.3	6,305	17.1	0	9,167	30	275,024	14.2	112	4	-2	45,129	80,789
B/C	Install new Building Management System	150,000	0	150,000	39,170	7.8	1,633	7.8	0	8,230	12	98,762	18.2	-34	-3	-6	-69,047	88,134
D	Install heat recovery units	67,000	0	67,000	10,433	3.1	3,117	11.6	0	5,280	30	158,392	12.7	136	5	-1	33,860	53,039
D	Install 17 new Pulse start metal halide fixtures with incentives	12,825	425	12,400	5,777	1.7	1	0.7	57	970	15	14,557	12.8	24	2	-1	-980	10,350
D	Install new Building Management System	100,000	0	100,000	6,950	2.1	3,597	12.8	750	6,039	12	72,463	16.6	-19	-2	-5	-40,603	52,094
D	Replace windows throughout building (approx 138)	276,000	0	276,000	13,386	4.0	4,209	15.6	0	7,018	30	210,554	39.3	-24	-1	n/a	-141,924	70,363
E	Install Heat Recovery Unit for Gymnasium	11,000	0	11,000	1,328	0.4	587	2.0	0	978	15	14,669	11.2	33	2	1	508	8,848
E	Install 220 new T8 fixtures with incentives	42,530	3,300	39,230	14,572	4.4	0	1.6	1,045	3,435	15	51,522	11.4	71	5	1	1,188	26,091
E	Replace existing hot water boilers (2)	62,000	1,750	60,250	0	0.0	2,800	9.3	1,125	4,387	30	131,610	13.7	174	6	-2	23,556	30,864
E	Install new Building Management System	125,000	0	125,000	11,699	0.2	3,762	13.9	0	6,231	12	74,774	20.1	-40	-3	-7	-63,709	62,416
L	Install a new building management system	140,000	0	140,000	46,328	18.5	2,902	14.9	0	11,437	15	171,559	12.2	23	2	0	-5,417	114,939
All buildings	Lighting controls - includes motion sensors, dayligh sensors, occupancy sensors, and external lighting controls	100,000	0	100,000	168,816	67.5	0	19.2	0	27,517	15	412,755	3.6	313	21	26	223,794	302,265
	<b>Greater than 10 yr payback</b>	<b>1,333,743</b>	<b>10,875</b>	<b>1,322,868</b>	<b>326,954</b>	<b>111</b>	<b>33,913</b>	<b>140</b>	<b>4,513</b>	<b>99,058</b>		<b>1,932,003</b>	<b>13.4</b>	<b>981</b>	<b>-</b>	<b>-</b>	<b>51,443</b>	<b>959,230</b>

## APPENDIX C: Install New Campus-Wide Building Management System

The existing BAS at various buildings does not function as intended and are not programmed accurately to reflect the occupied and unoccupied modes. SWA recommends the Sussex Community College to install a new Direct Digital Control (DDC) Building Automation System (BAS). The new BAS should be open source and be compatible with the existing state of art Automated Logic BMS at the A building. The BAS should be programmable with occupied/unoccupied modes settings and with night-setback schedules for building HVAC system. Space temperature sensors individually and collectively should report to the BAS, which in turn would control the heating and cooling on HVAC equipment. The new system would operate the HVAC system tightly and reduce wasteful energy. Savings in therms and kWh will be realized mainly from reducing the hours of operation of the roof top unit resulting in ventilation load savings and fan savings during unoccupied modes. SWA recommends the new BAS to have all lighting controls, both for internal and for external lights. The external lights do not operate on any photocells and the existing timers do not control the lights as intended.

ECM Counter	ECM description	est. installed cost, \$	est. incentives, \$	net est. ECM cost with incentives, \$	kWh, 1st yr savings	kW, demand reduction/mo	therms, 1st yr savings	kBtu/sq ft, 1st yr savings	est. operating cost, 1st yr savings, \$	total 1st year cost savings, \$	life of measure, yrs	est. lifetime cost savings, \$	simple payback, yrs	lifetime return on investment, %	annual return on investment, %	internal rate of return, %	net present value, \$	CO2 reduced, lbs/yr
<b>B/C</b>	Install new Building Management System	150,000	0	150,000	39,170	7.8	1,633	7.8	0	8,230	12	98,762	18.2	-34	-3	-6	-69,047	88,134
<b>D</b>	Install new Building Management System	100,000	0	100,000	6,950	2.1	3,597	12.8	750	6,039	12	72,463	16.6	-19	-2	-5	-40,603	52,094
<b>E</b>	Install new Building Management System	125,000	0	125,000	11,699	0.2	3,762	13.9	0	6,231	12	74,774	20.1	-40	-3	-7	-63,709	62,416
<b>L</b>	Install a new building management system	140,000	0	140,000	46,328	18.5	2,902	14.9	0	11,437	15	171,559	12.2	23	2	0	-5,417	114,939
<b>All buildings</b>	Lighting controls - includes motion sensors, dayligh sensors, occupancy sensors, and external lighting controls	100,000	0	100,000	168,816	67.5	0	19.2	0	27,517	15	412,755	3.6	313	21	26	223,794	302,265
	<b>Install a campus wide BMS with all lighting controls</b>	<b>615,000</b>	<b>0</b>	<b>615,000</b>	<b>272,963</b>	<b>96.2</b>	<b>11,894</b>	<b>68.6</b>	<b>750</b>	<b>59,454</b>	<b>66</b>	<b>830,313</b>	<b>10.3</b>	<b>242</b>	<b>-</b>	<b>-</b>	<b>45,018</b>	<b>619,848</b>