Atlantic County, New Jersey

Energy Audit

Prepared For:
Atlantic County

Contact: **FINAL**
Marge Nocito
Asst. Chief Administrative Services

Prepared By:
Dome – Tech, Inc.

Prepared Under the Guidelines of the State of NJ Local Government Energy Audit Program

July 2010

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COUNTY OF ATLANTIC

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July 1, 2010

Ms. Marge Nocito
Asst. Chief of Administrative Services
County Of Atlantic
1227 Drexel Ave
PO Box 1107
Atlantic City, NJ 08604

Re: EXECUTIVE SUMMARY FOR COUNTY OF ATLANTIC
STATE OF NEW JERSEY LOCAL GOVERNMENT ENERGY AUDIT –DRAFT REPORT

Dear Ms. Nocito:

Dome-Tech was retained by the County of Atlantic, as a pre-qualified participant in the Local Government Energy Audit Program, to perform an energy audit of 29 facilities (36 buildings). The objectives of the energy audit were to evaluate the County's energy consumption, establish baselines for energy efficiency and identify opportunities to reduce the amount of energy used and/or its cost.

The scope of the audit is standardized under the Program, and consisted of the following:

- Benchmarking historic energy consumption utilizing EPA Energy Star's Portfolio Manager
- Characterizing building use, occupancy, size, and construction
- Providing a detailed equipment list including estimated service life and efficiency
- Identifying and quantifying energy conservation measures (ECMs)
- Evaluating the economic viability of various renewable/distributed energy technologies
- Performing a utility tariff analysis and assessing savings potential from energy procurement strategies
- Providing the method of analyses

The following lists the buildings that were examined:

Facility	Sq. Ft.	% of Total	Number of Bldgs
Animal Shelter	21,000	1.7%	1
Atlantic County Civil Courthouse	127,260	10.2%	1
A.C. Criminal Courthouse	176,000	14.1%	1
Atlantic County Government Center	64,710	5.2%	1
Atlantic County Justice/annex/records	141,240	11.3%	3
Atlantic County Office Building	138,646	11.1%	1
A.C. Superintendent of Elections	5,250	0.4%	1
Canale Training Center	29,000	2.3%	1
Cardiff Center	7,100	0.6%	1
EHT Library	11,350	0.9%	1
Farmington Facility	8,760	0.7%	1
Firearns Training/Pistol Range	7,500	0.6%	1
Galloway Library	16,300	1.3%	1
Hammonton Human Services	15,500	1.2%	1
Hammonton Public Library	13,720	1.1%	1
Hammonton Public Works Yard	18,230	1.5%	1
Harborfields	23,511	1.9%	1
John F. Gaffney Green Tree Golf Course	15,500	1.2%	2
Mays Landing Library	37,675	3.0%	1

Meadowview (Dental Clinic & Nutrition	113.366	9.1%	1
Public Works Fleet Management	15,000	1.2%	1
Public Works Transportation & Engineering	12,740	1.0%	2
Rutgers Cooperative Extension	15,546	1.2%	1
Shoreview	39,323	3.2%	1
Stillwater/Annex/Central Kitchen/D Building	117,512	9.4%	4
Supported Work/Facilities	14,285	1.1%	1
Unemployment	15,569	1.3%	1
Voting Machine Warehouse	20,404	1.6%	1
Warren E. Fox Nature Center	3,133	0.3%	1
	1,245,130	100%	36

Based upon data received for the period October 2008 –November 2009, the County had an annual expenditure of:

- Electricity: 16,134,340 kWh at a total cost of $ 2,376,064.63
- Natural Gas: 871,190 therms at a total cost of $1,350,220.13

Please refer to Section 2 of this report for a detailed list of identified Energy Conservation Measures (ECMs), along with a summary of their preliminary economics (estimated project cost, estimated annual energy savings, applicable rebate(s), etc.) In this report, all identified ECMs are ranked and presented two ways. First, they are ranked by their simple payback; secondly, they are sorted by building.

If all identified ECMs were to be implemented, they would provide the following estimated benefits to Atlantic County:

- Total annual electrical savings: 1,995,190 kilowatt-hours; 12% reduction
- Total annual natural gas savings: 44,980 therms of natural gas usage; 5% reduction
- Total annual cost savings: $359,770; 9% reduction
- Total annual CO_2 emissions reduction: 922 tons
- Total estimated net implementation cost: $2,775,240
- Total average simple payback: 6.4 years

The projects that are recommended for implementation (at all facilities) include, but are not limited to: upgrading the lighting, switching from electric domestic hot water storage type heaters to gas tankless heaters, replacing old boilers, replacing old AC systems, installing vending machine power management devices, and implementing energy awareness programs.

The County of Atlantic data was entered into the US EPA ENERGY STAR's Portfolio Manager database program. The facilities scores ranged from a low of 4 to a high of 88. Buildings with a score of 75 or higher may qualify for the ENERGY STAR Building Label. Please see report for individual building scores.

Distributed/Renewable Energy Systems were reviewed for the facilities with the following conclusions:

- Dome-Tech considered three different types of wind turbine technologies that consisted of both building-mounted and traditional ground-mounted variety. Due to payback and potential for energy reduction, a 50 kilowatt ground mounted wind turbine project or a 5 kilowatt roof mounted project appear to be the most attractive options. Should County of Atlantic decide to pursue a wind turbine project, Dome-Tech recommends commissioning a more detailed study.
- Roof-mounted photovoltaic systems were assessed at over 20 facilities. These ranged in size from 20 to 322 kw dc and could provide between 3% to 92% of each location's annual energy requirements.
- CHP, Fuel Cells, and Micro-turbines were also researched. It was determined that Meadowview and the Atlantic County Justice facility may benefit from the installation of micro-turbine systems. Dome-Tech does not recommend implementation at the other buildings due to the lack of thermal requirements in the summertime.

Regarding the procurement of utilities, Dome-Tech understands that County of Atlantic's facilities are served by multiple electric accounts behind Atlantic City Electric, under various rate classes. The County is also served by multiple natural gas accounts behind South Jersey Gas Company. The County is an active participant in the South Jersey Power Co-Operative for the retail energy procurement of both electricity and natural gas.

During the development of this audit, Dome-Tech was assisted by Jerry Griffin and other facility personnel, who were both knowledgeable and very helpful to our efforts. We would like to acknowledge and thank those individuals.

Sincerely,

John Butterly
Senior Energy Engineer

Atlantic County - Local Goverment Energy Audit ECM Summary (sorted by Building)

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
6	Lighting Upgrade	Animal Shelter	12,970	3	0	$4,890	$250	$0	$4,640	$2,090	$0	$2,090	2.2	35.0%	5	$5,810	4
4	Upgrade Insulation on HHW pipes	Atlantic County Civil Courthouse	0	0	120	$280	$0	$0	$280	$170	$0	$170	1.6	60.2%	10	$1,170	1
5	Premium Efficiency Motors	Atlantic County Civil Courthouse	8,210	1	0	$3,190	$340	$0	$2,850	$1,150	$0	$1,150	2.5	40.3%	18	$12,967	3
6	Lighting Upgrade	Atlantic County Civil Courthouse	225,190	48	0	$68,790	$2,640	$0	$66,150	$33,330	$0	$33,330	2.0	41.5%	5	$100,500	74
7	Replace 50 gal electric storage type DHW heaters w/ gas fired tankless units	Atlantic County Civil Courthouse	32,210	9	-1,290	$7,630	$900	$0	$6,730	$2,880	$0	$2,880	2.3	42.6%	15	$27,651	3
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Atlantic County Civil Courthouse	0	0	9,093	$176,800	$9,000	$0	$167,800	$13,230	$0	$13,230	12.7	6.1%	25	$62,576	53
10	Convert from CV to VAV Pumping (Single Loop to Pri/Sec Loop)	Atlantic County Civil Courthouse	94,040	0	0	$121,400	$1,200	$0	$120,200	$13,900	$0	$13,900	8.6	7.8%	15	$45,737	31
14	Windows Upgrade	Atlantic County Civil Courthouse	6,210	0	2,720	$189,820	$0	$0	$189,800	$4,870	$0	$4,870	39.0	-3.2%	25	-$104,998	18
6	Lighting Upgrade	Atlantic County Criminal Courthouse	189,670	41	0	$84,110	$630	$0	$83,480	$29,780	$0	$29,780	2.8	23.0%	5	$65,420	63
6	Lighting Upgrade	Atlantic County Criminal Courthouse	2,420	1	0	$960	$20	$0	$940	$410	$0	$410	2.3	33.2%	5	$1,110	1
7	Replace 15 gal electric storage type DHW heater w/ gas fired tankless unit	Atlantic County Criminal Courthouse	1,620	2	-50	$2,540	$300	$0	$2,240	$190	$0	$190	11.8	3.2%	15	$28	0
6	Lighting Upgrade	Atlantic County Government Center	81,740	18	0	$22,810	$1,140	$0	$21,670	$10,720	$0	$10,720	2.0	40.4%	5	$31,930	27
7	Replace 52 gal electric storage type DHW heaters w/ gas fired tankless units	Atlantic County Government Center	5,050	5	-190	$5,090	$600	$0	$4,490	$350	$0	$350	12.8	2.7%	16	-$94	0
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Atlantic County Government Center	0	0	5,986	$189,880	$9,000	$0	$180,900	$9,500	$0	$9,495	19.0	2.2%	25	-$15,475	35
11	At EOL, Replace RTUs w/ High Efficiency Units	Atlantic County Government Center	19,185	3	0	$85,360	$2,730	$59,230	$23,470	$2,510	$0	$2,510	9.4	6.6%	15	$6,494	6
13	Walk-In Cooler Fan Controls	Atlantic County Justice Facility	2,410	0	0	$4,070	$0	$0	$4,070	$340	$0	$340	12.0	3.0%	15	-$11	1
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Atlantic County Justice Facility Records	0	0	2,830	$5,450	$0	$0	$5,450	$3,940	$0	$3,940	1.4	72.0%	10	$28,159	17
6	Lighting Upgrade	Atlantic County Justice/annex/records	178,580	43	0	$130,780	$9,210	$0	$121,570	$24,140	$0	$24,140	5.0	-0.2%	5	-$870	59
8	Energy Star Kitchen Appliance Upgrade	Atlantic County Justice/Annex/Records	18,420	1	0	$18,370	$0	$0	$18,400	$2,450	$0	$2,450	7.5	10.2%	15	$10,848	6
5	Premium Efficiency Motors	Atlantic County Office Building	20,310	3	0	$9,920	$830	$0	$9,090	$2,840	$0	$2,840	3.2	31.0%	18	$29,970	7

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
6	Lighting Upgrade	Atlantic County Office Building	143,020	34	0	$57,950	$1,345	$0	$56,610	$20,020	$0	$20,020	2.8	22.6%	5	$43,490	47
4	Upgrade Insulation on HHW pipes	Atlantic County Superintendent of Elections	0	0	120	$280	$0	$0	$280	$180	$0	$180	1.6	63.8%	10	$1,255	1
12	Replace Wall AC Units w/ High Efficiency Units	Atlantic County Superintendent of Elections	1,330	0	0	$1,750	$0	$0	$1,750	$230	$0	$230	7.6	5.3%	10	$212	0
8	Energy Star Kitchen Appliance Upgrade	Canale Fire Training Academy	6,040	0	0	$2,650	$0	$0	$2,650	$850	$0	$850	3.1	31.6%	15	$7,497	2
6	Lighting Upgrade	Canale Training Center	39,980	8	0	$21,740	$1,940	$0	$19,800	$5,660	$0	$5,660	3.5	13.2%	5	$8,500	13
6	Lighting Upgrade	Cardiff Center	7,610	1	0	$3,960	$335	$0	$3,625	$1,270	$0	$1,270	2.9	22.2%	5	$2,725	3
7	Replace 30 gal electric storage type DHW heater w/ gas fired tankless unit	Cardiff Center	3,520	5	-130	$2,540	$300	$0	$2,240	$390	$0	$390	5.7	15.4%	15	$2,416	0
1	Install Vendmisers	County-wide	28,260	1	0	$4,300	$0	$0	$4,300	$4,060	$0	$4,060	1.1	90.7%	5	$16,000	9
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	DPW Engineering	0	0	727	$58,280	$1,060	$0	$57,220	$1,110	$0	$1,110	51.5	-4.9%	25	-$37,891	4
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	DPW Fleet Management	0	0	2,040	$71,950	$1,590	$0	$70,360	$3,010	$0	$3,010	23.4	0.5%	25	-$17,946	12
14	Windows Upgrade	DPW Fleet Management	1,610	0	660	$22,140	$0	$0	$22,100	$1,200	$0	$1,200	18.4	2.5%	25	-$1,204	4
4	Upgrade Insulation on HHW pipes	EHT Library	0	0	120	$280	$0	$0	$280	$210	$0	$210	1.3	74.7%	10	$1,511	1
6	Lighting Upgrade	EHT Library	29,280	7	0	$8,440	$300	$0	$8,140	$4,630	$0	$4,630	1.8	49.2%	5	$15,010	10
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	EHT Library	3,420	5	-110	$5,100	$600	$0	$4,500	$350	$0	$350	12.9	2.0%	15	-$322	0
6	Lighting Upgrade	Farmington Facility	5,730	1	0	$2,830	$135	$0	$2,695	$935	$0	$935	2.9	21.7%	5	$1,980	2
6	Lighting Upgrade	Firearms Training/Pistol Range	2,650	1	0	$980	$20	$0	$960	$440	$0	$440	2.2	36.0%	5	$1,240	1
6	Lighting Upgrade	Galloway Library	29,620	7	0	$10,910	$305	$0	$10,605	$4,380	$0	$4,380	2.4	30.3%	5	$11,295	10
6	Lighting Upgrade	Hammonton Human Services	16,940	4	0	$6,730	$490	$0	$6,240	$2,650	$0	$2,650	2.4	31.8%	5	$7,010	6
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	Hammonton Human Services	5,140	5	-200	$2,540	$300	$0	$2,240	$500	$0	$500	4.5	21.1%	15	$3,729	1
8	Energy Star Kitchen Appliance Upgrade	Hammonton Human Services	19,125	2	0	$11,320	$0	$0	$11,300	$2,990	$0	$2,990	3.8	25.6%	15	$24,394	6
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Hammonton Human Services	0	0	485	$55,720	$800	$0	$54,920	$700	$0	$700	78.7	-7.4%	25	-$42,766	3
11	At EOL, Replace RTUs w/ High Efficiency Units	Hammonton Human Services	9,980	2	0	$54,170	$1,690	$38,300	$14,210	$1,560	$0	$1,560	9.1	7.0%	15	$4,413	3

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Hammonton Library	0	0	558	$58,280	$1,060	$0	$57,220	$800	$0	$800	71.2	-6.8%	25	-$43,220	3
6	Lighting Upgrade	Hammonton Public Library	27,000	6	0	$14,910	$2,965	$0	$11,945	$4,180	$0	$4,180	2.9	22.1%	5	$8,955	9
7	Replace electric storage type DHW heater w/ gas fired tankless unit	Hammonton Public Library	6,570	5	-260	$2,540	$300	$0	$2,240	$650	$0	$650	3.4	28.3%	15	$5,520	0
7	Replace electric storage type DHW heater w/ gas fired tankless unit	Hammonton Public Works	1,330	5	-40	$2,540	$300	$0	$2,240	$130	$0	$130	17.2	-1.7%	15	-$688	0
8	Energy Star Kitchen Appliance Upgrade	Hammonton Public Works	6,040	0	0	$2,650	$0	$0	$2,650	$850	$0	$850	3.1	31.6%	15	$7,497	2
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Hammonton Public Works Yard	0	0	3,970	$7,620	$0	$0	$7,620	$5,770	$0	$5,770	1.3	75.4%	10	$41,599	23
6	Lighting Upgrade	Hammonton Public Works Yard	14,260	3	0	$10,520	$1,235	$0	$9,285	$2,140	$0	$2,140	4.3	4.9%	5	$1,415	5
4	Upgrade Insulation on HHW pipes	Harborfield	0	0	120	$280	$0	$0	$280	$180	$0	$180	1.6	63.8%	10	$1,255	1
13	Walk-In Cooler Fan Controls	Harborfield	900	0	0	$2,030	$0	$0	$2,030	$150	$0	$150	13.5	1.3%	15	-$239	0
6	Lighting Upgrade	Harborfields	15,040	4	0	$14,770	$1,500	$0	$13,270	$2,300	$0	$2,300	5.8	-4.6%	5	-$1,770	5
8	Energy Star Kitchen Appliance Upgrade	Harborfields	19,550	2	0	$21,120	$0	$0	$21,100	$2,610	$0	$2,610	8.1	9.0%	15	$10,058	6
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Harborfields	0	0	1,900	$82,190	$2,640	$0	$79,550	$2,840	$0	$2,840	28.0	-0.9%	25	-$30,097	11
12	Replace Window AC Units w/ High Efficiency Units	Harborfields	1,905	0	0	$2,500	$0	$0	$2,500	$290	$0	$290	8.6	2.8%	10	-$26	1
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	John F. Gaffney Green Tree Golf Course	0	0	570	$1,090	$0	$0	$1,090	$820	$0	$820	1.3	74.9%	10	$5,905	3
6	Lighting Upgrade	John F. Gaffney Green Tree Golf Course Clubhouse	8,080	2	0	$3,155	$170	$0	$2,985	$1,300	$0	$1,300	2.3	33.1%	5	$3,515	3
6	Lighting Upgrade	Mays Landing Library	33,600	8	0	$12,120	$520	$0	$11,600	$4,770	$0	$4,770	2.4	30.1%	5	$12,250	11
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	Mays Landing Library	8,920	5	-355	$2,540	$300	$0	$2,240	$750	$0	$750	3.0	33.0%	15	$6,713	1
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Mays Landing Library	0	0	1,370	$77,070	$2,120	$0	$74,950	$2,000	$0	$2,000	37.5	-2.9%	25	-$40,124	8
11	At EOL, Replace RTUs w/ High Efficiency Units	Mays Landing Library	23,410	4	0	$100,430	$3,710	$70,530	$25,790	$3,320	$0	$3,320	7.8	9.6%	15	$13,844	8
3	Replace Electric Dishwasher Booster Heater w/ Gas Unit	Meadowview	62,670	27	-2,520	$8,210	$0	$0	$8,210	$4,850	$0	$4,850	1.7	58.5%	10	$40,290	6
4	Upgrade Insulation on HHW pipes	Meadowview	0	0	120	$280	$0	$0	$280	$160	$0	$160	1.8	56.5%	10	$1,085	1
8	Energy Star Kitchen Appliance Upgrade	Meadowview	30,820	2	0	$27,040	$0	$0	$27,000	$4,080	$0	$4,080	6.6	12.5%	15	$21,707	10

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
11	At EOL, Replace RTUs w/ High Efficiency Units	Meadowview	18,270	3	0	$83,100	$2,080	$61,490	$19,520	$2,420	$0	$2,420	8.1	9.0%	15	$9,370	6
12	Replace Window AC Units w/ High Efficiency Units	Meadowview	1,140	0	0	$1,500	$0	$0	$1,500	$150	$0	$150	10.0	0.0%	10	-$220	0
13	Walk-In Cooler Fan Controls	Meadowview	600	0	0	$1,020	$0	$0	$1,020	$90	$0	$90	11.3	3.7%	15	$54	0
6	Lighting Upgrade	Meadowview (Dental Clinic & Nutrition	72,480	16	0	$33,730	$1,405	$0	$32,325	$9,640	$0	$9,640	3.4	15.0%	5	$15,875	24
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Public Works Engineering	0	0	2,830	$5,450	$0	$0	$5,450	$4,310	$0	$4,310	1.3	78.8%	10	$31,315	17
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	Public Works Engineering	3,810	5	-140	$2,540	$300	$0	$2,240	$340	$0	$340	6.6	12.6%	15	$1,819	1
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Public Works Fleet Management	0	0	2,830	$5,450	$0	$0	$5,450	$4,180	$0	$4,180	1.3	76.4%	10	$30,206	17
6	Lighting Upgrade	Public Works Fleet Management	24,210	6	0	$20,130	$2,170	$0	$17,960	$3,565	$0	$3,565	5.0	-0.3%	5	-$135	8
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	Public Works Fleet Management	7,430	5	-290	$2,540	$300	$0	$2,240	$620	$0	$620	3.6	26.9%	15	$5,162	1
12	Replace Window AC Units w/ High Efficiency Units	Public Works Fleet Management	950	0	0	$1,250	$0	$0	$1,250	$140	$0	$140	8.9	2.1%	10	-$56	0
6	Lighting Upgrade	Public Works Transportation & Engineering	9,070	2	0	$4,960	$365	$0	$4,595	$1,320	$0	$1,320	3.5	13.4%	5	$2,005	3
6	Lighting Upgrade	Rutgers Cooperative Extension	30,950	6	0	$12,580	$760	$0	$11,820	$4,980	$0	$4,980	2.4	31.4%	5	$13,080	10
7	Replace 120 gal electric storage type DHW heater w/ gas fired tankless unit	Rutgers Cooperative Extension	5,260	5	-200	$2,540	$300	$0	$2,240	$570	$0	$570	3.9	24.5%	15	$4,565	1
11	At EOL, Replace RTUs w/ High Efficiency Units	Rutgers Cooperative Extension	15,350	3	0	$71,980	$2,600	$51,340	$18,100	$2,460	$0	$2,460	7.4	10.6%	15	$11,267	5
6	Lighting Upgrade	Shoreview	19,090	5	0	$13,540	$1,295	$0	$12,245	$3,230	$0	$3,230	3.8	10.0%	5	$3,905	6
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Shoreview	0	0	3,420	$77,070	$2,120	$0	$74,950	$5,000	$0	$5,000	15.0	4.4%	25	$12,133	20
12	Replace Window AC Units w/ High Efficiency Units	Shoreview	9,720	0	0	$12,750	$0	$0	$12,750	$1,640	$0	$1,640	8.0	4.4%	10	$898	3
14	Windows Upgrade	Shoreview	5,360	0	2,190	$103,060	$0	$0	$103,000	$3,930	$0	$3,930	26.4	-0.4%	25	-$35,089	15
6	Lighting Upgrade	Stillwater	101,715	19	0	$43,630	$3,270	$0	$40,360	$14,240	$0	$14,240	2.8	22.5%	5	$30,840	34
3	Replace Electric Dishwasher Booster Heater w/ Gas Unit	Stillwater - Central Kitchen	20,720	54	-830	$8,210	$0	$0	$8,210	$1,420	$0	$1,420	5.8	11.4%	10	$5,990	2
13	Walk-In Cooler Fan Controls	Stillwater - Central Kitchen / Warehouse	6,320	1	0	$9,150	$0	$0	$9,150	$940	$0	$940	9.7	6.0%	15	$2,072	2
5	Premium Efficiency Motors	Stillwater - Main Building	9,090	1	0	$4,530	$830	$0	$3,700	$1,280	$0	$1,280	2.9	34.4%	18	$13,904	3

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
12	Replace Window AC Units w/ High Efficiency Units	Stillwater Building D	7,620	0	0	$10,000	$0	$0	$10,000	$1,070	$0	$1,070	9.1	1.8%	10	-$617	3
7	Replace 30 gal electric storage type DHW heater w/ gas fired tankless unit	Stillwater Annex	2,380	5	-80	$2,540	$300	$0	$2,240	$210	$0	$210	10.7	4.6%	15	$267	0
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Stillwater Kitchen	0	0	2,830	$5,450	$0	$0	$5,450	$5,070	$0	$5,070	1.1	92.9%	10	$37,798	17
8	Energy Star Kitchen Appliance Upgrade	Stillwater Kitchen	20,320	2	0	$19,890	$0	$0	$19,900	$5,260	$0	$5,260	3.8	25.6%	15	$42,894	7
11	At EOL, Replace RTUs w/ High Efficiency Units	Stillwater Kitchen	9,780	2	0	$49,610	$1,560	$34,950	$13,140	$1,370	$0	$1,370	9.6	6.2%	15	$3,215	3
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Supported Work / Facilities	0	0	2,830	$5,450	$0	$0	$5,450	$4,140	$0	$4,140	1.3	75.7%	10	$29,865	17
4	Upgrade Insulation on HHW pipes	Supported Work / Facilities	0	0	120	$280	$0	$0	$280	$170	$0	$170	1.6	60.2%	10	$1,170	1
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Supported Work / Facilities	0	0	1,210	$71,950	$1,590	$0	$70,360	$1,770	$0	$1,770	39.8	-3.3%	25	-$39,539	7
12	Replace Window/Wall AC Units w/ High Efficiency Units	Supported Work / Facilities	2,670	0	0	$2,500	$0	$0	$2,500	$390	$0	$390	6.4	9.0%	10	$827	1
7	Replace 66 gal electric storage type DHW heater w/ gas fired tankless unit	Supported Work / Facility	2,860	6	-100	$2,540	$300	$0	$2,240	$270	$0	$270	8.3	8.5%	15	$983	0
6	Lighting Upgrade	Supported Work/Facilities	11,720	3	0	$4,860	$220	$0	$4,640	$1,710	$0	$1,710	2.7	24.6%	5	$3,910	4
11	At EOL, Replace RTUs w/ High Efficiency Units	Unemployement Office	15,350	3	0	$67,830	$2,600	$47,190	$18,000	$2,550	$0	$2,550	7.1	11.3%	15	$12,442	5
6	Lighting Upgrade	Unemployment	20,670	5	0	$6,615	$0	$0	$6,615	$3,430	$0	$3,430	1.9	43.3%	5	$10,535	7
6	Lighting Upgrade	Voting Machine Warehouse	22,280	6	0	$8,170	$60	$0	$8,110	$3,830	$0	$3,830	2.1	37.7%	5	$11,040	7
7	Replace 19 gal electric storage type DHW heater w/ gas fired tankless unit	Voting Maching Warehouse	1,230	3	-4	$2,540	$300	$0	$2,240	$180	$0	$180	12.4	2.4%	15	-$91	0
6	Lighting Upgrade	Warren E. Fox Nature Center	5,190	1	0	$1,720	$100	$0	$1,620	$830	$0	$830	2.0	42.5%	5	$2,530	2
	Totals		**1,995,190**	**487**	**44,980**	**$2,775,240**	**$91,645**	**$363,030**	**$2,320,180**	**$359,770**	**$0**	**$359,770**	**6.4**	**12%**	**12**	**$2,124,038**	**922**

Notes:

1. KW - Where Zero (0) values are shown in the table there is no demand reduction for this measure.
2. Rebates- Where Zero (0) values are shown in the table we could not find any rebates of other financial incentives that are currently available for this measure.

Atlantic County - Local Goverment Energy Audit ECM Summary (sorted by Simple Payback)

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
1	Install Vendmisers	County-wide	28,260	1	0	$4,300	$0	$0	$4,300	$4,060	$0	$4,060	1.1	90.7%	5	$16,000	9
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Stillwater Kitchen	0	0	2,830	$5,450	$0	$0	$5,450	$5,070	$0	$5,070	1.1	92.9%	10	$37,798	17
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Public Works Engineering	0	0	2,830	$5,450	$0	$0	$5,450	$4,310	$0	$4,310	1.3	78.8%	10	$31,315	17
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Public Works Fleet Management	0	0	2,830	$5,450	$0	$0	$5,450	$4,180	$0	$4,180	1.3	76.4%	10	$30,206	17
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Supported Work / Facilities	0	0	2,830	$5,450	$0	$0	$5,450	$4,140	$0	$4,140	1.3	75.7%	10	$29,865	17
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Hammonton Public Works Yard	0	0	3,970	$7,620	$0	$0	$7,620	$5,770	$0	$5,770	1.3	75.4%	10	$41,599	23
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	John F. Gaffney Green Tree Golf Course	0	0	570	$1,090	$0	$0	$1,090	$820	$0	$820	1.3	74.9%	10	$5,905	3
2	Replace Ceiling Suspended Fan Coils w/ Infrared Units	Atlantic County Justice Facility Records	0	0	2,830	$5,450	$0	$0	$5,450	$3,940	$0	$3,940	1.4	72.0%	10	$28,159	17
3	Replace Electric Dishwasher Booster Heater w/ Gas Unit	Stillwater - Central Kitchen	20,720	54	-830	$8,210	$0	$0	$8,210	$1,420	$0	$1,420	5.8	11.4%	10	$5,990	2
3	Replace Electric Dishwasher Booster Heater w/ Gas Unit	Meadowview	62,670	27	-2,520	$8,210	$0	$0	$8,210	$4,850	$0	$4,850	1.7	58.5%	10	$40,290	6
4	Upgrade Insulation on HHW pipes	EHT Library	0	0	120	$280	$0	$0	$280	$210	$0	$210	1.3	74.7%	10	$1,511	1
4	Upgrade Insulation on HHW pipes	Atlantic County Superintendent of Elections	0	0	120	$280	$0	$0	$280	$180	$0	$180	1.6	63.8%	10	$1,255	1
4	Upgrade Insulation on HHW pipes	Harborfield	0	0	120	$280	$0	$0	$280	$180	$0	$180	1.6	63.8%	10	$1,255	1
4	Upgrade Insulation on HHW pipes	Supported Work / Facilities	0	0	120	$280	$0	$0	$280	$170	$0	$170	1.6	60.2%	10	$1,170	1
4	Upgrade Insulation on HHW pipes	Atlantic County Civil Courthouse	0	0	120	$280	$0	$0	$280	$170	$0	$170	1.6	60.2%	10	$1,170	1
4	Upgrade Insulation on HHW pipes	Meadowview	0	0	120	$280	$0	$0	$280	$160	$0	$160	1.8	56.5%	10	$1,085	1
5	Premium Efficiency Motors	Atlantic County Civil Courthouse	8,210	1	0	$3,190	$340	$0	$2,850	$1,150	$0	$1,150	2.5	40.3%	18	$12,967	3
5	Premium Efficiency Motors	Stillwater - Main Building	9,090	1	0	$4,530	$830	$0	$3,700	$1,280	$0	$1,280	2.9	34.4%	18	$13,904	3
5	Premium Efficiency Motors	Atlantic County Office Building	20,310	3	0	$9,920	$830	$0	$9,090	$2,840	$0	$2,840	3.2	31.0%	18	$29,970	7
6	Lighting Upgrade	Animal Shelter	12,970	3	0	$4,890	$250	$0	$4,640	$2,090	$0	$2,090	2.2	35.0%	5	$5,810	4

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
6	Lighting Upgrade	Atlantic County Civil Courthouse	225,190	48	0	$68,790	$2,640	$0	$66,150	$33,330	$0	$33,330	2.0	41.5%	5	$100,500	74
6	Lighting Upgrade	A.C. Criminal Courthouse	189,670	41	0	$84,110	$630	$0	$83,480	$29,780	$0	$29,780	2.8	23.0%	5	$65,420	63
6	Lighting Upgrade	Atlantic County Justice/annex/records	178,580	43	0	$130,780	$9,210	$0	$121,570	$24,140	$0	$24,140	5.0	-0.2%	5	-$870	59
6	Lighting Upgrade	Atlantic County Government Center	81,740	18	0	$22,810	$1,140	$0	$21,670	$10,720	$0	$10,720	2.0	40.4%	5	$31,930	27
6	Lighting Upgrade	Atlantic County Office Building	143,020	34	0	$57,950	$1,345	$0	$56,610	$20,020	$0	$20,020	2.8	22.6%	5	$43,490	47
6	Lighting Upgrade	A.C. Superintendent of Elections	2,420	1	0	$960	$20	$0	$940	$410	$0	$410	2.3	33.2%	5	$1,110	1
6	Lighting Upgrade	Canale Training Center	39,980	8	0	$21,740	$1,940	$0	$19,800	$5,660	$0	$5,660	3.5	13.2%	5	$8,500	13
6	Lighting Upgrade	Cardiff Center	7,610	1	0	$3,960	$335	$0	$3,625	$1,270	$0	$1,270	2.9	22.2%	5	$2,725	3
6	Lighting Upgrade	EHT Library	29,280	7	0	$8,440	$300	$0	$8,140	$4,630	$0	$4,630	1.8	49.2%	5	$15,010	10
6	Lighting Upgrade	Farmington Facility	5,730	1	0	$2,830	$135	$0	$2,695	$935	$0	$935	2.9	21.7%	5	$1,980	2
6	Lighting Upgrade	Firearms Training/Pistol Range	2,650	1	0	$980	$20	$0	$960	$440	$0	$440	2.2	36.0%	5	$1,240	1
6	Lighting Upgrade	Galloway Library	29,620	7	0	$10,910	$305	$0	$10,605	$4,380	$0	$4,380	2.4	30.3%	5	$11,295	10
6	Lighting Upgrade	Hammonton Human Services	16,940	4	0	$6,730	$490	$0	$6,240	$2,650	$0	$2,650	2.4	31.8%	5	$7,010	6
6	Lighting Upgrade	Hammonton Public Library	27,000	6	0	$14,910	$2,965	$0	$11,945	$4,180	$0	$4,180	2.9	22.1%	5	$8,955	9
6	Lighting Upgrade	Hammonton Public Works Yard	14,260	3	0	$10,520	$1,235	$0	$9,285	$2,140	$0	$2,140	4.3	4.9%	5	$1,415	5
6	Lighting Upgrade	Harborfields	15,040	4	0	$14,770	$1,500	$0	$13,270	$2,300	$0	$2,300	5.8	-4.6%	5	-$1,770	5
6	Lighting Upgrade	John F. Gaffney Green Tree Golf Course Clubhouse	8,080	2	0	$3,155	$170	$0	$2,985	$1,300	$0	$1,300	2.3	33.1%	5	$3,515	3
6	Lighting Upgrade	Mays Landing Library	33,600	8	0	$12,120	$520	$0	$11,600	$4,770	$0	$4,770	2.4	30.1%	5	$12,250	11
6	Lighting Upgrade	Meadowview (Dental Clinic & Nutrition	72,480	16	0	$33,730	$1,405	$0	$32,325	$9,640	$0	$9,640	3.4	15.0%	5	$15,875	24
6	Lighting Upgrade	Public Works Fleet Management	24,210	6	0	$20,130	$2,170	$0	$17,960	$3,565	$0	$3,565	5.0	-0.3%	5	-$135	8
6	Lighting Upgrade	Public Works Transportation & Engineering	9,070	2	0	$4,960	$365	$0	$4,595	$1,320	$0	$1,320	3.5	13.4%	5	$2,005	3
6	Lighting Upgrade	Rutgers Cooperative Extension	30,950	6	0	$12,580	$760	$0	$11,820	$4,980	$0	$4,980	2.4	31.4%	5	$13,080	10

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
6	Lighting Upgrade	Shoreview	19,090	5	0	$13,540	$1,295	$0	$12,245	$3,230	$0	$3,230	3.8	10.0%	5	$3,905	6
6	Lighting Upgrade	Stillwater	101,715	19	0	$43,630	$3,270	$0	$40,360	$14,240	$0	$14,240	2.8	22.5%	5	$30,840	34
6	Lighting Upgrade	Supported Work/Facilities	11,720	3	0	$4,860	$220	$0	$4,640	$1,710	$0	$1,710	2.7	24.6%	5	$3,910	4
6	Lighting Upgrade	Unemployment	20,670	5	0	$6,615	$0	$0	$6,615	$3,430	$0	$3,430	1.9	43.3%	5	$10,535	7
6	Lighting Upgrade	Voting Machine Warehouse	22,280	6	0	$8,170	$60	$0	$8,110	$3,830	$0	$3,830	2.1	37.7%	5	$11,040	7
6	Lighting Upgrade	Warren E. Fox Nature Center	5,190	1	0	$1,720	$100	$0	$1,620	$830	$0	$830	2.0	42.5%	5	$2,530	2
7	Replace 50 gal electric storage type DHW heaters w/ gas fired tankless units	Atlantic County Civil Courthouse	32,210	9	-1,290	$7,630	$900	$0	$6,730	$2,880	$0	$2,880	2.3	42.6%	15	$27,651	3
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	Mays Landing Library	8,920	5	-355	$2,540	$300	$0	$2,240	$750	$0	$750	3.0	33.0%	15	$6,713	1
7	Replace electric storage type DHW heater w/ gas fired tankless unit	Hammonton Public Library	6,570	5	-260	$2,540	$300	$0	$2,240	$650	$0	$650	3.4	28.3%	15	$5,520	0
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	Public Works Fleet Management	7,430	5	-290	$2,540	$300	$0	$2,240	$620	$0	$620	3.6	26.9%	15	$5,162	1
7	Replace 120 gal electric storage type DHW heater w/ gas fired tankless unit	Rutgers Cooperative Extension	5,260	5	-200	$2,540	$300	$0	$2,240	$570	$0	$570	3.9	24.5%	15	$4,565	1
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	Hammonton Human Services	5,140	5	-200	$2,540	$300	$0	$2,240	$500	$0	$500	4.5	21.1%	15	$3,729	1
7	Replace 30 gal electric storage type DHW heater w/ gas fired tankless unit	Cardiff Center	3,520	5	-130	$2,540	$300	$0	$2,240	$390	$0	$390	5.7	15.4%	15	$2,416	0
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	Public Works Engineering	3,810	5	-140	$2,540	$300	$0	$2,240	$340	$0	$340	6.6	12.6%	15	$1,819	1
7	Replace 66 gal electric storage type DHW heater w/ gas fired tankless unit	Supported Work / Facility	2,860	6	-100	$2,540	$300	$0	$2,240	$270	$0	$270	8.3	8.5%	15	$983	0
7	Replace 30 gal electric storage type DHW heater w/ gas fired tankless unit	Stillwater Annex	2,380	5	-80	$2,540	$300	$0	$2,240	$210	$0	$210	10.7	4.6%	15	$267	0
7	Replace 52 gal electric storage type DHW heaters w/ gas fired tankless units	Atlantic County Government Center	5,050	5	-190	$5,090	$600	$0	$4,490	$350	$0	$350	12.8	2.7%	16	-$94	0
7	Replace 15 gal electric storage type DHW heater w/ gas fired tankless unit	A.C. Superintendent of Elections	1,620	2	-50	$2,540	$300	$0	$2,240	$190	$0	$190	11.8	3.2%	15	$28	0
7	Replace 19 gal electric storage type DHW heater w/ gas fired tankless unit	Voting Maching Warehouse	1,230	3	-4	$2,540	$300	$0	$2,240	$180	$0	$180	12.4	2.4%	15	-$91	0
7	Replace 40 gal electric storage type DHW heater w/ gas fired tankless unit	EHT Library	3,420	5	-110	$5,100	$600	$0	$4,500	$350	$0	$350	12.9	2.0%	15	-$322	0
7	Replace electric storage type DHW heater w/ gas fired tankless unit	Hammonton Public Works	1,330	5	-40	$2,540	$300	$0	$2,240	$130	$0	$130	17.2	-1.7%	15	-$688	0
8	Energy Star Kitchen Appliance Upgrade	Canale Fire Training Academy	6,040	0	0	$2,650	$0	$0	$2,650	$850	$0	$850	3.1	31.6%	15	$7,497	2

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
8	Energy Star Kitchen Appliance Upgrade	Hammonton Public Works	6,040	0	0	$2,650	$0	$0	$2,650	$850	$0	$850	3.1	31.6%	15	$7,497	2
8	Energy Star Kitchen Appliance Upgrade	Stillwater Kitchen	20,320	2	0	$19,890	$0	$0	$19,900	$5,260	$0	$5,260	3.8	25.6%	15	$42,894	7
8	Energy Star Kitchen Appliance Upgrade	Hammonton Human Services	19,125	2	0	$11,320	$0	$0	$11,300	$2,990	$0	$2,990	3.8	25.6%	15	$24,394	6
8	Energy Star Kitchen Appliance Upgrade	Meadowview	30,820	2	0	$27,040	$0	$0	$27,000	$4,080	$0	$4,080	6.6	12.5%	15	$21,707	10
8	Energy Star Kitchen Appliance Upgrade	Atlantic County Justice/Annex/Records	18,420	1	0	$18,370	$0	$0	$18,400	$2,450	$0	$2,450	7.5	10.2%	15	$10,848	6
8	Energy Star Kitchen Appliance Upgrade	Harborfields	19,550	2	0	$21,120	$0	$0	$21,100	$2,610	$0	$2,610	8.1	9.0%	15	$10,058	6
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	AC Civil Courthouse	0	0	9,093	$176,800	$9,000	$0	$167,800	$13,230	$0	$13,230	12.7	6.1%	25	$62,576	53
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Shoreview	0	0	3,420	$77,070	$2,120	$0	$74,950	$5,000	$0	$5,000	15.0	4.4%	25	$12,133	20
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	AC Government Center	0	0	5,986	$189,880	$9,000	$0	$180,900	$9,500	$0	$9,495	19.0	2.2%	25	-$15,475	35
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	DPW Fleet Management	0	0	2,040	$71,950	$1,590	$0	$70,360	$3,010	$0	$3,010	23.4	0.5%	25	-$17,946	12
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Supported Work / Facilities	0	0	1,210	$71,950	$1,590	$0	$70,360	$1,770	$0	$1,770	39.8	-3.3%	25	-$39,539	7
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Mays Landing Library	0	0	1,370	$77,070	$2,120	$0	$74,950	$2,000	$0	$2,000	37.5	-2.9%	25	-$40,124	8
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Harborfields	0	0	1,900	$82,190	$2,640	$0	$79,550	$2,840	$0	$2,840	28.0	-0.9%	25	-$30,097	11
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	DPW Engineering	0	0	727	$58,280	$1,060	$0	$57,220	$1,110	$0	$1,110	51.5	-4.9%	25	-$37,891	4
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Hammonton Library	0	0	558	$58,280	$1,060	$0	$57,220	$800	$0	$800	71.2	-6.8%	25	-$43,220	3
9	Replace Boiler w/ High Efficiency Modulating Condensing Boiler	Hammonton Human Services	0	0	485	$55,720	$800	$0	$54,920	$700	$0	$700	78.7	-7.4%	25	-$42,766	3
10	Convert from CV to VAV Pumping (Single Loop to Pri/Sec Loop)	Atlantic County Civil Courthouse	94,040	0	0	$121,400	$1,200	$0	$120,200	$13,900	$0	$13,900	8.6	7.8%	15	$45,737	31
11	At EOL, Replace RTUs w/ High Efficiency Units	Unemployement Office	15,350	3	0	$67,830	$2,600	$47,190	$18,000	$2,550	$0	$2,550	7.1	11.3%	15	$12,442	5
11	At EOL, Replace RTUs w/ High Efficiency Units	Rutgers Cooperative Extension	15,350	3	0	$71,980	$2,600	$51,340	$18,100	$2,460	$0	$2,460	7.4	10.6%	15	$11,267	5
11	At EOL, Replace RTUs w/ High Efficiency Units	Mays Landing Library	23,410	4	0	$100,430	$3,710	$70,530	$25,790	$3,320	$0	$3,320	7.8	9.6%	15	$13,844	8
11	At EOL, Replace RTUs w/ High Efficiency Units	Meadowview	18,270	3	0	$83,100	$2,080	$61,490	$19,520	$2,420	$0	$2,420	8.1	9.0%	15	$9,370	6
11	At EOL, Replace RTUs w/ High Efficiency Units	Hammonton Human Services	9,980	2	0	$54,170	$1,690	$38,300	$14,210	$1,560	$0	$1,560	9.1	7.0%	15	$4,413	3

	Energy Conservation Measures (ECM)	Buildings	Energy Savings			Gross Installation Costs*	Rebates/ Incentive	Avoided Cost	Net Implementation Costs	Annual Energy Cost Savings	Annual Oper. Cost Savings	Total Annual Cost Savings	Simple Pay Back	Internal Rate of Return (IRR)	Measure Life	Lifecycle Savings	CO_2 Savings (tons)
			kWh	kW	Therms												
11	At EOL, Replace RTUs w/ High Efficiency Units	Atlantic County Government Center	19,185	3	0	$85,360	$2,730	$59,230	$23,470	$2,510	$0	$2,510	9.4	6.6%	15	$6,494	6
11	At EOL, Replace RTUs w/ High Efficiency Units	Stillwater Kitchen	9,780	2	0	$49,610	$1,560	$34,950	$13,140	$1,370	$0	$1,370	9.6	6.2%	15	$3,215	3
12	Replace Window/Wall AC Units w/ High Efficiency Units	Supported Work / Facilities	2,670	0	0	$2,500	$0	$0	$2,500	$390	$0	$390	6.4	9.0%	10	$827	1
12	Replace Wall AC Units w/ High Efficiency Units	Atlantic County Superintendent of Elections	1,330	0	0	$1,750	$0	$0	$1,750	$230	$0	$230	7.6	5.3%	10	$212	0
12	Replace Window AC Units w/ High Efficiency Units	Shoreview	9,720	0	0	$12,750	$0	$0	$12,750	$1,640	$0	$1,640	8.0	4.4%	10	$898	3
12	Replace Window AC Units w/ High Efficiency Units	Harborfields	1,905	0	0	$2,500	$0	$0	$2,500	$290	$0	$290	8.6	2.8%	10	-$26	1
12	Replace Window AC Units w/ High Efficiency Units	Public Works Fleet Management	950	0	0	$1,250	$0	$0	$1,250	$140	$0	$140	8.9	2.1%	10	-$56	0
12	Replace Window AC Units w/ High Efficiency Units	Stillwater Building D	7,620	0	0	$10,000	$0	$0	$10,000	$1,070	$0	$1,070	9.1	1.8%	10	-$617	3
12	Replace Window AC Units w/ High Efficiency Units	Meadowview	1,140	0	0	$1,500	$0	$0	$1,500	$150	$0	$150	10.0	0.0%	10	-$220	0
13	Walk-In Cooler Fan Controls	Stillwater - Central Kitchen / Warehouse	6,320	1	0	$9,150	$0	$0	$9,150	$940	$0	$940	9.7	6.0%	15	$2,072	2
13	Walk-In Cooler Fan Controls	Meadowview	600	0	0	$1,020	$0	$0	$1,020	$90	$0	$90	11.3	3.7%	15	$54	0
13	Walk-In Cooler Fan Controls	AC Justice Facility	2,410	0	0	$4,070	$0	$0	$4,070	$340	$0	$340	12.0	3.0%	15	-$11	1
13	Walk-In Cooler Fan Controls	Harborfield	900	0	0	$2,030	$0	$0	$2,030	$150	$0	$150	13.5	1.3%	15	-$239	0
14	Windows Upgrade	DPW Fleet Management	1,610	0	660	$22,140	$0	$0	$22,100	$1,200	$0	$1,200	18.4	2.5%	25	-$1,204	4
14	Windows Upgrade	Shoreview	5,360	0	2,190	$103,060	$0	$0	$103,000	$3,930	$0	$3,930	26.4	-0.4%	25	-$35,089	15
14	Windows Upgrade	AC Civil Courthouse	6,210	0	2,720	$189,820	$0	$0	$189,800	$4,870	$0	$4,870	39.0	-3.2%	25	-$104,998	18
	Totals		**1,995,190**	**487**	**44,980**	**$2,775,240**	**$91,645**	**$363,030**	**$2,320,180**	**$359,770**	**$0**	**$359,770**	**6.4**	**12%**	**12**	**$2,124,038**	**922**

cars	160
trees	252

0.661
11.708

Discount Rate =

CO2 Emissions Factors
lb/kWh
lb/therm

Energy Audit Purpose & Scope

Purpose:

- The objectives of the energy audit are to evaluate the site's energy consumption, establish baselines for energy consumption and identify opportunities to reduce the amount of energy used and/or its cost.

Scope:

I. Historic Energy Consumption: Benchmark energy use using Energy Star Portfolio Manager

II. Facility Description – characterize building usage, occupancy, size and construction.

III. Equipment Inventory – detailed equipment list including useful life and efficiency.

IV. Energy Conservation Measures: Identify and evaluate opportunities for cost savings and economic returns.

V. Renewable/Distributed Energy Measures: evaluate economic viability of various renewable/distributed energy technologies.

VI. Energy Purchasing and Procurement Strategies: perform utility tariff analysis and assess potential for savings from energy procurement strategies.

VII. Method of Analysis: Appendices

Historic Energy Consumption

Utility Usage and Costs Summary

Time-period: Oct. 2008 – Nov. 2009

Buildings	Electric				Natural Gas			
	Account	Annual Consumption	Annual Cost	$ / kWh	Account	Annual Consumption	Annual Cost	$ / Therm
Animal Shelter	1242 5639 9997 meter#1487231	161,360	$24,621.80	$0.153	108 36 0080 02 meter#1487231	18,412	$30,120.15	$1.636
A.C. Civil Courthouse	0311 8019 999 meter#93485190	2,166,600	$305,594.46	$0.141	103 33 0041 08 meter#0159950	67,677	$110,289.12	$1.630
A.C. Criminal Courthouse	1176 1959 9956 Mtrs#58503493/ 84534440	3,039,768	$458,142.53	$0.151	118 38 3521 09 meter#0430973	85,562	$139,384.02	$1.629
					118 37 0114 mtr#090422446	3,413	$4,743.16	$1.390
A.C. Government Center	0079 3919 9993 meter#84876373	925,736	$122,855.36	$0.133	118 37 0164 08 mtr#0231992, 0254805, 0272305	51,478	$76,350.33	$1.483
A.C. Justice Facility & Annex	0077 2829 9996 meter#23660765	3,087,600	$430,531.31	$0.139	118 38 3437 02 mtr# 0362678, 0413899, 0450827	177,388	$261,132.53	$1.472
AC Office Building	0507 6129 9994 meter#83996281	224,013	$28,946.53	$0.129	103 34 0094 03 meter#0159945	51,892	$84,600.93	$1.630
A.C. Supert. of Elections	0079 2039 9990 mtr#105732952	22,066	$3,821.83	$0.173	118 37 0115 65 meter#0422799	3,307	$4,891.39	$1.479
Cardiff Center	0293 3409 9982 meter#90477123	55,246	$9,637.52	$0.174	113 38 0092 09 mtr#0190248	5,279	$6,314.61	$1.196

Please see Appendix for full utility data and consumption profiles for all buildings.

Historic Energy Consumption

Utility Usage and Costs Summary — Time-period: Oct. 2008 – Nov. 2009

Buildings	Electric				Natural Gas			
	Account	Annual Consumption	Annual Cost	$ / kWh	Account	Annual Consumption	Annual Cost	$ / Therm
Canale Training Center	1138 5989 9990 meter#5856728	444,600	$69,686.16	$0.157	113 35 2808 03 mtrs#0341205, 0503938	18,084	$29,623.94	$1.638
EHT Library	0169 5709 9993 meter#83996223	180,960	$29,972.64	$0.166	115 36 0032 mtr#020516059	1,525	$2,485.23	$1.630
Farmington Facility Mgmnt	0281 3719 9981 meter#71107124	22,088	$3,702.42	$0.168	104 35 0104 09 meter#0367122	3,519	$5,000.65	$1.421
Firearms Train/Pistol Range	1240 5829 9999 meter#73964573	75,095	$12,176.30	$0.162	*No Natural Gas Utility Billing Received*			
Galloway Library	0780 3179 9980 meter#1145124	295,960	$45,884.06	$0.155	103 38 0133 02 meter#0351341	6,883	$10,904.32	$1.584
Hammonton Human Services	0281 3719 9999 meter#93485237	164,800	$26,959.07	$0.164	215 04 0029 04 meter#0351408	7,909	$11,622.09	$1.469
Hammonton Library	0263 7449 9999 meter#93485221	114,200	$18,690.66	$0.164	216 04 0025 07 meter#0396997	5,579	$6,696.88	$1.200
Hammonton Public Works	1397 7519 9991 meter#96412993	128,520	$19,618.14	$0.153	215 03 1859 08 meter#0268090	8,616	$13,078.34	$1.518
Harborfields	0191 3299 9996 meter#23660766	355,360	$ 51,320.06	$0.144	115 39 0032 09 meter#0448526	25,751	$42,125.16	$1.636

Historic Energy Consumption

Utility Usage and Costs Summary — Time-period: Oct. 2008 – Nov. 2009

Buildings	Electric				Natural Gas			
	Account	Annual Consumption	Annual Cost	$ / kWh	Account	Annual Consumption	Annual Cost	$ / Therm
John F. Gaffney Golf Course	1126 6189 9990 meter#82890277	494,880	$ 72,573.12	$0.147	118 37 0054 19 meter#0350914	1,486	$1,885.58	$1.269
John F. Gaffney Golf Course					118 37 2600 22 mtrs#0210896, 0232794,0254017, 0350914	3,449	$4,132.82	$1.198
Mays Landing Library	0079 2359 9992 meter#56618192	395,600	$ 58,889.66	$0.149	118 37 0116 07 meter#0422396	11,202	$18,151.58	$1.620
Meadowview Nursing Home	0638 1409 9998 meter#23660761	1,600,560	$ 229,275.13	$0.143	111 38 0234 18 meter#0341150	143,291	$218,940.85	$1.528
Public Works Fleet Mgmnt	0146 8449 9990 meter#82890370	232,560	$ 34,185.32	$0.147	111 38 0235 33 meter#0190054	12,233	$20,149.17	$1.647
PW Transport.& Engineering	0978 4109 9969 meter#58311345	103,125	$ 15,881.16	$0.154	111 38 0231 03 meter#0437641	7,034	$9,506.23	$1.351
					111 38 2804 06 meter#0213766	387	$621.74	$1.607
Rutgers Extension	0079 7779 9993 meter#57789236	139,920	$23,558.93	$0.168	118 36 0056 00 meter#0516166	6,360	$9,446.91	$1.485
Shoreview	0121 7539 9992 meter#80592237	149,040	$28,672.69	$0.192	111 38 0232 28 meter#0516348	22,682	$37,083.13	$1.635

Historic Energy Consumption

Utility Usage and Costs Summary Time-period: Oct. 2008 – Nov. 2009

Buildings	Electric				Natural Gas			
	Account	Annual Consumption	Annual Cost	$ / kWh	Account	Annual Consumption	Annual Cost	$ / Therm
Stillwater/Annex/Kitch./D Bldg	0121 3659 9995 meter#83431414	1,196,400	$191,426.21	$0.160	111 38 2761 07 mtrs#0210352, 0516579, 4267356	52,089	$81,607.62	$1.567
Stillwater/Kitchen					111 38 0229 07 meter#0484812	41,458	$67,600.96	$1.631
Supported Work /Facilities	0210 5119 9996 meter#83996146	117,080	$18,126.00	$0.155	103 33 0046 03 meter#0135212	7,553	$12,333.94	$1.633
Unemployment	1179 2869 9992 meter#83995910	52,080	$8,971.26	$0.172	104 31 0032 42 meter#0292419	3,869	$5,671.30	$1.466
Voting Machine Warehouse	0146 8349 9991 mtr#105734212	110,120	$19,369.69	$0.176	111 38 0233 01 meter#0372072	9,971	$16,454.65	$1.650
Warren E. Fox Nature Center	0078 6549 9995 Meter#55604149	79,010	$12,974.61	$0.164	118 35 3171 05 meter#0406121	5,855	$7,738.54	$1.322
TOTAL / AVERAGE		**16,134,347**	**$2,376,064.63**	**$0.147**		**871,193**	**$1,350,220.13**	**$1.550**

Historic Energy Consumption

ENERGY STAR SCORES

- Energy Star Score is calculated to establish a facility-specific energy intensity baseline.
- Energy Star can be used to compare energy consumption to other similar facilities and to gauge the success of energy conservation and cost containment efforts.
- Energy Star scores are only applicable to certain types of buildings (i.e.: schools K-12, offices or dormitory buildings). The EPA does not have a classification for municipal and multi-use building type; therefore and Energy Star Score can not be calculated for these types of facilities.
- Buildings with an Energy Star rating/score of 75, or above, are eligible to apply for an official Energy Star Building label. The utility billing period needs to be updated to within 120 days of application for the Energy Star Label.

Historic Energy Consumption

ENERGY STAR SCORES

Facility Name	Total Floor Area	Energy Star Score	Eligible to Apply for ENERGY STAR	Current Site Energy Intensity (kBtu/SF)	Current Source Energy Intensity (kBtu/SF)	Average Source EUI by Building Type *
Animal Shelter	21,000	*NA*	*NA*	116.3	182.0	*Other - 213*
Atlantic County Civil Courthouse	127,260	44	*NA*	113.5	252.4	
A.C. Criminal Courthouse	176,000	41	*NA*	109.9	250.8	
Atlantic County Government Center	64,710	20	*NA*	129.0	247.1	
Atlantic County Justice/annex/records	141,240	6	*NA*	200.5	381.1	
Atlantic County Office Building	138,646	21	*NA*	123.0	323.0	
A.C. Superintendent of Elections	5,250	*NA*	*NA*	77.6	114.1	*Public Mtg - 102*
Canale Training Center	29,000	*NA*	*NA*	114.9	240.4	*Other - 213*
Cardiff Center	7,100	*NA*	*NA*	98.9	165.0	*Clinic - 219*
EHT Library	11,350	*NA*	*NA*	68.1	196.5	*Library - 246*
Farmington Facility	8,760	87	*Needs current Bills*	50.5	72.9	
Firearms Training/Pistol Range	7,500	*NA*	*NA*	34.3	114.5	*Other - 213*
Galloway Library	16,300	*NA*	*NA*	105.1	252.0	*Library - 246*
Hammonton Human Services	15,500	50	*NA*	88.2	175.6	
Hammonton Public Library	13,720	*NA*	*NA*	28.5	95.2	*Library - 246*
Hammonton Public Works Yard	18,230	*NA*	*NA*	71.6	130.1	*Service - 150*
Harborfields	23,511	*NA*	*NA*	168.4	300.0	*Public Order-157*
John F. Gaffney Green Tree Golf Course	15,500	*NA*	*NA*	56.6	115.6	*Recreation - 136*
Mays Landing Library	37,675	*NA*	*NA*	65.5	150.8	*Library - 246*
Meadowview (Dental Clinic & Nutrition	113,366	*NA*	*NA*	174.6	293.3	*Clinic - 219*
Public Works Fleet Management	15,000	*NA*	*NA*	134.6	262.5	*Service - 150*
Public Works Transportation & Engineering	12,740	*NA*	*NA*	86.0	153.5	*Service - 150*
Rutgers Cooperative Extension	15,546	47	*NA*	71.8	145.7	
Shoreview	39,323	88	*Needs current Bills*	68.1	101.0	
Stillwater/Annex/Central Kitchen/D Building	117,512	*NA*	*NA*	113.7	197.9	*Other - 213*
Supported Work/Facilities	14,285	*52*	*NA*	77.4	143.2	
Unemployement	15,569	*NA*	*NA*	37.4	66.0	*Other - 213*
Voting Machine Warehouse	20,404	*NA*	*NA*	69.2	114.7	*Storage Ctr - 90*
Warren E. Fox Nature Center	3,133	*NA*	*NA*	273.5	484.1	*Recreation - 136*

* Note: This data comes from the 2003 CBECS National Average Source and Site Energy Use and Performance Comparisions by Building Type. This is Average EUI is used only where Portfolio Manager does not have the buidling category listed to be eligible to receive an Energy Star score.

Historic Energy Consumption (continued)

Portfolio Manager Sign - In

- An account has been created for Atlantic County in Portfolio Manager. You will have received an email to notify you of the generation of this account and shared access with Dome-Tech. Please use this to read your facility information. Please feel free to alter this information when the report is finalized. We would ask that you leave the sign-in information alone until then. Your building's information is currently shared as read only.
- When the report is finalized the shared access will be changed so that you can use / edit the information and change as you wish.
- Website link to sign-in: https://www.energystar.gov/istar/pmpam/index.cfm?fuseaction=login.Login

- Username: ***AtlanticCounty***
- Password: ***DTAtlanticCounty***
- Email for account: ***nocito_marge@aclink.org***

Facility Description – AC Civil Courthouse

➢ Building Name: AC Civil Courthouse

Address:	1201 Bacharach Blvd Atlantic City, NJ 08404
Gross Floor Area:	127,260 s.f.
Year Built:	1975; renovations 1983
# Occupants:	326
Use:	The building houses courts and offices; it is operated M-F 8:30 am until 4:30 pm; closed weekends and holidays

➢ Construction Features:

Facade:	Three stories, brick, in good condition
Roof Type:	Flat, light-colored, white membrane, metal deck, approximately 10+ years old, in good condition
Windows:	Covering 50% of the façade, metal frame, mixture of single and double glazed, most are fixed, some are operable, casement, skylights in atrium, mostly in good condition, some displaying infiltration (see ECMs)
Exterior Doors:	Approximately 3, metal frame, greater than 85% glass, in good condition

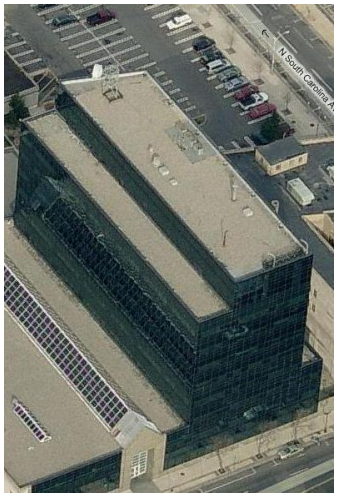
Facility Description – AC Civil Courthouse

Major Mechanical Systems

- Boilers and Heat Exchangers
  - *Two (2) Cleaver-Brooks natural gas boilers,*
  - *two (2) Baldor 15HP HHW pumps, two (2) US Electric Motors 10HP HHW pumps*
- Chilled Water System
  - *One (1) York and one (1) Trane centrifugal chiller, one (1) BAC 2-cell cooling tower, three (3) Baldor CHW pumps (15 and 20 HP), two (2) Weinman CDW pumps (15 HP)*
- Air Handling Systems
  - *four (2) Nesbitt air handling units (AHUs), two (2) Trane AHUs each with HHW coils and CHW coils*
  - *five (5) Greenheck exhaust fans, one (1) Trane exhaust fan, one (1) Cook exhaust fan*
  - *multiple Airtherm UnitAire fan coil units*
- Domestic Hot Water System
  - *Two (2) RECO HHW / DHW heat exchangers,*
  - *one (1) Bradford-White 50 gal hot water heater*
    - **(replaces above indirect HTX when HHW boilers are not operating)**
  - *one (1) A.O. Smith electric 40 gal hot water heater,*
  - *one (1) Ruudglas 50 gal hot water heater*

Please see Appendix for detailed Equipment Inventory.

Facility Description – AC Office Building



- **Building Name:** **AC Office Building**

Address:	1333 Atlantic Avenue Atlantic City, NJ 08404
Gross Floor Area:	138,646 s.f.
Year Built:	1985
# Occupants:	311
Use:	The building consists of offices and conference rooms; it is operated M-F 8:30 am – 4:30 pm; closed weekends and holidays

- **Construction Features:**

Facade:	Nine stories; glass curtain wall, in good condition
Roof Type:	Flat, light-colored, metal deck, gravel, approximately 10+ years old, in good condition
Windows:	Covering 100% of the façade, glass curtain wall, double glazed, fixed, in good condition
Exterior Doors:	Approximately 3, metal frame, greater than 85% glass, in good condition

Facility Description – AC Office Building

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *Two (2) Cleaver-Brooks natural gas boilers, two (2) 40HP Baldor hot water pumps*
    - *Perimeter fin-tube radiation*
  - Chilled Water System
    - *Two (2) York chillers, three (3) Lincoln Electric chilled water pumps (1-10HP, 2-15HP)*
    - *one (1) BAC 5-cell cooling tower, two (2) Lincoln Electric CDW pumps (15 HP)*
  - Air Handling Systems
    - *Two (2) Trane AHUs, one (1) Carrier AHU each with HHW preheat coils and CHW coils*
    - *Eight (8) VAV terminal units with HHW reheat coils*
  - Domestic Hot Water System
    - *Two (2) Repco HHW / DHW indirect heat exchangers with electric backup heat*

**One (1) Jenny Air air compressor; one (1) Quincy air compressor*

Facility Description – AC Criminal Courthouse

➢ Building Name: AC Criminal Courthouse

Address:	4997 Unami Blvd Mays Landing, NJ 08330
Gross Floor Area:	176,000 s.f.
Year Built:	2005
# Occupants:	272
Use:	The building houses courts and offices; it is operated M-F 8:30 am until 4:30 pm, closed weekends and holidays

➢ Construction Features:

Facade:	Three stories, brick and stucco, in excellent condition
Roof Type:	Flat, light-colored, metal deck, built-up asphalt, in good condition
Windows:	Covering approximately 50% of façade, aluminum framed, double glazed, fixed, in excellent condition
Exterior Doors:	Approximately 35, main door is glass with metal frame (>85% glass), remaining are metal with small or no window, in excellent condition

Facility Description – AC Criminal Courthouse

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *Two (2) Raypak natural gas HHW boilers;*
    - *Four (4) B & G Series 80 & 1510 HHW pumps (2 of each)*
    - *Perimeter fintube radiation*
    - *three (3) Sterling hot water unit heaters*
  - Air Handling Systems
    - *Six (6) McQuay and one (1) Governair roof top units (RTUs) with Dx cooling and direct fired, natural gas heat exchangers (rarely used)*
    - *Ten (10) Penn exhaust fans (1/4 -1 HP)*
    - *One-hundred, twenty-four (124) Enviro-Tec VAV boxes*
    - *Seventy-three (73) Enviro-Tec Fan powered VAV boxes with HHW reheat coils (perimeter)*
  - Air Conditioning Systems
    - *One (1) Mitsubishi split AC system; one (1) Lennox split AC system*
  - Domestic Hot Water System
    - *Forty-plus (40+) EE Max electric tankless DHW heaters in restrooms*
    - *Two (2) Bradford-White 15 gallon electric, storage-type DHW heaters for larger restrooms*

Facility Description – AC Government Center

Building Name: AC Government Center

Address:	5909 E. Main Street Mays Landing, NJ 08330
Gross Floor Area:	64,710 s.f.
Year Built:	1979
# Occupants:	49
Use:	The building houses mostly offices; it is operated M-F 8:30 am until 4:30 pm, closed weekends and holidays

Construction Features:

Facade:	Two stories, brick, in good condition
Roof Type:	Predominantly flat, pitched in some areas, dark-colored, metal deck, flat portions are asphalt built-up, pitched portions are asphalt/fiberglass shingles, in good condition
Windows:	Covering approximately 50% of façade, metal frame, double glazed, operable, in good condition
Exterior Doors:	Approximately 4, main entrance has a metal frame (>85% glass), remaining are metal with a small window, in good condition

Facility Description – AC Government Center

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *One (1) A.O. Smith natural gas fired steam boiler (1995), rarely used,*
    - *one (1) Superior natural gas fired steam boiler (1972),*
    - *one (1) steam / HHW heat exchanger,*
    - *one (1) electric unit heater, one (1) hot water unit heater*
  - Chilled Water System
    - *Five (5) TecoGen natural gas engine-driven 50 ton chillers,*
      - **one has been cannibalized for parts**
  - Air Handling System
    - *Five (5) Trane interior built-up AHUs, two (2) Trane RTUs,*
    - *168 HHW / CHW fan coil units*
    - *eighteen (18) Greenheck exhaust fans*
  - Air Conditioning System
    - *One (1) Sanyo split system*
  - Domestic Hot Water System
    - *One (1) Halliday / Ruud electric storage-type, 52 gallon DHW heater*

Facility Description – AC Justice Facility, Annex, and Records Storage

- **Building Name:** **AC Justice Facility, Annex, & Records Storage**

Address:	5060 Atlantic Ave Mays Landing, NJ 08330
Gross Floor Area:	128,560 s.f.; Annex: 12,680 s.f.
Year Built:	1985
# Occupants:	192 staff; approximately 900 detainees
Use:	Justice and Annex are detention facilities they are operated 24/7/365. Records is a warehouse with some workshops.

- **Construction Features:**

Facade:	Three stories, brick and stucco (JF and Annex), metal (Records), in good condition
Roof Type:	Flat, light-colored, metal deck, gravel (JF and Annex), metal (Records - not accessible), in good condition
Windows:	Covering approximately 20% of façade, metal frame, double glazed, fixed non-operable, in good condition
Exterior Doors:	Approximately 5, main is glass with metal frame (>85% glass), remaining are metal with a small or no window, in good condition

Facility Description – AC Justice Facility, Annex, and Records Storage

- **Major Mechanical Systems – Justice Facility - Main**
  - Boilers and Heat Exchangers
    - *Two (6) natural gas heating hot water boilers;*
    - *Two (2) hot water pumps;*
    - *Perimeter fin-tube radiation in front offices;*
    - *Eleven (11) hot water unit heaters; five (5) natural gas fan coil units;*
  - Chilled Water System
    - *Two (2) York screw chillers;*
    - *Two (2) chilled water pumps*
    - *One (1) cooling tower (2 cell)*
    - *Two (2) condenser water pumps*
  - Air Handling Systems
    - *Nine (9) chilled water, natural gas, direct fired roof top units (RTUs)*
    - *Two (2) natural gas, direct-fired make-up air units; forty-nine (49) exhaust fans; twenty-six (26) variable air volume boxes*
  - Air Conditioning System
    - *Thirteen (13) split AC systems*
  - Domestic Hot Water System
    - *Three (3) natural gas, indirect fired, hot water boilers;*

Facility Description – AC Justice Facility, Annex, and Records Storage

- **Major Mechanical Systems – Justice Facility Annex**
  - Boilers and Heat Exchangers
    - *Four (4) natural gas HHW boilers;*
    - *Two (2) hot water pumps;*
  - Chilled Water System
    - *One (1) air-cooled chiller;*
    - *Two (2) chilled water pumps;*
  - Air Handling Systems
    - *Two (2) CHW, HHW roof top units (RTUs)*
    - *Eleven (11) exhaust fans; twenty-six (26) variable air volume boxes*
  - Air Conditioning System
    - *three (3) split AC systems*
  - Domestic Hot Water System
    - *Three (3) natural gas, indirect-fired, hot water boilers; one (1) 100 gallon, natural gas, storage-type hot water heater*

Facility Description – AC Justice Facility, Annex, and Records Storage

- **Major Mechanical Systems – Records Storage**
  - Boilers and Heat Exchangers
    - *Five (5) natural gas fan coil units (workshop and mailroom);*
  - Air Handling Systems
    - *Two (2) Dx, natural gas, direct fired packaged air handling units*
  - Air Conditioning System
    - *One (1) split AC system (mailroom)*

Facility Description – Canale Training Center

Building Name: Canale Training Center

Address:	5033 English Creek Road Egg Harbor Township, NJ 08234
Gross Floor Area:	Main: 21,000 s.f.; Storage: 8,000 s.f.
Year Built:	1993
# Occupants:	16 employees
Use:	The building is used for the purposes of holding training in preparation for natural catastrophes, disasters, and aggressive acts such as bioterrorism and weapons of mass destruction; it is operated M-F from 8 am until 4 pm, closed weekends & holidays

Construction Features:

Facade:	One story, brick/block, in good condition
Roof Type:	Partially pitched, light-colored, metal deck, pitched sections have asphalt/fiberglass shingles, flat sections have gravel, in good condition
Windows:	Covering approximately 10% of façade, metal frame, double glazed, fixed 2x2, some fixed clearstory, in good condition
Exterior Doors:	Approximately 6, 2 at the main entrance are > 85% glass, 4 are metal garage bay doors >85% glass, in good condition

Facility Description – Canale Training Center

- **Major Mechanical Systems**

  - Boilers and Heat Exchangers
    - *Five (5) Weil-McLain natural gas, condensing HHW boilers,*
    - *three (3) natural gas fired infrared heater tubes*

  - Air Handling Systems
    - *One (1) Trane DX / HHW RTU, nine (9) exhaust fans*

  - Air Conditioning System
    - *One (1) Fujitsu split system*

  - Domestic Hot Water System
    - *One (1) 10 gallon A.O. Smith electric storage-type DHW heater,*
    - *One (1) 200 gallon A.O. Smith natural gas storage type DHW heater*

Facility Description – Cardiff Center

- **Building Name:** **Cardiff Center**

Address:	3050 Spruce Avenue Egg Harbor Township, NJ 08234
Gross Floor Area:	7100 s.f.
Year Built:	1992
# Occupants:	14 employees; students vary between 20 and 30(max)
Use:	The building houses mostly offices, it serves as a central point where families can access multiple services, it is operated M-F 8 am until 4 pm, closed weekends and holidays

- **Construction Features:**

Facade:	Two stories, brick with stucco finish, in good condition
Roof Type:	Pitched, light-colored, wood deck, asphalt/fiberglass shingles, in good condition
Windows:	Covering approximately 25% of façade, metal frame, double glazed, operable, double hung, in good condition
Exterior Doors:	Approximately 4, metal clad <85% glass, in good condition

Facility Description – Cardiff Center

- **Major Mechanical Systems**

  - Boilers and Heat Exchangers
    - *Multiple Trane electric baseboard heaters, one (1) Trane cabinet unit heater, one (1) Trane heat pump*
    - *Three (3) Reznor gas fired duct heaters that supply supplemental heating to the Trane A/C units*

  - Air Conditioning / Air Handler Systems
    - *Three (3) Trane split system units,*

  - Domestic Hot Water System
    - *One (1) Bradford-White 30 gal electric hot water heater*

Facility Description – Egg Harbor Township Library

Building Name: Egg Harbor Township Library

Address:	1 Swift Drive Egg Harbor Township, NJ 08234
Gross Floor Area:	11,350 s.f.
Year Built:	1981
# Occupants:	7 employees
Use:	The building houses a library, it is operated Mon thru Thurs from 9 am until 8 pm and F & S from 9 am until 5 pm, closed Sundays and holidays

Construction Features:

Facade:	One story, brick, in good condition
Roof Type:	Flat, light-colored, believed to be metal deck (not accessible), dark membrane, in good condition
Windows:	Covering approximately 20% of façade, metal frame, double glazed, fixed, casement, in good condition
Exterior Doors:	Approximately 2, main entrance is metal frame >85% glass; rear is metal with no window, in good condition

Facility Description – Egg Harbor Township Library

- **Major Mechanical Systems**

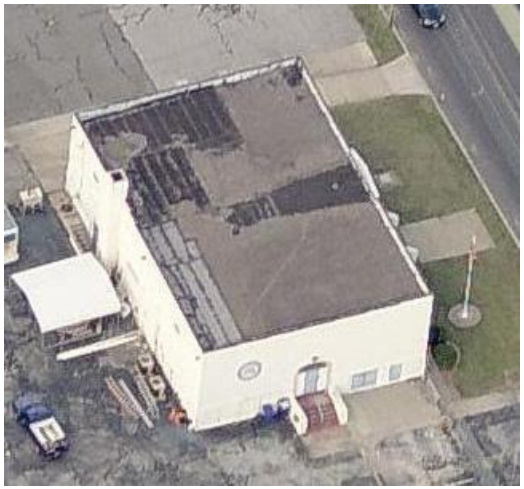
  - Boilers and Heat Exchangers
    - *One (1) Weil-McLain natural gas HHW boiler serving heat pump loop,*
    - *Two (2) Marathon 5HP circulating pumps*
    - *Eleven (11) electric resistance baseboard heaters*

  - Air Conditioning Systems
    - *Twelve (12) water source (closed loop) heat pumps*

  - Chilled Water System
    - *One (1) BAC cooling tower serving heat pump loop*

  - Domestic Hot Water System
    - *One (1) A.O. Smith 40 gal electric hot water heater*
    - *One (1) Bradford-White 30 gal electric hot water heater*

Facility Description – Farmington Facility



- **Building Name:** **Farmington Facility**

Address:	1413 Doughty Road Egg Harbor Township, NJ 08234
Gross Floor Area:	8,760 s.f.
Year Built:	1922
# Occupants:	10 employees
Use:	The building houses offices for the Atlantic County Facilities Management, which provides maintenance for County buildings; it is operated M-F 8:30 am until 4:30 pm, closed weekends & holidays

- **Construction Features:**

Facade:	Two stories, brick covered with stucco, in good condition
Roof Type:	Flat, dark-colored, believed to be metal deck (not accessible), asphalt built-up, in good condition
Windows:	Covering approximately 5% of façade, very few windows, most covered with metal louvers, metal framed, single glazed, in good condition
Exterior Doors:	Approximately 4, metal frame, two with small windows, in good condition

Facility Description – Farmington Facility

- **Major Mechanical Systems**

  - Air Handling / A/C Systems
    - *Two (2) York split-system heat pumps*
    - *two (2) electric unit heaters*
    - *One (1) exhaust fan*

  - Domestic Hot Water System
    - *One (1) EIM AquaStart natural gas fired hot water heater*

Facility Description – Warren E. Fox Nature Center

Building Name: Warren E. Fox Nature Center

Address:	109 State Highway Rt 50 Estell Manor, NJ 08319
Gross Floor Area:	3,133 s.f.
Year Built:	1984
# Occupants:	5 employees
Use:	The facility is a park and recreation center where the County holds environmental education and recreation programs, it is operated M-F from 8 am until 4 pm and on weekends and holidays from 8 am – 4 pm

Construction Features:

Facade:	Two stories, stained wood siding over wooden frame, in good condition
Roof Type:	Pitched, light-colored wood, built-up, in good condition
Windows:	Covering approximately 25% of façade, vinyl/metal, double glazed, fixed, casement and skylights, in good condition
Exterior Doors:	Approximately 4, wood frame sliding glass doors, in good condition

Facility Description – Warren E. Fox Nature Center

- **Major Mechanical Systems**
  - Air Conditioning System
    - *Three (3) York split system heat pumps,*
  - Domestic Hot Water System
    - *One (1) Bradford-White 40 gal electric hot water heater*
  - Air Handling Systems
    - *Three (3) exhaust fans*

Facility Description – Galloway Township Library

- **Building Name:** **Galloway Township Library**

Address:	306 Jimmie Leeds Road Galloway, NJ 08205
Gross Floor Area:	16,300 s.f.
Year Built:	1995
# Occupants:	13 employees
Use:	The building houses a library, it is operated Mon thru Thurs from 9 am until 8 pm and on F & S from 9 am until 5 pm; closed Sundays and holidays

- **Construction Features:**

Facade:	Three stories, brick, in excellent condition
Roof Type:	Flat, dark-colored, believed to be metal deck (not accessible), dark membrane, in good condition
Windows:	Covering approximately 10% of façade, metal frame, double glazed, fixed, casement, in excellent condition
Exterior Doors:	Approximately 2, main entrance is metal frame > 85% glass, rear is metal with no window, in excellent condition

Facility Description – Galloway Township Library

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *Three (3) HydroTherm natural gas boilers, one (1) Weil-McLain natural gas boiler, two (2) 100 gpm 3HP circulating pumps, one (1) Trane unit heater, two (2) Modine unit heaters, two (2) KHD unit heaters, one (1) QuietOne electric heater*
  - Chilled Water System
    - *One (1) Trane air-cooled chiller;*
    - *two (2) A.O. Smith CHW pumps (170 gpm; 5HP)*
  - Air Handling Systems
    - *Nine (9) Trane built-up AHUs, Nine (9) HW circulating pumps, one (1) GE exhaust fan, eight (8) Penn exhaust fans*
  - Domestic Hot Water System
    - *One (1) Trane hot water heater*

  **One (1) air compressor*

Facility Description – Hammonton Human Services

➢ Building Name: Hammonton Human Services

Address:	310 Bellevue Avenue Hammonton, NJ 08037
Gross Floor Area:	15,500 s.f.
Year Built:	n/a
# Occupants:	46 employees
Use:	The building houses health services facilities for County children and families, it is operated M-F 8 am until 4 pm, closed weekends and holidays

➢ Construction Features:

Facade:	Aluminum, in good condition
Roof Type:	Flat, metal deck, asphalt built-up, in good condition
Windows:	Metal frame, fixed, double glazed, tinted, in good condition
Exterior Doors:	Metal <85% glass, in good condition

Facility Description – Hammonton Human Services

- **Major Mechanical Systems**

  - Boilers and Heat Exchangers
    - *One (1) natural gas Weil McLain HHW boiler*

  - Air Conditioning Systems
    - *Five (5) Rheem split AC systems*
    - *One (1) ICP Commercial split AC system*

  - Domestic Hot Water System
    - *Three (3) Bradford-White electric hot water heaters*

Facility Description – Hammonton Public Library

➢ Building Name: Hammonton Public Library

Address:	451 S. Egg Harbor Road Hammonton, NJ 08037
Gross Floor Area:	13,720 s.f.
Year Built:	1981
# Occupants:	8 employees
Use:	The building houses a library, it is operated Mon thru Thurs from 9 am until 8 pm and on Friday & Saturday from 9 am until 5 pm; closed Sundays and holidays

➢ Construction Features:

Facade:	Brick <85% glass, in good condition
Roof Type:	Pitched, green, new raised seam, metal deck, in good condition
Windows:	Metal frame, fixed, double glazed, in good condition
Exterior Doors:	Metal >85% glass, in good condition

Facility Description – Hammonton Public Library

- **Major Mechanical Systems**

  - Boilers and Heat Exchangers
    - *One (1) A.O. Smith natural gas boiler, one (1) Bell & Gossett ½ HP hot water pump, one(1) Leland Faraday 2HP hot water pump, one (1) Airtherm cabinet unit heater*

  - Air Handling Systems
    - *Six (6) Greenheck exhaust fans*

  - Air Conditioning System
    - *Seven (7) Trane split AC systems,*

  - Domestic Hot Water System
    - *Two (2) Bradford-White electric hot water heaters*

Facility Description – Hammonton Public Works

- **Building Name:** **Hammonton Public Works**

Address:	451 S. Egg Harbor Road Hammonton, NJ 08037
Gross Floor Area:	18,230 s.f.
Year Built:	n/a
# Occupants:	25 employees
Use:	The building is a garage for repairs and maintenance activities throughout the County

- **Construction Features:**

Facade:	Brick, interior walls are wallboard, in good condition
Roof Type:	Flat, metal deck, ballasted river rock, in good condition
Windows:	Metal frame, fixed, single glazed, in poor condition (approx. 30+ yrs old)
Exterior Doors:	Insulated garage doors, metal, 90% glazing, in good condition

Facility Description – Hammonton Public Works

- **Major Mechanical Systems**

  - Heat Exchangers
    - *Five (5) electric baseboard heaters*

  - Air Handling / AC Systems
    - *One (1) Trane split-system AC unit with natural gas direct-fired heat*
    - *Four (4) Trane fan coil units*

  - Domestic Hot Water System
    - *One (1) Bradford-White electric hot water heater*

Facility Description – Harborfields Youth Detention Center

- **Building Name:** **Harborfields Youth Detention Center**

Address:	800 Buffalo Avenue Egg Harbor City, NJ 08215
Gross Floor Area:	Main: 22,500 s.f., Trailer 1: 695 s.f., Trailer 2: 316 s.f.
Year Built:	1974
# Occupants:	10 employees; 27 secure beds for residents
Use:	The facility is a detention center for juveniles and utilizes two mobile classroom trailers, it is operated 24/7/365

- **Construction Features:**

Facade:	One story, brick over concrete block, in good condition
Roof Type:	Flat, light colored, metal deck, dark membrace painted white, in good condition
Windows:	Covering approximately 20% of façade, metal frame, mostly single pane, operable, awnings, in good condition
Exterior Doors:	Approximately 2, main doors are glass with metal frame (>85%), remaining are metal with no or small windows (<25%), in good condition

Facility Description – Harborfields Youth Detention Center

- **Major Mechanical Systems**

  - Air Conditioning Systems
    - *Ten (10) window air conditioners*
    - *Five (5) Sanyo heat pumps*
    - *One (1) unit ventilator (DX cooling)*

  - Air Handling Systems
    - *One (1) Carrier roof top unit (RTU); three (3) Trane RTUs*
      - **Dx cooling, natural gas, direct-fired heating**
    - *Ten (10) electric fan coil units*
    - *Twenty-one (21) exhaust fans*

  - Boilers and Heat Exchangers
    - *One (1) natural gas cast iron boiler*

  - Domestic Hot Water System
    - *Two (2) natural gas hot water heaters (75 & 100 gal)*

Facility Description – John F. Gaffney Green Tree Golf Course

- **Building Name:** **John F. Gaffney Green Tree Golf Course**

Address:	1030 Somers Point – Mays Landing Road Egg Harbor Twp, NJ 08234
Gross Floor Area:	Main: 7,500 s.f., Cart Barn: 6000 s.f., Pump House: 2000 s.f.
Year Built:	1971
# Occupants:	8 employees
Use:	The facility is a a regulation 18 hole course that includes a driving range, golf shop, snack bar and practice green, it is operated 7 days a week and holidays from 5:30 am until dark

- **Construction Features:**

Facade:	Vinyl siding over masonry block, cart barn has metal siding, in good condition
Roof Type:	Pitched, light-colored, wood (cart barn is metal), asphalt shingle (cart barn has a metal roof), in good condition
Windows:	Covering approximately 10% of façade, metal frame, double glazed, fixed, some sliding, casement, in good condition
Exterior Doors:	Approximately 2, main entrance has metal frame >85% glass, remaining are metal clad with small window. Cart barn has wooden doors that need to be replaced.

Facility Description – John F. Gaffney Green Tree Golf Course

- **Major Mechanical Systems**

  - Air Conditioning System
    - *Two (2) Armstrong split AC systems, two (2) Reznor natural gas in-duct unit heaters, two (2) General Electric unit heaters, two (2) electric baseboard heaters, one (1) LP natural gas unit heater*

  - Domestic Hot Water System
    - *One (1) Bradford-White natural gas hot water heater*

  ** One (1) air compressor, twenty-six (26) electric battery chargers, two (2) irrigation pumps, one (1) jockey pump*

Facility Description – Mays Landing Library

- **Building Name:** **Mays Landing Library**

Address:	44 Farragut Avenue Mays Landing, NJ 08330
Gross Floor Area:	37,675 s.f.
Year Built:	1900
# Occupants:	44 employees
Use:	The building is a library, it is operated Mon thru Thurs from 9 am until 9 pm and Fri & Sat from 9 am until 5 pm; closed Sundays and holidays

- **Construction Features:**

Facade:	Two stories, brick and stucco, in good condition
Roof Type:	Pitched, light-colored, metal frame, asphalt/fiberglass shingles, in good condition
Windows:	Covering approximately 50% of façade, vinyl/metal frame, double glazed, fixed and operable mixture, casement and double hung mixture, in good condition
Exterior Doors:	Approximately 1, metal framed glass door, in good condition

Facility Description – Mays Landing Library

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *One (1) Weil-McLain natural gas boiler*
  - Air Conditioning System
    - *Six (6) York ducted split systems*
    - *One (1) Liebert CRAC unit*
    - *One (1) Comfort Aire window AC unit*
  - Air Handling Systems
    - *One (1) York AHU*
    - *Three (3) exhaust fans*
    - *One (1) MicroCon air filtration unit*
  - Domestic Hot Water System
    - *One (1) Bradford-White electric hot water heater*
    - *One (1) StoneSteel electric hot water heater*

***One (1) APC uninterruptible power supply; one (1) elevator; one (1) emergency generator

Facility Description – Pistol Range

- **Building Name:** **Pistol Range**

Address:	175 Betsy Scull Road Egg Harbor Twp, NJ 08234
Gross Floor Area:	7,500 s.f.
Year Built:	1997
# Occupants:	1 employee
Use:	The building provides a safe shooting environment, fire arms training and safety classes

- **Construction Features:**

Facade:	One story, masonry block, in good condition
Roof Type:	Pitched, light-colored, wood frame, asphalt/fiberglass shingle, in good condition
Windows:	Covering approximately 20% of façade, metal frame, double glazed, fixed, casement, in good condition
Exterior Doors:	Approximately 2, main entrance is metal frame >85% glass, other is metal clad with small window, in good condition

Facility Description – Pistol Range

- **Major Mechanical Systems**

  - Boilers and Heat Exchangers
    - *One (1) Radco electric boiler*
    - *One (1) Q-Mark electric unit heater*

  - Air Conditioning System
    - *One (1) Carrier split system*
    - *One (1) Carrier unit ventilator*

  - Domestic Hot Water System
    - *One (1) Bradford-White electric hot water heater*

Facility Description – Public Works Engineering & Transportation

- **Building Name:** **Public Works Engineering & Transportation**

Address:	201 New Road and Dolphin Avenue Northfield, NJ 08201
Gross Floor Area:	Engineering: 11,400 s.f.; Transportation: 1,340 s.f.
Year Built:	1957/ 2008
# Occupants:	74 employees/ 36 employees
Use:	The facility consists of two buildings used by the Public Works Department as office space, the buildings are operated M-F from 8-4, closed weekends and holidays

- **Construction Features:**

Facade:	The Engineering building is a one story, brick over steel frame, in good condition. The Transportation building is a one story, modular building with a wood frame and vinyl siding.
Roof Type:	The Engineering building is a flat, light-colored, metal deck, ballasted gravel, in good condition. The Transportation building is a pitched, light-colored wood deck with asphalt shingle, in excellent condition.
Windows:	The Engineering building has windows covering approximately 20% of façade, metal frame, double glazed, fixed, non-operable, fixed ribbon-type and fixed skylights, in good condition. The Transportation building has windows covering approximately 25% of façade, vinyl clad, operable, double hung, double glazed, screens, in excellent condition.

Facility Description – Public Works Engineering & Transportation

Exterior Doors: The Engineering building has approximately 4, main doors are metal frame >85% glass, back door is metal with small windows <25% glass, 2 metal garage bay doors (unable to determine if insulated), in good condition. The transportation building has approximately 2, metal clad, 50% double glazed, in excellent condition.

- **Major Mechanical Systems**
  - Air Conditioning System
    - *Three (3) split AC systems*
    - *Five (5) hot water fan coil units*
    - *Three (3) electric baseboard heaters*
    - *Two (2) heat pumps*
    - *One (1) window air conditioner*
  - Air Handling Systems
    - *Four (4) RTUs*
    - *Seven (7) exhaust fans*
  - Boilers and Heat Exchangers
    - *One (1) boiler (in poor condition – corroded)*
  - Domestic Hot Water System
    - *One (1) 40 gal electric hot water heater*
    - *One (1) 30 gal electric hot water heater*

Facility Description – Public Works Fleet Management

➢ Building Name: Public Works Fleet Management

Address:	101 New Road (Rt. 9) and Dolphin Avenue Northfield, NJ 08201
Gross Floor Area:	15,000 s.f.
Year Built:	1957
# Occupants:	27 employees
Use:	The facility consists of a storage garage for equipment used for the maintenance of county roads and rights of way, bridges and signals, and other maintenance throughout the county. It is operated M-F from 8:30 – 4:30 , closed weekends and holidays.

➢ Construction Features:

Facade:	One story, metal architectural panels, in good condition.
Roof Type:	Pitched, light-colored, metal, in good condition.
Windows:	Covering 50% of façade, metal frame, single glazed, casement, operable, in fair condition – some did not fully close.
Exterior Doors:	Approximately 10, main doors are metal frame with small windows, rear doors (2) are all metal, garage bay doors are metal, in good condition.

Facility Description – Public Works Fleet Management

- **Major Mechanical Systems**

  - Boilers and Heat Exchangers
    - *One (1) boiler (manufacturer unknown)*
    - *Five (5) gas fired fan coil units*
    - *One (1) infrared unit heater*

  - Air Conditioning System
    - *Three (3) split ac systems*
    - *Five (5) window air conditioners*

  - Air Handling Systems
    - *Seven (7) exhaust filter units*

  - Domestic Hot Water System
    - *One (1) 40 gal electric hot water heater*

Facility Description – Rutgers Cooperative Extension

Building Name: Rutgers Cooperative Extension

Address:	6260 Harding Highway Mays Landing, NJ 08330
Gross Floor Area:	15,546 s.f.
Year Built:	1963
# Occupants:	18 employees
Use:	The facility is a school building. It is operated M-F from 8:30-4:30, closed weekends and holidays.

Construction Features:

Facade:	One story, painted concrete block, in good condition.
Roof Type:	Flat, dark-colored, built-up, believed to be metal deck (not accessible), in good condition.
Windows:	Covering 50% of façade, metal frame, double glazed, casement, fixed, in good condition – some are being replaced.
Exterior Doors:	Approximately 2, main entrance, metal frame >85% glass, other is all metal, in good condition.

Facility Description – Rutgers Cooperative Extension

- **Major Mechanical Systems**
  - Air Handling Systems
    - *Eight (8) Trane roof top units (RTUs) with Dx cooling*
  - Boilers and Heat Exchangers
    - *Five (5) Weil-McLain natural gas boilers; four (4) circulating pumps (2 are Grundfos)*
  - Domestic Hot Water System
    - *One (1) Bradford-White 120 gal electric hot water heater*

Facility Description – Shoreview

Building Name: Shoreview

Address:	101 S. Shore Road Northfield, NJ 08225
Gross Floor Area:	39,323 s.f.
Year Built:	1913
# Occupants:	70 employees
Use:	The facility is an office building. It is operated M-F from 9-5, closed weekends and holidays.

Construction Features:

Facade:	Three story, brick masonry, in good condition.
Roof Type:	Pitched, light-colored, wood deck, asphalt/fiberglass shingle, in good condition.
Windows:	Covering 50% of façade, wood, single glazed, double hung, operable, in fair condition – some need replacing, spring mechanisms are wearing out.
Exterior Doors:	Approximately 5, main are wood frame 50% glass, others are metal with small windows <25% glass, in good condition.

Facility Description – Shoreview

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *Five (5) packaged natural gas direct fired HHW boilers in modular arrangement (at end of service life) with associated circulation pumps, radiators*
  - Air Conditioning System
    - *In excess of 50 window air conditioning units, three (3) Mitsubishi 21,000 BTU split system Dx units, three (3) condensing units from various manufacturers*
  - Air Handling Systems
    - *One (1) exhaust fan*
  - Domestic Hot Water System
    - *One (1) domestic hot water heater*

  **Emergency generator*

Facility Description – Stillwater (Main building)

➢ Building Name: Stillwater (Main building)

Address:	201 Shore Road Northfield, NJ 08225
Gross Floor Area:	57,036 s.f.
Year Built:	1895
# Occupants:	89 employees
Use:	The facility is an office building. It is operated M-F from 8-5, closed weekends and holidays.

➢ Construction Features:

Facade:	Three story, brick masonry, in good condition.
Roof Type:	Pitched, light-colored, wood deck, asphalt/fiberglass shingle, in good condition.
Windows:	Covering 25% of façade, vinyl clad metal, operable, double hung, in good condition.
Exterior Doors:	Approximately 4-5, metal, in good condition.

Facility Description – Stillwater (Main building)

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *Two (2) A.O. Smith 1,000,000 BTU/hr packaged boilers with associated Bell & Gossett hot water circulation pumps, radiators*
  - Chilled Water System
    - *Two (2) natural gas engine driven Tecochill 586,000 BTU/hr air-cooled chillers with associated circulation pumps*
  - Air Handling Systems
    - *Six (6) Trane DX ducted split systems with electric heating coils that serve the North Wing's 2nd and 3rd floors*
    - *three (3) Dunn & Bush air handlers with HHW and CHW coils*
    - *Nine (9) exhaust fans,*
  - Air Conditioning Systems
    - *one (1) window air conditioner,*
    - *three (3) fan coil units*
  - Domestic Hot Water System
    - *Served by loop from the Central Kitchen building*

Facility Description – Stillwater (ANNEX)

➢ Building Name: Stillwater (ANNEX)

Address:	Shore Road Northfield, NJ 08225
Gross Floor Area:	22,860 s.f.
Year Built:	1990
# Occupants:	10 employees
Use:	The facility is a temporary shelter for runaway, homeless, and abused adolescents. It is operated 24/7/365.

➢ Construction Features:

Facade:	Three story, brick over steel frame, in excellent condition.
Roof Type:	Flat, light-colored, metal deck, built-up, in good condition.
Windows:	Covering 25% of façade, vinyl clad metal, operable, double hung, glazed, in good condition.
Exterior Doors:	Approximately 2, metal, main has glass, in good condition.

Facility Description – Stillwater (ANNEX)

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *One(1) natural gas fired HHW boiler in outdoor shed with associated pumps, electric resistance heaters, HHW radiators around perimeter*
  - Air Conditioning Systems
    - *Three (3) McQuay ducted split AC systems*
  - Air Handling Systems
    - *Three (3) Dunn & Bush air handlers,*
    - *three (3) exhaust fans*
  - Domestic Hot Water System
    - *One (1) domestic hot water heater*

Facility Description – Stillwater (Central Kitchen)

Building Name: Stillwater (Central Kitchen)

Address:	201 Shore Road Northfield, NJ 08225
Gross Floor Area:	26,210 s.f.
Year Built:	1975
# Occupants:	43 employees
Use:	The facility is a warehouse and cooking facility outfitted with kitchen equipment. It is operated M-F 8:30-4:30; closed weekends and holidays.

Construction Features:

Facade:	One story, brick over steel frame, in good condition.
Roof Type:	Flat, light-colored, metal deck, built-up, in fair condition – multiple bubbles in upper surface.
Windows:	Covering 10% of façade, metal, operable, casement, single glazed, in good condition.
Exterior Doors:	Approximately 2, plus 4-5 loading dock doors, metal framed, glass (20%)

Facility Description – Stillwater (Central Kitchen)

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *Natural gas direct fired heat exchangers in some RTUs,*
    - *two (2) natural gas fired steam boilers in a primary/standby arrangement primarily supplying steam to the kitchen*
    - *natural gas fired fan coil units in warehouse and hallway spaces*
  - Air Handling Systems
    - *Nine (9) packaged rooftop units (RTUs) with Dx cooling, three (3) have naturl gas direct-fired heat exchangers*
  - Domestic Hot Water System
    - *Two (2) indirect fired DHW systems consisting of large gas fired storage-type DHW heater (76 or 98 gallons) which stores DHW and supplements a HHW / DHW heat exchanger (with back-up electric heat) connected to a dedicated natural gas fired HHW boiler*
      - one system serves the kitchen and the other serves the DHW loop that runs to the other Stillwater buildings

Facility Description – Stillwater (D Building)

- **Building Name:** **Stillwater (D Building)**

Address:	201 Shore Road Northfield, NJ 08225
Gross Floor Area:	11,406 s.f.
Year Built:	1926
# Occupants:	7 employees
Use:	The facility is an office building. It is operated M-F 9-5; closed weekends and holidays. The top floor is unoccupied.

- **Construction Features:**

Facade:	One story, brick over steel frame, in fair condition – needs repointing.
Roof Type:	Pitched, light-colored, concrete deck, asphalt/fiberglass shingles, in good condition.
Windows:	Covering 25% of façade, vinyl clad metal, operable, double hung, double glazed, in good condition.
Exterior Doors:	Approximately 2, wood/glass (25%) in good condition.

Facility Description – Stillwater (D Building)

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *A.O. Smith 1,000 MBH natural gas fired HHW boiler(s) with associated Bell & Gossett pumps, radiators with thermostatic control valves*
  - Air Conditioning System
    - *Three (3) window air conditioning units*
  - Air Handling Systems
    - *Three (3) exhaust fans*
  - Domestic Hot Water System
    - *Served by the DHW loop from the Central Kitchen building*

Facility Description – Supported Work/Facilities

➢ Building Name: Supported Work/Facilities

Address:	1227 Drexel Avenue Atlantic City, NJ 08404
Gross Floor Area:	14,825 s.f.
Year Built:	1965
# Occupants:	26 employees
Use:	The facility is an office building. It is operated M-F 7-5; closed weekends and holidays.

➢ Construction Features:

Facade:	Two stories, brick, in good condition.
Roof Type:	Flat, light-colored, metal deck, built-up, in good condition.
Windows:	Covering 10% of façade, metal frame, double glazed, operable, horizontal sliding type, plus 4 non-operable skylights, in good condition.
Exterior Doors:	Approximately 2, metal frame <85% glass, 2 metal garage bay doors, in good condition.

Facility Description – Supported Work/Facilities

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *LGB natural gas fired HHW boiler with associated Bell & Gossett pumps and fin tube perimeter radiation*
  - Air Conditioning System
    - *Three (3) "ductless" split-system AC units*
    - *Ten (10) "through wall" window air conditioning units*
  - Domestic Hot Water System
    - *One (1) 66 gallon electric stoorage-type domestic hot water heater*

Facility Description – Superintendent of Elections

➢ Building Name: Superintendent of Elections

Address:	5920 Main Street Mays Landing, NJ 08330
Gross Floor Area:	5,250 s.f.
Year Built:	1925
# Occupants:	13 employees
Use:	The facility is an office building. It is operated M-F 8:30-4:30; closed weekends and holidays.

➢ Construction Features:

Facade:	One story, painted cement block, in good condition.
Roof Type:	Flat, light-colored, wood deck, built-up, in good condition (not accessible).
Windows:	Covering 25% of façade, wood frame, mixture of fixed and operable, single glazed, storefront and double hung, in good condition.
Exterior Doors:	Approximately 2, wood frame with single glazed window, in good condition.

Facility Description – Superintendent of Elections

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *One (1) Weil-McLain natural gas boiler*
    - *Three (3) Grundfos hot water pumps*
    - *One (1) Bell & Gosset hot water pump*
    - *One (1) Dayton electric unit heater*
  - Air Conditioning System
    - *Five (5) Climatrol through wall air conditioners*
    - *One (1) Kelvinator through wall air conditioner*
    - *One (1) Sharp through wall air conditioner*
  - Air Handling Systems
    - *Two (2) exhaust fans (manufacturer unknown)*

Facility Description – Unemployment Office

- **Building Name:** **Unemployment Office**

Address:	1433 Bacharach Blvd. Atlantic City, NJ 08404
Gross Floor Area:	15,569 s.f.
Year Built:	1944
# Occupants:	0 employees
Use:	The facility is an office building. It is currently vacant.

- **Construction Features:**

Facade:	One story, stucco over masonry block, in good condition.
Roof Type:	Flat, light-colored, metal deck, built-up, in good condition.
Windows:	Covering 20% of façade, metal frame, single glazed, 100% fixed (or 2/3 fixed, 1/3 operable), fixed or awning type, in fair condition.
Exterior Doors:	Approximately 3, main doors are metal frame >85% glass, other doors are metal with small windows <25% glass, in good condition.

Facility Description – Unemployment Office

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *Twelve (12) electric baseboard heaters,*
  - Air Handling Systems
    - *Four (4) AAON DX AHUs, three (3) Penn exhaust fans*
  - Air Conditioning System
    - *one (1) through wall AC unit,*
  - Domestic Hot Water System
    - *One (1) electric hot water heater*

Facility Description – Voting Machines Warehouse

Building Name: Voting Machines Warehouse

Address:	235 A Dolphin Avenue Northfield, NJ 08201
Gross Floor Area:	20,404 s.f.
Year Built:	1968
# Occupants:	varies; occupied during repair or election periods
Use:	The facility is a warehouse for voting machines. It is empty most times.

Construction Features:

Facade:	One story, masonry, in good condition.
Roof Type:	Flat, light-colored, metal deck, membrane, in excellent condition.
Windows:	Covering 20% of façade, metal frame, double glazed, operable, horizontal sliding type, in good condition.
Exterior Doors:	Approximately 2, 1 metal with 50% glass and 1 insulated metal garage bay door, in good condition.

Facility Description – Voting Machines Warehouse

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *One (1) electric baseboard heater*
  - Air Handling Systems
    - *Six (6) packaged roof top units with Dx cooling and natural gas, direct-fired heat exchangers*
  - Domestic Hot Water System
    - *One (1) electric hot water heater*

Facility Description – Animal Shelter

➢ Building Name: Animal Shelter

Address:	240 Old Turnpike Road Pleasantville, NJ 08232
Gross Floor Area:	21,000 s.f.
Year Built:	1995
# Occupants:	10 employees
Use:	The facility is an animal control shelter. It is operated 1-4 pm every day except Tuesdays, when it is operated from 1-3pm.

➢ Construction Features:

Facade:	One story plus attic, concrete block, in good condition.
Roof Type:	Pitched, dark-colored, metal roof – no deck, raised seem, in good condition.
Windows:	Covering 50% of façade, metal frame, double glazed, fixed, casement, in good condition.
Exterior Doors:	Approximately 3, main entrance, metal frame >85% glass, other – metal with small window, in good condition.

Facility Description – Animal Shelter

- **Major Mechanical Systems**
  - Boilers and Heat Exchangers
    - *Three (3) natural gas fired duct furnaces mounted near split AC system interior AHUs.*
    - *four (4) Fostoria electric cabinet heaters,*
    - *two (2) electric baseboard heaters*
  - Air Conditioning Systems
    - *Three (3) Trane ducted split AC systems,*
  - Air Handling Systems
    - *Five (5) Greenheck exhaust fans*
  - Domestic Hot Water System
    - *One (1) 225 gallon natural gas DHW heater*

*1 Washer, 1 Dryer

Facility Description – Meadowview Nursing Home / Cronin Dental Clinic / Leinweber Nutrition

- **Building Name:** **Meadowview Nursing Home**
  Cronin Dental Clinic
  Leinweber Nutrition

Address:	235 Dolphin Avenue Northfield, NJ 08225
Gross Floor Area:	Nursing Home: 107,000 s.f.; Dental Clinic: 4,273 s.f.; Leinweber: 2,093 s.f.
Year Built:	1940
# Occupants:	171/3/12 employees; 180 resident beds
Use:	The facility is a long term care and rehabilitation service facility, with a dental clinic and nutrition center. It is operated 24/7/365

- **Construction Features:**

Facade:	Three stories, brick, in good condition.
Roof Type:	Flat, dark-colored, metal roof, gravel, in good condition.
Windows:	Covering 50% of façade, metal frame, double glazed, operable, awning type, in good condition.
Exterior Doors:	Approximately 4, main – metal frame glass >85%, others – metal, in good condition.

Facility Description – Meadowview Nursing Home/ Cronin Dental Clinic/ Leinweber Nutrition

- **<u>Major Mechanical Systems</u> – Nursing Home**
  - Boilers and Heat Exchangers
    - *Two (2) Lockinvar natural gas boilers; One (1) A.O. Smith natural gas boiler;*
    - *Two (2) Bell & Gosset boiler circulating pumps; two (2) Bell & Gosset hot water pumps*
    - *Eighteen (18) HHW unit heaters*
    - *Perimeter fin tube radiation*
  - Air Conditioning System
    - *Six (6) window air conditioners*
    - *One (1) Trane heat pump*
  - Chilled Water System
    - *Four (4) TecoChill natural gas engine driven 50 ton chillers;*
    - *two (2) Lincoln Electric chilled water pumps*
  - Air Handling Systems
    - *two (2) Snyder General AHUs; Sixteen (16) AHUs – manufacturer unknown*
    - *One hundred twenty-five (125) CHW / HHW fan coil units (manufacturer unknown)*
    - *Twenty-six (26) exhaust fans;*
  - Domestic Hot Water System
    - *Four (4) A.O. Smith hot water heaters; one (1) A.O. Smith Tankless hot water heater*

***Two (2) City Water booster pumps; three (3) Milnor natural gas dryers (laundry); two (2) Onan emergency generators*

Facility Description – Meadowview Nursing Home/ Cronin Dental Clinic/ Leinweber Nutrition

- **<u>Major Mechanical Systems</u> – Dental and Nutrition Clinics**
  - Air Handling Systems
    - *Four (4) Carrier RTUs with Dx cooling and natural gas direct fired heat exchangers ;*
  - Domestic Hot Water System
    - *One (5) A.O. Smith hot water heaters*

Greenhouse Gas Emission Reduction

Implementation of all identified ECMs will yield:

- 1,995,190 kilowatt-hours of annual avoided electric usage.
- 44,980 therms of annual avoided natural gas usage.
- This equates to the following ***annual*** reductions:

- 922 tons of CO2;

  -OR-

- 160 Cars removed from road;

  -OR-

- 252 Acres of trees planted annually

The Energy Information Administration (EIA) estimates that power plants in the state of New Jersey emit 0.66 lbs CO2 per kWh generated.

The Environmental Protection Agency (EPA) estimates that one car emits 11,560 lbs CO2 per year.

The EPA estimates that reducing CO2 emissions by 7,333 pounds is equivalent to planting an acre of trees.

Notes and Assumptions

- Project cost estimates were based upon industry accepted published cost data, rough order of magnitude cost estimates from contractors, and regional prevailing wage rates. The cost estimates presented in this report should be used to select projects for investment grade development. The cost estimates presented in this report should not be used for budget development or acquisition requests.

- Estimated energy and cost savings are based on individual projects being implemented and do not account for potential synergies if multiple projects are implemented concurrently. Therefore, cumulative energy and cost savings shown in this report may or may not be representative of actual results.

- The average CO2 emission rate from power plants serving the facilities within this report was obtained from the Environmental Protection Agency's (EPA) eGRID2007 report. It is stated that power plants within the state of NJ emit 0.66 lbs of CO2 per kWh generated.
  - The EPA estimates that burning one therm of natural gas emits 11.708 lbs CO2.
  - The EPA estimates that one car emits 11,560 lbs CO2 per year.
  - The EPA estimates that reducing CO2 emissions by 7,333 pounds is equivalent to planting an acre of trees.

Notes and Assumptions

- For the purpose of calculating energy savings, the following average utility rates provided were used within this study:

AC #	Building Name	$/kWh	$/Therm
1	Animal Shelter	$0.161	$1.427
2	Atlantic County Civil Courthouse	$0.148	$1.455
3	A.C. Criminal Courthouse	$0.157	$1.454
3	Atlantic County Justice/annex/records	$0.134	$1.392
4	Atlantic County Government Center	$0.131	$1.586
6	Atlantic County Office Building	$0.140	$1.456
7	A.C. Superintendent of Elections	$0.170	$1.542
8	Canale Training Center	$0.141	$1.649
9	Cardiff Center	$0.166	-
10	EHT Library	$0.158	$1.748
11	Farmington Facility	$0.163	$1.554
12	Firearms Training/Pistol Range	$0.165	-
13	Galloway Library	$0.148	$1.441
14	Hammonton Human Services	$0.156	$1.534
15	Hammonton Public Library	$0.155	$1.440
16	Hammonton Public Works Yard	$0.143	$1.455
17	Harborfields	$0.153	$1.472
18	John F. Gaffney Green Tree Golf Course Clubhouse	$0.161	-
18.1	John F. Gaffney Green Tree Golf Course Cart Barn	$0.173	-
18.2	John F. Gaffney Green Tree Golf Course Pump House	$0.178	-
19	Mays Landing Library	$0.142	$1.460
20	Meadowview (Dental Clinic & Nutrition	$0.133	$1.373
21	Public Works Fleet Management	$0.142	$1.475
22	Public Works Engineering	$0.146	$1.522
22.1	Public Works Transportation	$0.146	-
23	Rutgers Cooperative Extension	$0.161	$1.395
24	Shoreview	$0.169	$1.462
25	Stillwater	$0.140	$1.453
25.1	Stillwater/Central Kitchen	$0.140	$1.790
25.2	Stillwater/D Building	$0.140	-
25.3	Stillwater/Annex	$0.140	-
26	Supported Work/Facilities	$0.146	$1.460
27	Unemployment	$0.166	$1.389
28	Voting Machine Warehouse	$0.172	$1.503
29	Warren E. Fox Nature Center	$0.160	-
		$0.144	**$1.454**

Energy Conservation Measures (ECM) #1: Vending Machine Power Management

- Dome-Tech recommends installing a VendMiser vending machine power management device on all vending machines. The County has approximately 25 vending machines.
- The device uses a passive infrared sensor to power down the machine when the area surrounding it is vacant. Then it monitors the room's temperature and automatically re-powers the cooling system at one- to three-hour intervals, independent of sales, to ensure that the product stays cold.
- The microcontroller will never power down the machine while the compressor is running, eliminating compressor short-cycling. In addition, when the machine is powered up, the cooling cycle is allowed to finish before again powering down (reduces compressor wear and tear).

Estimated Annual Energy Cost Savings:	$4,060
Estimated Gross Implementation Cost:	$4,300
NJ SmartStart Rebate	None
Net Estimated Implementation Costs:	$4,300
Simple Payback (yrs)	1.1
Annual Avoided CO_2 Emissions (tons):	9

ECM #2: Replace Ceiling Suspended Fan Coil Units (FCU) with Infrared Heating Units

	Stillwater Kitchen	Public Works Engineering	Public Works Management	Public Works Fleet	Public Works Yard	Supported Work / Hammonton Facility	John F. Gaffney Green Tree Golf Course	Atlantic County Justice Facility Records	TOTALS
Estimated Annual Energy Cost Savings:	$5,070	$4,310	$4,180	$5,770	$4,140	$820	$3,940	**$28,230**	
Estimated Gross Implementation Costs:	$5,450	$5,450	$5,450	$7,620	$5,450	$1,090	$5,450	**$35,960**	
NJ Smart Start Rebate:	$0	$0	$0	$0	$0	$0	$0	**$0**	
Net Estimated Implementation Costs:	$5,450	$5,450	$5,450	$7,620	$5,450	$1,090	$5,450	**$35,960**	
Estimated Simple Payback (years):	1.1	1.3	1.3	1.3	1.3	1.3	1.4	**1.3**	
Annual Avoided CO_2 Emissions (tons):	17	17	17	23	17	3	17	**109**	

- Several buildings have high bay areas equipped with direct-fired natural gas fan coil units (FCUs) suspended from the ceilings to provide heat for workers. Maintaining a conditioned environment using convective-type heating in a low occupancy and relatively high volumetric space can be costly.
- Consider replacing the existing unit heaters with gas direct-fired radiant unit heaters.
- Radiant heaters eliminate convective heat loss and thermal stratification by directly heating surfaces and people rather than volumetric air (Note that if such an area is equipped with ceiling fans, the fans should not be run during the heating season).

Proposed – Low intensity gas fired Infrared Heating Unit

Proposed – High intensity gas fired Infrared Heating Unit

ECM #3: Replace Electric Dishwasher Booster Heater with Natural Gas Fired Unit

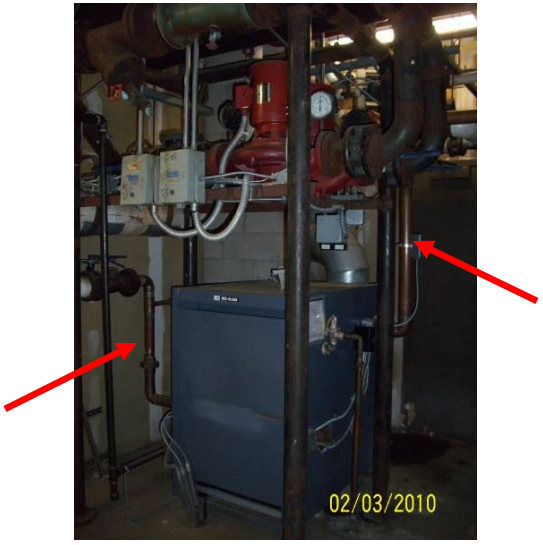
	Meadowview	Stillwater - Central Kitchen	TOTALS
Estimated Annual Energy Cost Savings:	$4,850	$1,420	**$6,270**
Estimated Gross Implementation Costs:	$8,210	$8,210	**$16,420**
NJ Smart Start Rebate:	$0	$0	**$0**
Net Estimated Implementation Costs:	$8,210	$8,210	**$16,420**
Estimated Simple Payback (years):	1.7	5.8	**2.6**
Annual Avoided CO_2 Emissions (tons):	6	2	**8**

Electric hot water booster heater

- These kitchens are equipped with electric hot water booster heaters for dishwashing.
- The buildings' electric costs are over $.0130 per kilowatt hour. The equivalent natural gas cost for a 95% efficient natural gas hot water heater is $4.44 per therm. The actual price for natural gas is approximately $1.440 per therm (almost 200 % less than electric heat).
- Replacing the electric heaters with natural gas units will provide at least $6,000 in annual savings and could reduce each building's electric demand by 27 and 54 kW respectively.

ECM #4: Upgrade Insulation on HHW pipes

- Several buildings have missing insulation around heating hot water (HHW) and domestic hot water pipes in the boiler rooms.
- Boilers will have to cycle on to maintain the temperature set point. Also tempered air is exiting the room through the outside air vents.
- Dome-Tech recommends insulating the domestic hot water and boiler pipes.
- Estimated cost assumes that the insulation can be installed by in-house staff.



Picture: EHT Library uninsulated HHW piping

	EHT Library	Atlantic County Superintendent of Elections	Supported Work / Facility	Atlantic County Civil Courthouse	Harborfields	Meadowview	TOTALS
Estimated Annual Energy Cost Savings:	$210	$180	$170	$170	$180	$160	**$1,070**
Estimated Gross Implementation Costs:	$280	$280	$280	$280	$280	$280	**$1,680**
NJ Smart Start Rebate:	$0	$0	$0	$0	$0	$0	**$0**
Net Estimated Implementation Costs:	$280	$280	$280	$280	$280	$280	**$1,680**
Estimated Simple Payback (years):	1.3	1.6	1.6	1.6	1.6	1.8	**1.6**
Annual Avoided CO_2 Emissions (tons):	1	1	1	1	1	1	**4**

ECM #5: Premium Efficiency Motors

	Atlantic County Civil Courthouse	Stillwater - Main Bldg	Atlantic County Office Building	TOTALS
Estimated Annual Energy Cost Savings:	$1,150	$1,280	$2,840	**$5,270**
Estimated Gross Implementation Costs:	$3,190	$4,530	$9,920	**$17,640**
NJ Smart Start Rebate:	$340	$830	$830	**$2,000**
Net Estimated Implementation Costs:	$2,850	$3,700	$9,090	**$15,640**
Estimated Simple Payback (years):	2.5	2.9	3.2	**3.0**
Annual Avoided CO_2 Emissions (tons):	3	3	7	**12**

- Most of the existing motors serving the pumps are standard efficiency motors. See the appendix for a detailed list of motors surveyed for this ECM. Standard efficiency motors consume more power than the premium efficiency motors.

Typical Efficiencies for Standard & Premium Motors
(1800 RPM Open Drip-Proof Motors)

Motor Size (HP)	# of Motors	Existing Efficiency	Proposed Efficiency	Rebate / Motor
2	1	84.0%	86.5%	$54
3	3	84.0%	89.5%	$54
5	2	84.0%	89.5%	$54
7.5	2	85.5%	91.0%	$81
10	5	85.5%	91.7%	$90
15	4	86.5%	93.0%	$104
40	2	90.5%	94.1%	$162

- Dome-Tech recommends replacing select regularly operated standard efficiency motors with new premium efficiency motors, or when a motor starts to fail.

ECM #6: Lighting Upgrade

- Although most of the current light fixtures throughout the County have higher efficiency T-8 fluorescent lamps and ballasts, improved lamp and light fixture designs will further reduce lighting energy costs by while maintaining the minimum lighting output as per state codes.

- Most of the current lights in the high bay areas, such as garages, warehouses and gymnasiums, are high intensity discharge lamps, which can be replaced with high output, higher efficiency fluorescent fixtures that are specifically designed for high ceiling applications. Lighting energy will be reduced by nearly 50% in applicable areas.

- Many low-usage rooms, classrooms, break rooms and restrooms were observed to have lights on regardless of occupancy. Installing occupancy sensors in these areas will automatically turn lights on/off according to actual occupancy by sensing the presence of people in the room. Occupancy sensors will reduce lighting energy costs by approximately 30%*.

  *Source: Turner, Wayne, Energy Management Handbook, 1999.

ECM #6: Lighting Upgrade (continued)

	Animal Shelter	Atlantic County Criminal Courthouse	Atlantic County Civil Courthouse Records	Atlantic County Justice/ Annex/	Atlantic County Government Center	Atlantic County Office Building	AC Superintendent of Elections	Canale Training Center	Cardiff Center	EHT Library	Farmington Facility	Firearms Training/ Pistol Range	Galloway Library	Hammonton Human Services	Hammonton Public Library	TOTALS
Estimated Annual Energy Cost Savings:	$2,090	$33,330	$29,780	$24,140	$10,720	$20,020	$410	$5,660	$1,270	$4,630	$935	$440	$4,380	$2,650	$4,180	
Estimated Gross Implementation Costs:	$4,890	$68,790	$84,110	$130,780	$22,810	$57,950	$960	$21,740	$3,960	$8,440	$2,830	$980	$10,910	$6,730	$14,910	
NJ Smart Start Rebate:	$250	$2,640	$630	$9,210	$1,140	$1,345	$20	$1,940	$335	$300	$135	$20	$305	$490	$2,965	
Net Estimated Implementation Costs:	$4,640	$66,150	$83,480	$121,570	$21,670	$56,605	$940	$19,800	$3,625	$8,140	$2,695	$960	$10,605	$6,240	$11,945	
Estimated Simple Payback (years):	2.2	2.0	2.8	5.0	2.0	2.8	2.3	3.5	2.9	1.8	2.9	2.2	2.4	2.4	2.9	
Annual Avoided CO_2 Emissions (tons):	4	74	63	59	27	47	1	13	3	10	2	1	10	6	9	

	Hammonton Public Works Yard	Harborfields	John F. Gafney Green Tree Golf Course	Mays Landing Library	Meadowview (Dental Clinic & Nutrition)	Public Works Fleet Management	Public Works Transportation & Engineering	Rutgers Cooperative Extension	Shoreview	Stillwater	Supported Work/Facilities	Unemployment	Voting Machine Warehouse	Warren E. Fox Nature Center	TOTALS
Estimated Annual Energy Cost Savings:	$2,140	$2,300	$1,300	$4,770	$9,640	$3,565	$1,320	$4,980	$3,230	$14,240	$1,710	$3,430	$3,830	$830	**$201,920**
Estimated Gross Implementation Costs:	$10,520	$14,770	$3,155	$12,120	$33,730	$20,130	$4,960	$12,580	$13,450	$43,630	$4,860	$6,615	$8,170	$1,720	**$631,200**
NJ Smart Start Rebate:	$1,235	$1,500	$170	$520	$1,405	$2,170	$365	$760	$1,295	$3,270	$220	$0	$60	$100	**$34,795**
Net Estimated Implementation Costs:	$9,285	$13,270	$2,985	$11,600	$32,325	$17,960	$4,595	$11,820	$12,155	$40,360	$4,640	$6,615	$8,110	$1,620	**$596,405**
Estimated Simple Payback (years):	4.3	5.8	2.3	2.4	3.4	5.0	3.5	2.4	3.8	2.8	2.7	1.9	2.1	2.0	**3.0**
Annual Avoided CO_2 Emissions (tons):	5	5	3	11	24	8	3	10	6	34	4	7	7	2	**458**

ECM #7: Replace Electric Storage-type Domestic Hot Water Heater with Gas-Fired Tankless Units

- Domestic hot water at multiple facilities is created by conventional electric storage water heaters typically rated at 40 gallons and 4.5 kilowatts each.
- While these units are insulated, they do experience heat losses which have to be replaced via the heating elements. These stand-by losses can be avoided by replacing the units with "tankless" or "instantaneous" units which only create hot water when it is called for.
- Additionally, natural gas is available at each of the facilities listed in the table below. Converting from electricity to natural gas DHW heaters yields additional savings. On a "per Btu" basis natural gas is much less expensive than electricity. For example, a typical electric rate for these facilities is $0.142 per kilowatt hour or $0.042 per MBtu. The equivalent natural gas cost for a 85% efficient natural gas hot water heater is $1.460 per therm or $0.015 per MBtu – almost 1/3 the price of electricity.

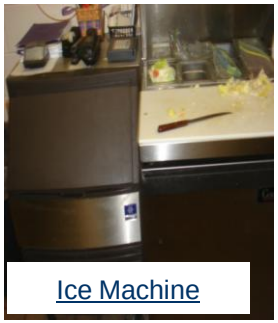
Picture: Typical 40 gallon Electric Storage-type Hot Water Heater (Mays Landing Library)

	Atlantic County Civil Courthouse	Mays Landing Library	Hammonton Public Library	Public Works Fleet Management	Rutgers Cooperative Extension	Hammonton Human Services	Cardiff Center	Public Works Engineering	Supported Work / Facilities	Stillwater	Atlantic County Government Center	Superintendent of Elections	Voting Machine Warehouse	EHT Library	Hammonton Public Works	TOTALS
Estimated Annual Energy Cost Savings:	$2,880	$750	$650	$620	$570	$500	$390	$340	$270	$210	$350	$190	$180	$350	$130	**$8,380**
Estimated Gross Implementation Costs:	$7,630	$2,540	$2,540	$2,540	$2,540	$2,540	$2,540	$2,540	$2,540	$2,540	$5,090	$2,540	$2,540	$5,100	$2,540	**$48,300**
NJ Smart Start Rebate:	$900	$300	$300	$300	$300	$300	$300	$300	$300	$300	$600	$300	$300	$600	$300	**$5,700**
Net Estimated Implementation Costs:	$6,730	$2,240	$2,240	$2,240	$2,240	$2,240	$2,240	$2,240	$2,240	$2,240	$4,490	$2,240	$2,240	$4,500	$2,240	**$42,600**
Estimated Simple Payback (years):	2.3	3.0	3.4	3.6	3.9	4.5	5.7	6.6	8.3	10.7	12.8	11.8	12.4	12.9	17.2	**5.1**
Annual Avoided CO_2 Emissions (tons):	3	1	0	1	1	1	0	1	0	0	0	0	0	0	0	**10**

ECM #8: Replace Kitchen Equipment with Energy Star Rated Equipment

	Canale Training Center	Hammonton Public Works	Stillwater Kitchen	Hammonton Human Services	Meadowview	Atlantic County Justice/Annex/ Records	Harborfields	TOTALS
Estimated Annual Energy Cost Savings:	$850	$850	$5,260	$2,990	$4,080	$2,450	$2,610	**$19,090**
Estimated Gross Implementation Costs:	$2,650	$2,650	$19,900	$11,300	$27,000	$18,400	$21,100	**$103,000**
NJ Smart Start Rebate:	$0	$0	$0	$0	$0	$0	$0	**$0**
Net Estimated Implementation Costs:	$2,650	$2,650	$19,900	$11,300	$27,000	$18,400	$21,100	**$103,000**
Estimated Simple Payback (years):	3.1	3.1	3.8	3.8	6.6	7.5	8.1	**5.4**
Annual Avoided CO_2 Emissions (tons):	2	2	7	6	10	6	6	**40**

Food Warmer



Ice Machine

- Several buildings have significant commercial kitchen facilities. Much of the kitchen equipment (reach-in coolers/freezers, food warmers, dishwashers) is older and less efficient than new higher efficiency equipment.
- Replacing the electric equipment with higher efficiency Energy Star labeled equipment will provide annual energy savings.
- Improvements in kitchen equipment include lower idle rates, better insulation which reduces the amount of standby losses through sides and top, and premium efficiency fan motors.

Electric Convection Oven

Freezer Refrigerator

ECM #9: Replace Boilers with High Efficiency Modulating Condensing Boilers

- Many of the County facilities are equipped with natural gas fired hot water boilers in various configurations of one or more units.
- For the most part, these boilers are old and are nearing the end of the equipment service life (ASHRAE states the service life of similar equipment to be 25 years).
- The ages, sizes, types and configurations of the boilers do not lend themselves to efficient operation. Generally, as boilers approach the end of their service life, the efficiency degrades and the boiler must consume more fuel in order to produce the same rated output. In addition, there is a direct correlation between risk of equipment failure (tube breaks & meltdown, shell cracks, furnace surface area failure) and equipment age.
- If the existing boilers could be replaced by high efficiency, modulating or modular condensing boilers, savings will be realized in two ways:
  - Modulating boilers, usually 1,000 MBH or smaller, employ multiple burners to meet the heating load. Each burner operates independently, eliminating the "all on/all off" operation of single burner boilers. As building load increases only those burners necessary to meet the load are fired. This allows each burner to run at optimal efficiency. (The new Criminal Courthouse employs two modulating boilers.) Modular boilers operate under the same principal but for larger installations. In this case multiple boilers are used rather than multiple burners. Modular boilers usually are employed in 1000, 2000 or 3000 MBH sizes. (Meadowview and the Justice Annex currently have modular boiler installations.)
  - Condensing boilers recover energy from the exhaust gas thus allowing high efficiencies of 90% and above.

Picture: Old HHW Boilers (Shoreview)

Picture: Old HHW Boiler (Fleet Management)

Proposed New High Efficiency Condensing Hot Water Boiler

ECM #9: Replace Boilers with High Efficiency Modulating Condensing Boilers (continued)

- When a boiler is both a modulating/modular type and a condensing type, extremely high efficiencies can be realized.

- The high first cost of a new boiler system may preclude this ECM from being justified by economics alone at some of the facilities. The ECM table details the economics at each site. However, reliability issues warrant consideration of these projects as part of a long-term capital improvement plan.

	Atlantic County Civil Courthouse	Shoreview	Atlantic County Government Center	Public Works Fleet Management	Harborfields	Supported Work / Facilities	Mays Landing Library	Public Works Engineering	Hammonton Library	Hammonton Human Services	**TOTALS**
Estimated Annual Energy Cost Savings:	$13,230	$5,000	$9,500	$3,010	$2,840	$1,770	$2,000	$1,110	$800	$700	**$39,960**
Estimated Gross Implementation Costs:	$176,800	$77,070	$189,900	$71,950	$82,190	$71,950	$77,070	$58,280	$58,280	$55,720	**$919,210**
NJ Smart Start Rebate:	$9,000	$2,120	$9,000	$1,590	$2,640	$1,590	$2,120	$1,060	$1,060	$800	**$30,980**
Net Estimated Implementation Costs:	$167,800	$74,950	$180,900	$70,360	$79,550	$70,360	$74,950	$57,220	$57,220	$54,920	**$888,230**
Estimated Simple Payback (years):	12.7	15.0	19.0	23.4	28.0	39.8	37.5	51.5	71.5	78.5	**22.2**
Annual Avoided CO_2 Emissions (tons):	53	20	35	12	11	7	8	4	3	3	**157**

NOTE: The presented economics should be used for planning purposes only. If the client decides to proceed with any boiler replacement project, these economics should be refined with an investment grade analysis.

ECM #10: Convert from CV to VAV Pumping (single Loop to Primary/Secondary Loop)

Atlantic County Civil Courthouse	
Estimated Annual Energy Cost Savings:	$13,900
Estimated Gross Implementation Costs:	$121,400
NJ Smart Start Rebate:	$1,200
Net Estimated Implementation Costs:	$120,200
Estimated Simple Payback (years):	8.6
Annual Avoided CO_2 Emissions (tons):	31

- The Civil Courthouse has large HHW and CHW supply pumps. These pumps operate in online / standby mode.

Building	Pumps	Motor Nameplate HP	Equivalent Power Draw, kW	Annual Run Hours
AC Civil Courthouse	CWP 1	20	14.92	3093
AC Civil Courthouse	CWP 3, 4	15	11.19	3093
AC Civil Courthouse	HWP 1,2	10	7.42	5667
AC Civil Courthouse	HWP 3,4	15	11.19	5667

- The pumps run at full speed regardless of system hot or chilled water demands.
- Annual system pumping cost may be reduced by installing variable frequency drives (VFDs) on the pump motors. Pump speed could be based upon system differential pressure or temperature.
- The installation cost estimates assume the pump motors are inverter duty, and VFD's will be installed on both pump motors. Installation costs and payback will be reduced by approximately 35% if a VFD is installed on only one pump.

ECM #11: At End of Life (EOL) Replace aging Roof Top and Split AC Units with High Efficiency Units

Split-system AC Units (Meadowview)

Roof Top Unit (Central Kitchen)

- Several facilities have aging roof top or split-system AC units that are in excess of 15-20 years old. These systems at the end of their estimated equipment service life (EESL) per ASHRAE standards (The EESL for RTU and split AC units is 15 years).
- Dome-Tech recommends replacing these units with new higher efficiency units.
- New **14.0** SEER* (Seasonal Energy Efficiency Rating) units are more efficient at full/part loads than the existing equipment (SEER **10.6**).

*Energy Efficiency Ratting: EER is the rating of cooling output (Btu) divided by the electrical energy input (watts). The higher the EER, the more efficient the unit. SEER is similar to EER but adjusted for seasonal effects. SEER is usually only applied to smaller AC units (< 20 tons)

ECM #11: At EOL Replace aging Roof Top and Split AC Units with High Efficiency Units (continued)

	Unemployement	Rutgers Cooperative Extension	Mays Landing Library	Meadowview	Hammonton Human Services	Atlantic County Government Center	Stillwater Kitchen	TOTALS
Estimated Annual Energy Cost Savings:	$2,550	$2,460	$3,320	$2,420	$1,560	$2,510	$1,370	**$16,190**
Estimated Gross Implementation Costs:[1]	$67,800	$72,000	$100,000	$83,100	$54,200	$85,400	$49,600	**$512,100**
Rebates / Incentives:	$2,600	$2,600	$3,710	$2,080	$1,690	$2,730	$1,560	**$16,970**
Estimated Avoided Costs: [2]	$47,200	$51,300	$70,500	$61,500	$38,300	$59,200	$34,900	**$362,900**
Net Estimated Implementation Costs:	$18,000	$18,100	$25,790	$19,520	$14,210	$23,470	$13,140	**$132,230**
Estimated Simple Payback (years):	7.1	7.4	7.8	8.1	9.1	9.4	9.6	**8.2**
Annual Avoided CO_2 Emissions (tons):	5	5	8	6	3	6	3	**37**

Note: Savings do not include potential maintenance savings.

1. Gross Implementation Cost = Cost of Installing Higher SEER Units
2. Avoided Cost = Cost of Like and Kind replacement

ECM #12: Replace Window AC Units

Picture: Supt of Elections Window AC Unit

- Several facilities have installed multiple window air conditioning units to provide localized cooling for small private offices and storage areas. Many units are in poor physical condition, and inefficient compared to today's standards.
- Dome-Tech recommends replacing these units with new higher efficiency units.
- New 10.8 SEER (Seasonal Energy Efficiency Rating) units are estimated to be at least 14% more efficient at full/part loads than the existing equipment.

	Supported Work / Facilities	Superintendent of Elections	Shoreview	Harborfields	PW Fleet Management	Stillwater Building D	Meadowview	TOTALS
Estimated Annual Energy Cost Savings:	$390	$230	$1,600	$290	$140	$1,100	$150	**$3,900**
Estimated Gross Implementation Costs:	$2,500	$1,750	$12,750	$2,500	$1,250	$10,000	$1,500	**$32,250**
NJ Smart Start Rebate:	$0	$0	$0	$0	$0	$0	$0	**$0**
Net Estimated Implementation Costs:	$2,500	$1,750	$12,750	$2,500	$1,250	$10,000	$1,500	**$32,250**
Estimated Simple Payback (years):	6.4	7.6	8.0	8.6	8.9	9.1	10.0	**8.3**
Annual Avoided CO_2 Emissions (tons):	1	0	3	1	0	3	0	**8**

ECM #13: Walk-In Cooler Controllers

	Stillwater Kitchen	Meadowview	Atlantic County Justice Facility	Harborfields	TOTALS
Estimated Annual Energy Cost Savings:	$940	$90	$340	$150	**$1,520**
Estimated Gross Implementation Costs:	$9,150	$1,020	$4,070	$2,030	**$16,270**
NJ Smart Start Rebate:	$0	$0	$0	$0	**$0**
Net Estimated Implementation Costs:	$9,150	$1,020	$4,070	$2,030	**$16,270**
Estimated Simple Payback (years):	9.7	11.3	12.0	13.5	**10.7**
Annual Avoided CO_2 Emissions (tons):	2	0	1	0	**3**

- The walk-in cooler evaporator fans at several buildings operate continuously; however, full airflow is only required 50% of the runtime.
- In the most common applications (those that use single-phase power), motors for the fans are typically shaded-pole or permanent-split-capacitor types, both of which are very inefficient.
- Inexpensive controllers are currently available that slow these fans when full-speed operation is unnecessary.
- Reducing the operating speed reduces the energy consumption of the fan. In addition, the motor produces less heat at slower speeds, which means that the compressor has less heat to remove from the refrigerated compartment.

ECM #14: Window Replacement

- During its inspections, Dome-Tech noted that the Civil Courthouse, Fleet Management and Shoreview each had notable numbers of windows that were either obsolete or had deteriorated to a point where they would save energy if they were replaced. For instance, the single glazed ribbon windows on the upper floors of the old wing of the Civil Courthouse allowed enough outside air to infiltrate that the interior blinds would sway when the wind gusted outside.

- Window replacement projects at these facilities would result in measurable improvement in winter heat retention and summer heat rejection. In addition, increased aesthetic value and occupant comfort would accompany a window project. It should be noted, however, that even an optimized window project can rarely be justified solely on economic payback from energy savings.

- Because the economics alone are not sufficient to justify implementation, occupant comfort and aesthetics should be the overriding considerations in moving forward with this project.

	Public Works Fleet Management	Shoreview	Atlantic County Civil Courthouse	TOTALS
Estimated Annual Energy Cost Savings:	$1,200	$3,900	$4,870	**$9,970**
Estimated Gross Implementation Costs:	$22,100	$103,000	$189,800	**$314,900**
NJ Smart Start Rebate:	$0	$0	$0	**$0**
Net Estimated Implementation Costs:	$22,100	$103,000	$189,800	**$314,900**
Estimated Simple Payback (years):	18.4	26.4	39.0	**31.6**
Annual Avoided CO_2 Emissions (tons):	4	15	18	**37**

NOTE: The presented economics should be used for planning purposes only. If the client decides to proceed with the window replacement project, these economics should be refined with an investment grade analysis.

ECM #15: Creation of an Energy Awareness & Education Program

- County of Atlantic currently has no formal observed program in place.

- The workplace is an excellent forum for encouraging energy conservation practices and town halls are also a great place to get the word out to the community. By doing so, townships can do their part to promote an energy conscious and conservation-minded society that leads to energy cost reductions, environmental benefits, and national energy independence..

Estimated Annual Savings:	2-3%*
Gross Estimated Implementation Cost:	$1500 each
Expected Rebate / Energy Efficiency Credit:	None
Net Estimated Implementation Costs:	$1500
Simple Payback (yrs): (with and w/o rebate)	Varies
Annual Avoided CO_2 Emissions (tons):	Varies
Cost per Ton CO_2 Reduction ($/ton):	Varies

* Estimated Annual Savings are based on the robustness of the program implemented, maintenance, and annual energy costs.

Renewable/Distributed Energy Measures

Distributed Generation & Renewable Energy

- Distributed Generation (on-site generation) generates electricity from many small energy sources. These sources can be renewable (solar/wind/geothermal) or can be small scale power generation technologies (CHP, fuel cells, microturbines)
- Renewable energy is energy generated from natural resources (sunlight, wind, and underground geothermal heat) which are naturally replenished
- Photovoltaics (solar) are particularly popular in Germany and Spain and growing in popularity in the U.S.
- Wind power is growing as well, mostly in Europe and the U.S.
- Geothermal applications are used widely in western U.S. (most prominent in the Yellowstone basin and in northern California)

Distributed Energy Technologies: CHP/Cogeneration

- CHP (combined heat and power) or cogeneration is the simultaneous creation of two forms of energy, usually electricity and some useful form of thermal energy such as steam or hot water. In most applications a heat engine, such as a reciprocating, internal combustion engine or a rotary turbine, is employed to turn a generator. Heat is recovered from either the engine cooling system and/or the exhaust. Depending on the application, this heat may be used to create hot water for heating or chilled water for cooling via the application of an absorption chiller. Industrial sized CHP units employing utility scale gas turbine technology can produce steam for processes or central plant heating.
  - Microturbines are miniature rotary engines, similar to jet engines, that extract energy from a flow of combustion gases, usually natural gas. They can produce significant amounts of electricity in a very small footprint and the exhaust is hot enough to produce hot water for heating and chilled water for cooling when coupled with an absorption chiller. Microturbines are a proven technology and are best suited for facilities with year-round thermal and/or cooling loads. Usually a base thermal load of approximately 3 million BTU per hour is required for a microturbine application to be economic.
  - Fuel Cells are a relatively new technology that can operate at very high efficiencies when employed in a CHP configuration. They are essentially electrochemical devices that operate by catalysis, separating the protons and the electrons of the reactant fuel, and forcing the electrons to travel through a circuit to produce electricity. The catalyst is typically a platinum group metal or alloy. Another catalytic process takes the electrons and recombines them with the protons and oxidant, producing water and heat as recoverable waste products. Depending on the reactant fuel, usually natural gas, carbon dioxide may also be produced.

- Dome-Tech examined installing microturbines at the Justice Complex and the Meadowview nursing facility. Both locations have significant hot water and chilled water systems that would benefit from the microturbine's thermal output. They both also have sufficient outdoor space for locating the turbines close enough for fuel and CHW/HHW connections yet far enough to simplify dealing with any noise and emissions concerns. It was assumed these facilities meet the base thermal load requirements. A detailed examination of each facility's thermal load profile would be required before proceeding with a microturbine project.

CHP/Cogeneration: A.C. Justice/Annex/Records

Microturbine Economics

- Two 200 kW microturbines plus an absorption chiller will generate electricity, hot water and chilled water.

Simple Payback		
Total Installed Cost	$3,000 /kW	$1,140,000
State Grant	$1,000 /kW	($380,000)
Federal Investment Tax Credit	$0 /kW	$0
Net Installed Cost	**$2,000 /kW**	**$760,000**
Year 1 Annual Savings		
Avoided Electric Energy:	2,846,124 kWh	$381,443
Avoided Heating Fuel:	11,031 MMBTU	$153,545
Avoided Cooling:	529,759 kWh	$70,999
CHP Gas:	34,617 MMBTU	($346,167)
Service Contract:	2.7 ¢/kWhr	($88,213)
Net Annual Savings (Year 1)		**$171,608**
Simple Payback (years)		**4.4**

NOTE: The presented economics should be used for planning purposes only. If the client decides to proceed with a microturbine project, these economics should be refined with an investment grade analysis.

CHP/Cogeneration: Meadowview

Microturbine Economics

One PureComfort 200 system (one 200 kW microturbines plus an absorption chiller) will generate electricity, hot water and chilled water.

Simple Payback		
Total Installed Cost	$4,250 /kW	$807,500
State Grant	$1,000 /kW	($190,000)
Federal Investment Tax Credit	$0 /kW	$0
Net Installed Cost	**$3,250 /kW**	**$617,500**
Year 1 Annual Savings		
Avoided Electric Energy:	1,423,062 kWh	$189,267
Avoided Heating Fuel:	6,216 MMBTU	$85,342
Avoided Cooling:	1,659 MMBTU	$22,782
CHP Gas:	17,308 MMBTU	($173,083)
Service Contract:	2.7 ¢/kWhr	($44,107)
Net Annual Savings (Year 1)		**$80,201**
Simple Payback (years)		**7.7**

NOTE: The presented economics should be used for planning purposes only. If the client decides to proceed with a microturbine project, these economics should be refined with an investment grade analysis.

Solar Photovoltaic

- Sunlight can be converted into electricity using photovoltaic's (PV).
- A solar cell or photovoltaic cell is a device that converts sunlight directly into electricity.
- Photons in sunlight hit the solar panel and are absorbed by semiconducting materials, such as silicon. Electrons are knocked loose from their atoms, allowing them to flow through the material to produce electricity.
- Solar cells are often electrically connected and encapsulated as a module, in series, creating an additive voltage. The modules are connected in an array. The power output of an array is measured in watts or kilowatts, and typical energy needs are measured in kilowatt-hours.
- Can be recommended in this application for placement on additional buildings / areas (such as fields or parking areas).

Renewable Energy Technologies: Solar Photovoltaic – Roof Mounted Systems

Many County facilities have large, flat, relatively uncluttered roofs that could support solar photovoltaic systems. The following illustrates the economics of such an installation on the Galloway Library roof. Economics for other facilities are contained in the appendices.

Install Roof Mount Solar Photovoltaic System(s)	
Galloway Library	
Assumptions	
System Capacity, kw-dc (maximum utilization of roof space)	104 kw dc
Estimated Annual AC Energy Produced by Proposed Solar PV System	116,454 kwh
Total Annual Facility Electric Use, kwhrs	315,680 kwh
Proposed % of Total Annual kWh supplied by Solar PV	37%
All-In Rate for Electric Year 1	$0.148 / kwh
Year 1 Electric Cost Savings	$17,235
Year 1 Maintenance Costs	$2,089
Estimated Year 1 SREC Value:	$640 / SREC
Estimated Year 1 SREC Revenue:	$74,492
Financial Results	
Actual Payback	**7.5 years**
IRR (25 Years)	**10.2%**
Net Present Value (25 yrs, 8% discount rate)	**$84,445**
Cost and Rebate / Tax Incentives	
Cost per kW installed	$6,000
System Installed Cost (does not include value of tax credits)	$626,658

System Capacity (kW)	Coverage (Square Feet)	No. of Panels	Annual Output (kWh)
104.443	3931	454.1	116453.945

Dome-Tech recommends assessing and possibly replacing the roofs before installation of PV system.

Renewable Energy Technologies: Solar Photovoltaic

Non-Financial Benefits of Solar PV

- The implementation of solar PV projects at Atlantic County would place your facilities at the forefront of renewable energy utilization. This allows the opportunity to not only gain experience with this energy technology, but also to win recognition as an environmentally sensitive, socially conscious institution. Additionally, these projects could be incorporated into community events to raise awareness of current energy alternatives to the younger generations.

Renewable Energy Technologies: Wind

Wind turbines generate electricity by harnessing a wind stream's kinetic energy as it spins the turbine airfoils. As with most renewable energy sources, wind energy is subject to intermittent performance due to the unpredictability of wind resources.

Atlantic County Wind Speeds

As previously stated, wind speed is critical to the successful wind turbine installation. According to average wind data from NASA's Surface Meteorology and Solar Energy records, the average annual wind speed for the Atlantic County area is 4.99 meters per second for ground mounted systems and 6.31 m/s for roof mounted systems along the coast. Ideal wind speeds for a successful project should average over 6 meters per second.

For Atlantic County, Dome-Tech considered three (3) types of wind turbine technologies; building integrated wind turbines (1 kW each) and traditional ground mounted wind turbines (5 kW & 50 kW).

Building Integrated Wind Turbines
Model: AeroVironment AVX1000
Height: 8.5'
Rotor Diameter: 6'
Weight: 130 lbs.
Cut-In Wind Speed: 2.2 m/s
Maximum Generating Capacity: 1 kW

5 kW Ground Mount
Model: WES5 Tulipo
Height: 40'
Rotor Diameter: 16'
Weight: 1,900 lbs.
Cut-In Wind Speed: 3.0 m/s
Maximum Generating Capacity: 5.2 kW

50 kW Ground Mount
Model: Entegrity EW50
Height: 102'
Rotor Diameter: 50'
Weight: 21,000 lbs.
Cut-In Wind Speed: 4.0 m/s
Maximum Generating Capacity: 50 kW

Renewable Energy Technologies: Wind

The Atlantic County Office Building and the Civil Courthouse in Atlantic City are potential candidates for roof mounted systems. The project economics and wind turbine pros and cons for a roof mounted option are presented in the following tables:

Wind Turbine Economics ***Roof Mounted***

	Building Integrated	Roof Mount 5 kW
Gross Installation Cost Estimate	$130,000	$62,400
NJJ SSB Rebate	$60,773	$53,248
Net Installation Cost Estimate	$69,227	$9,152
Annual Energy Savings	$5,307	$3,034
Simple Payback	13.0 yrs.	3.0 yrs.
System Capacity	20 kW	10 kW
Annual Avoided Energy Use	35,145 kWh	20,095 kWh
Annual CO2 Emmisions, Tons	12	7
% of Annual Electric Use*	1.0%	0.6%

AC Office Building: 3400200 kWh/Year.

Wind Turbine Pros & Cons

Pros	Cons
➢Annual reduction in energy spend and use can be potentially reduced by $3,000 to $5,000 ➢Typical equipment life span is 15-30 years. ➢Reduction of annual greenhouse gas emissions by 7-12 tons per year. ➢A wind turbine project could be incorporated into school curriculums to raise student awareness of energy alternatives. ➢High visible “green” project.	➢Payback period is significant (over 6 years). ➢Average area wind speed is not ideal and impacts performance. ➢Prone to lighting strikes. ➢Bird collisions are likely, but may be reduced with avian guard (building integrate only). ➢Zoning may be an issue. Check with local zoning regulations. ➢Wind turbines do create noise, although below 50 dB (a typical car ride is over 80 dB). ➢Roof mounted turbines can introduce vibrations into the building structure.

Should the County decide to pursue a wind turbine project, Dome-Tech recommends commissioning a more detailed study.

Renewable Energy Technologies: Wind

Sites with large open campuses such as Stillwater, Shoreview, the Justice Facility and several of the libraries are potential candidates for ground mounted systems. The project economics and wind turbine pros and cons for ground mounted options are presented in the following tables:

Wind Turbine Economics ***Ground Mounted***

	Ground Mount 5 kW	Ground Mount 50 kW
Gross Installation Cost Estimate	$62,400	$250,000
NJJ SSB Rebate	$44,910	$112,090
Net Installation Cost Estimate	$17,490	$137,910
Annual Energy Savings	$1,970	$19,344
Simple Payback	8.9 yrs.	7.1 yrs.
System Capacity	10 kW	50 kW
Annual Avoided Energy Use	14,034 kWh	137,781 kWh
Annual CO2 Emmisions, Tons	5	48
% of Annual Electric Use*	1.1%	11.0%

Stillwater: 1250100 kWh/Year.

Wind Turbine Pros & Cons

Pros	Cons
➢Annual reduction in energy spend and use can be potentially reduced by almost $19,300 ➢Typical equipment life span is 15-30 years. ➢Reduction of annual greenhouse gas emissions by 5-48 tons per year. ➢A wind turbine project could be incorporated into science and other curriculums to raise student awareness of energy alternatives. ➢High visible "green" project.	➢Payback period is significant (over 7 years). ➢Average area wind speed is not ideal and impacts performance. ➢Prone to lighting strikes. ➢Bird collisions are likely, but may be reduced with avian guard (building integrate only). ➢Zoning may be an issue. Check with local zoning regulations. ➢Wind turbines do create noise, although below 50 dB (a typical car ride is over 80 dB).

Due to attractive payback and high potential for energy reduction, the 50 kilowatt ground mounted wind turbine project appears to be the most attractive option. Should the County decide to pursue a wind turbine project, Dome-Tech recommends commissioning a more detailed study.

Utility Tariff and Rate Review: Electricity

- **Accounts and Rate Class:** The County of Atlantic has twenty-nine facilities with twenty-nine electric accounts with all service behind Atlantic City Electric under rate classes Annual and Monthly General Service.

- **Electric Consumption and Cost:** Based on the one-year period studied, the total annual electric expenditure for the County is about $2,376,000 and the total annual consumption is about 16,134,000 kilowatt-hours (kWh).

- **Average/Effective Rate per kWh:** For the one year period studied, the County's average monthly cost per kilowatt-hour ranged from 12.7 ¢/kWh to 16.9 ¢/kWh, inclusive of utility delivery charges. The County's overall, average cost per kilowatt-hour during this period was 14.7 ¢/kWh.

  - Note that these average electric rates are "all–inclusive"; that is, they include all supply service (generation and commodity-related) charges, as well as all delivery service charges. Both the supply and delivery service is currently provided by Atlantic City Electric. The supply service charges typically represent the majority (60-80%) of the total monthly bill. It is the supply portion of your bill that is deregulated, which is discussed on subsequent slides in this section.

Utility Tariff and Rate Review: Natural Gas

- **Accounts and Rate Class:** The County is served by thirty-two natural gas accounts behind South Jersey Gas Company under rate classes Firm Transportation or General Service Gas.

- **Natural Gas Consumption and Cost:** Based on the one-year period studied, the total annual natural gas expenditure for the County is about $1,338,000 and the total annual consumption is about 904,000 therms (th). Natural gas is used predominantly throughout the winter period for heating purposes.

- **Average/Effective Rate per Therm:** For the one year period studied, the County's average cost per therm ranged from $1.264 to $3.619 per therm, inclusive of utility delivery charges. The County's overall, average cost per therm during this period was $1.48 per therm.
  - Note that these average natural gas rates are "all–inclusive"; that is, they include all supply service (interstate transportation and commodity-related) charges, as well as all delivery service charges. The supply service charges typically represent the majority (60-80%) of the total monthly bill. It is the supply portion of your bill that is deregulated, which is discussed on subsequent slides in this section.

Utility Deregulation in New Jersey: Background and Retail Energy Purchasing

- In August 2003, per the Electric Discount and Energy Competition Act [N.J.S.A 48:3-49], the State of New Jersey deregulated its electric marketplace thus making it possible for customers to shop for a third-party (someone other than the utility) supplier of retail electricity.
- Per this process, every single electric account for every customer in New Jersey was placed into one of two categories: BGS-FP or BGS-CIEP. BGS-FP stands for Basic Generation Service-Fixed Price; BGS-CIEP stands for Basic Generation Service-Commercial and Industrial Energy Pricing.
- At its first pass, this categorization of accounts was based on rate class. The largest electric accounts in the State (those served under a Primary or a Transmission-level rate class) were moved into BGS-CIEP pricing. All other accounts (the vast majority of accounts in the State of New Jersey, including residential) were placed in the BGS-FP category, receiving default electric supply service from the utility.
- The New Jersey Board of Public Utilities (NJBPU) has continued to move new large energy users from the BGS-FP category into the BGS-CIEP category by lowering the demand (kW) threshold for electric accounts receiving Secondary service. Several years ago, this threshold started at 1,500kW; now, it has come down to 1,000 kW. So, if an account's "peak load share" (as assigned by the utility) is less than 1,000 kW, then that facility/account is in the BGS-FP category. If you are unsure, you may contact Dome-tech for assistance.

Utility Deregulation in New Jersey: Background and Retail Energy Purchasing (cont.)

- There are at least 3 important differentiating factors to note about each rate category:
  1. The rate structure for BGS-FP accounts and for BGS-CIEP accounts varies.
  2. The "do-nothing" option (ie, what happens when you don't shop for retail energy) varies.
  3. The decision about whether, and why, to shop for a retail provider varies.

- Secondary (small to medium) Electric Accounts:
  - BGS-FP rate schedules for all utilities are set, and re-set, each year. Per the results of our State's BGS Auction process, held each February, new utility default rates go into effect every year on June 1st. The BGS-FP rates become each customer's default rates, and they dictate a customer's "Price to Compare" (benchmark) for shopping purposes. To learn more about the BGS Auction process, please go to www.bgs-auction.com.
  - A customer's decision about whether to buy energy from a retail energy supplier is, therefore, dependent upon whether a supplier can offer rates that are lower than the utility's (default) Price to Compare. In 2009, and for the first time in several years, many BGS-FP customers have "switched" from the utility to a retail energy supplier because there have been savings. This may be the same case in 2010.

- Primary (large) Electric Accounts:
  - The BGS-CIEP category is quite different. There are two main features to note about BGS-CIEP accounts that do not switch to a retail supplier for service. The first is that they pay an hourly market rate for energy; the second is that these accounts also pay a "retail margin adder" of $0.0053/kWh. For these large accounts, this retail adder can amount to tens of thousands of dollars. The adder is eliminated when a customer switches to a retail supplier for service.
  - For BGS-CIEP accounts, the retail adder makes a customer's decision about *whether* to switch relatively simple. However, the process of setting forth a buying strategy can be complex, which is why many public entities seek professional assistance when shopping for energy.
  - For more information concerning hourly electric market prices for our region, please refer to www.pjm.com.

Utility Deregulation in New Jersey: Background and Retail Energy Purchasing (cont.)

- Natural Gas Accounts:
  - The natural gas market in New Jersey is also deregulated. Unlike the electric market, there are no "penalties", or "adders", for not shopping for natural gas. Most customers that remain with the utility for natural gas service pay rates that are market-based and that fluctuate on a monthly basis. While natural gas is a commodity that is exceptionally volatile and that is traded minute-by-minute during open trading sessions, market rates are "settled" each month, 3 business days prior to the subsequent month (this is called the "prompt month"). Customers that do not shop for a natural gas supplier will typically pay this monthly settlement rate to the utility, plus other costs that are necessary to bring gas from Louisiana up to New Jersey and ultimately to your facility.
  - For additional information about natural gas trading and current market futures rates for various commodities, you can refer to www.nymex.com.
  - A customer's decision about whether to buy natural gas from a retail supplier is typically dependent upon whether a customer seeks budget certainty and/or longer-term rate stability. Customers can secure longer-term fixed prices by enlisting a retail natural gas supplier. Many larger natural gas customers also seek the assistance of a professional consultant to assist in their procurement process.
  - Woodruff Energy is currently your retail supplier, this contract should be reviewed annually or when due to expire as shopping for the best retail pricing can save on utility costs year to year.

Retail Energy Purchasing: Recommendations and Resources

- Electric
  - Based on current and recent market conditions, and actual bid processes run by Dome-Tech for various clients during 2010, we have seen customers with BGS-FP accounts save approximately 10-20% in projected energy costs by switching to retail energy supplier. It is important to note that actual rates and potential savings will be dependent on several factors, including market conditions, account usage characteristics/load profile (load factor), volume, and contract term. The County is currently utilizing Pepco as a third party supplier for electricity.

- Natural Gas
  - Based on current and recent market conditions, and actual bid processes run by Dome-Tech for various clients during 2010, we have seen many customers entering into longer-term contracts for fixed natural gas rates. These rates vary substantially based on load type, volume, and term. The County is currently utilizing Woodruff Energy as a third party supplier for natural gas.

- Energy Purchasing Co-Operatives
  - Many public entities participate in various energy aggregation buying groups. Sometimes, an entity will have multiple options to choose from. These might include purchasing through a County co-operative, or purchasing through a trade-type association (for instance, many schools participate in NJASBO's ACES program). Co-operative purchasing may not necessarily get you the lowest rates; however, there is often substantial volume, and it can represent a good alternative for entities with limited energy consumption who can have a difficult time getting energy suppliers to respond to them on a direct, singular basis. The county is currently participating the South Jersey Power Co-Op for Natural Gas.

- To determine whether a savings opportunity currently exists for your entity, or for guidance on how to get started, you may contact Dome-Tech to discuss. There is also additional information provided below.

Retail Energy Purchasing: Recommendations and Resources (cont.)

- To learn more about energy deregulation, visit the New Jersey Board of Public Utilities website: www.bpu.state.nj.us
- For more information about the retail energy supply companies that are licensed and registered to serve customers in New Jersey, visit the following website for more information: http://www.bpu.state.nj.us/bpu/commercial/shopping.html
- Provided below is a list of NJ BPU-licensed retail energy suppliers:

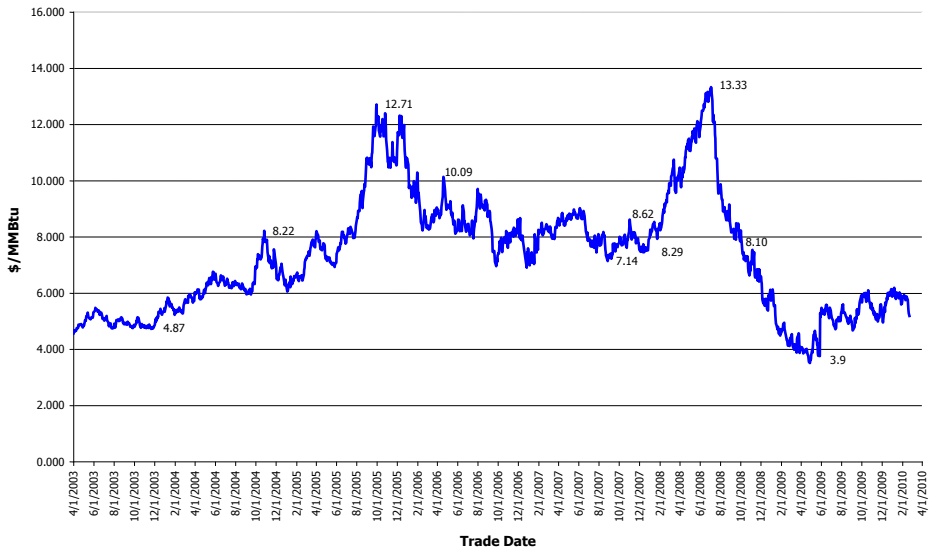
Company	Electricity	Natural Gas	Website
Pepco	X	X	www.pepcoenergy.com
Hess	X	X	www.hess.com
Sprague	X	X	www.spragueenergy.com
UGI	X	X	www.gasmark.com
South Jersey Energy	X	X	www.sjindutries.com
Direct	X	X	www.directenergy.com
Global	X	X	www.globalp.com
Liberty	X		www.libertypowercorp.com
ConEd Solutions	X		www.conedsolutions.com
Constellation	X		www.constellation.com
Glacial	X		www.glacialenergy.com
Integrys	X		www.intergryenergy.com
Suez	X		www.suezenergyna.com
Sempra	X		www.semprasolutions.com
Woodruff		X	www.woodruffenergy.com
Mx Energy		X	www.mxenergy.com
Hudson		X	www.hudsonenergy.net
Great Eastern		X	www.greateasterngas.com

**Note: Not every Supplier serves customers in all utility territories within New Jersey*

Historical Energy Futures Settlement Prices

- Below please find graphs that show the last several years' worth of market settlement prices for both natural gas and electricity. Each of these graphs shows the average closing prices of a rolling 12-month period of energy futures prices. The graphs are representative of the commodity, alone; they do not include any of the additional components (capacity, transmission, ancillary services, etc.) that comprise a retail energy price. They are meant to provide an indication of the level of pricing that a particular customer might expect to see, but the graphs do not account for the specific load profile of any individual energy user.

Henry Hub 12 month strip



PJM West 12 month strip

Operations & Maintenance

New Criminal Courthouse:
Corroded gas pipe and broken support

Harborfields:
Corroded gas pipe on new RTU

- **Issue:** The new Criminal Courthouse roof top units have natural gas heat. The gas is delivered to the units via a network of 2 inch and smaller steel pipes laid across the roof and supported by plastic supports. The pipes are heavily corroded and several of the supports have failed. Some of the gas piping at Harborfields is showing similar corrosion.
- **Impact:** The failed supports cause sections of the piping to sag causing stress on the joints that could result in leaks. The corrosion weakens the pipes in general which could result in broken pipes or large leaks. This could result in fire or failure of the heating systems.
- **Recommendation:** Dome-Tech recommends replacing the broken supports. A pipe coating authority should assess the corroded piping to determine the cause, severity and remedy of the corrosion problems.

Operations & Maintenance

- **Issue:** At the Civil Courthouse, the supply fan motor for AHU 126 in Room 209E was observed to be wobbling significantly as it ran. The cause appeared to be a combination of poor supporting structure and a belt that was too small.
- **Impact:** The motor shaft could be damaged causing the motor to fail.
- **Recommendation:** Dome-Tech recommends reinforcing the supports for the fan and verifying the belt is sized properly.

Operations & Maintenance

Harborfields:
Missing refrigerant line insulation

Stillwater - An:
Deteriorating refrigerant line insulation

- **Issue:** At several facilities, the insulation on refrigerant supply lines on exterior condenser units for AC split systems was deteriorated or missing. This is most likely due to exposure to the sun and UV rays.
- **Impact:** The units will have to consume more energy to make up for the heat gain caused by the missing insulation.
- **Recommendation:** Dome-Tech recommends the County adopt a maintenance program consisting of inspecting and replacing missing insulation on all exposed refrigerant lines. The insulation can be painted to prevent further damage from the sun.

Potential Project Funding Sources

Through the NJ Clean Energy program, the New Jersey Board of Public Utilities currently offers a variety of subsidies or rebates for many of the project types outlined in this report. More detailed information can be found at: www.njcleanenergy.com

NJ Smart Start Buildings – Equipment Rebates noted in ECMs where available. Equipment Rebates - Water Heaters, Lighting, Lighting Controls/Sensors, Chillers, Boilers, Heat pumps, Air conditioners, Energy Mgmt. Systems/Building Controls, Motors, Motor-ASDs/VSDs, Custom/Others http://www.njcleanenergy.com/commercial-industrial/programs/nj-smartstart-buildings/nj-smartstart-buildings

Pay for Performance Program – Performance-Based Incentives for installations. Provides up to 50% of total project costs. A minimum reduction target of 15% compared to baseline must be achieved. Energy modeling of building and systems and energy reduction plan is required (incentives are provided to pay for part of the study costs.) *Please note this program is not open to Government entities who are receiving direct Energy Efficiency and Conservation Block Grants.*
http://www.njcleanenergy.com/commercial-industrial/programs/pay-performance

Energy Savings Improvement Program (ESIP) Public entities can contract with energy saving companies in up to 15-year lease purchases enabling public entities to implement energy conservation measures to their facilities and pay for the costs using the value of energy savings that result from the improvements. The Energy saving companies (ESCO) would assist in bypassing large upfront costs to the entity.
www.nj.gov/dca/lgs/lfns/09lfns/2009-11.doc

Potential Project Funding Sources (continued)

Clean Energy Solutions Capital Investment Loan/Grant

The EDA offers up to $5 million in interest-free loans and grants to promote the concept of "going green" in New Jersey. Under this program, scoring criteria based on the project's environmental and economic development impact determines the percentage split of loan and grant awarded. Funding can be used to purchase fixed assets, including real estate and equipment, for an end-use energy efficiency project, combined heat and power (CHP or cogen) production facility, or new state-of-the-art efficient electric generation facility, including Class I and Class II renewable Energy.
http://www.njeda.com/web/Aspx_pg/Templates/Npic_Text.aspx?Doc_Id=1078&menuid=1360&topid=722&levelid=6&midid=1357

Clean Renewable Energy Bonds (CREBs) – For Renewable Energy Projects

Federal Loan Program for Solar Thermal Electric, Photovoltaics, Landfill Gas, Wind, Biomass, Hydroelectric, Geothermal Electric, Municipal Solid Waste, Hydrokinetic Power, Anaerobic Digestion, Tidal Energy, Wave Energy, Ocean Thermal

http://www.irs.gov/irb/2007-14_IRB/ar17.html

Renewable funding for PV & wind, plus federal credits currently available:
http://www.njcleanenergy.com/renewable-energy/programs/renewable-energy-incentive-program/applications-and-e-forms-renewable-ener

Potential Project Funding Sources (continued)

Direct Install Program – NJ Clean Energy makes the investment in energy efficiency upgrades by initially covering 80% of the cost to install the recommended energy efficiency measures. If eligible, the entity will pay ONLY 20% of the total cost to install the energy efficiency measures.
http://www.njcleanenergy.com/commercial-industrial/programs/direct-install

We encourage you to contact the program directly for further information on this particular program for the following buildings: Animal shelter, Government Center, Elections & Voting, Canale Center, all Libraries, Farmington Facility, Firearms Training, Hammonton HS & PW, Harborfields, Golf Course, PW Fleet & Engineering, Rutgers Ext. Shoreview, Supported Work, Unemployment, and Nature Center.

Steps to Participate for Buildings under 200KW / month

1. CONTACT THE PARTICIPATING CONTRACTOR IN YOUR AREA
Identify the contractor assigned and trained to provide Direct Install services in the county where your project is located. Using the contact information provided, call or email the Participating Contractor to discuss your project. The contractor will schedule an Energy Assessment and work with you to complete the Program Application and Participation Agreement. If you're unable to contact the Participating Contractor or have questions, you may contact us at 866-NJSMART or send an e-mail to DirectInstall@trcsolutions.com..

2. REVIEW RESULTS
After the Energy Assessment, the contractor will review results with you, including what measures qualify and your share of the project cost.

3. DECIDE TO MOVE FORWARD
You will sign a Scope of Work document to proceed with implementation of qualifying measures.

4. ARRANGE INSTALLATION
You and the Participating Contractor will set a convenient start date for the installation.

5. CONFIRM INSTALLATION
Once the Participating Contractor completes the installation, you accept the work by signing a Project Completion Form. A program representative will approve the project as complete.

6. COMPLETE TRANSACTION
You pay the Participating Contractor your share of the project cost and the program pays its share.

Next Steps

- **The following projects should be considered for further study and / or implementation:**
  - Replace ceiling suspended heaters with Infrared Units – x7 buildings
  - Replace Electric Hot Water Heater Boosters with Gas– Stillwater & Meadowview Kitchens
  - Upgrade Insulation of HHW pipes – x6 buildings
  - Lighting upgrades – All Buildings
  - Vending machine power management – All Buildings
  - Start Energy Awareness Program – County Wide
  - Retro-Commissioning Opportunities - County Wide

Note that additional "Phase 2" engineering may be required to further develop these projects, to bring them to bidding and implementation.