MARGATE SCHOOL DISTRICT

Energy Audit

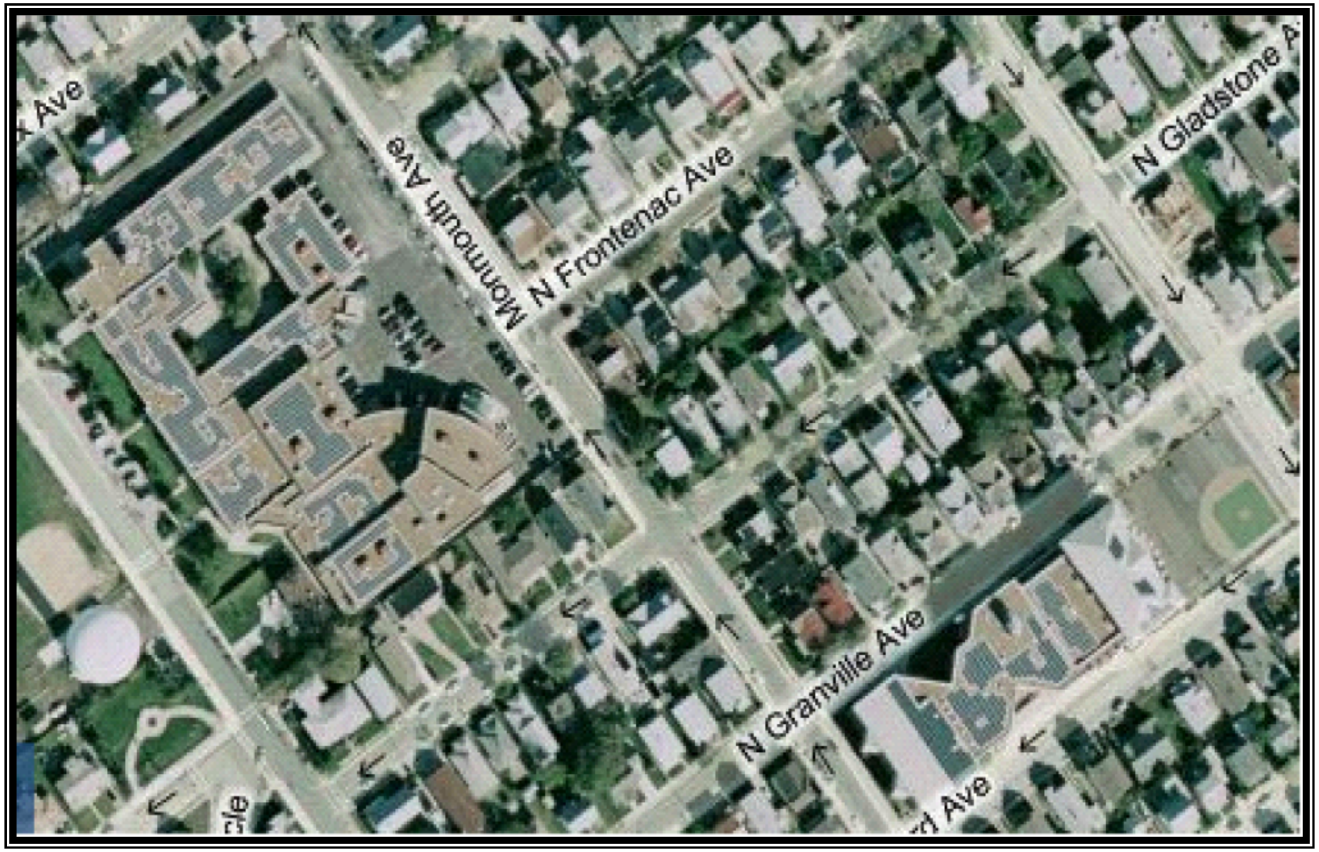
Prepared For:
Margate City Board of Education

Susan Palaia
Business Administrator

Prepared By:
Dome – Tech, Inc.

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

October 2009



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MARGATE CITY BOARD OF EDUCATION
ENERGY AUDIT REPORT
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October 8, 2009

Ms. Susan Palaia
School Business Administrator
Margate City School District
8103 Winchester Avenue
Margate, NJ 08402

**Re: EXECUTIVE SUMMARY FOR MARGATE CITY SCHOOL DISTRICT
STATE OF NEW JERSEY LOCAL GOVERNMENT ENERGY AUDIT**

Dear Ms. Palaia:

Dome-Tech was retained by Margate City School District, as a prequalified participant in the New Jersey Local Government Energy Audit Program, to perform an energy audit. The objective of the energy audit was to evaluate the schools' 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

Based upon data received for the period March 2008 - March 2009, the Margate City School District had an annual expenditure of:

- Electricity: 2,062,490 kWh at a total cost of $323,440.60
- Natural Gas: 92,111 therms at a total cost of $137,311.82

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 according to their simple payback; however, please note that the master ECM table can also be sorted by building, by measure type, cost, etc.

If all identified ECMs were to be implemented, they would provide the following estimated benefits to the Margate City School District:

- Total annual electrical savings: 628,275 kilowatt-hours; 30.4%
- Total annual natural gas savings: 52,305 therms, 56.7 %
- Total annual cost savings: $172,670; 373%
- Total annual CO_2 emissions reduction: 513 tons
- Total estimated gross implementation cost: $1,243,680
- Total rebates: $56,175
- Like in Kind Costs –for Equipment replacements $265,500
- Total estimated net implementation cost: $922,005
- Total average simple payback(w/rebate): 6.0 yrs

The projects that are recommended for implementation (at all facilities) include: time of day optimization, installation of timers on domestic hot water heaters, adjustment of the ventilation controls, lighting upgrades, vending machine power management device installation, starting an energy awareness program, energy procurement opportunities, and retro-commissioning opportunities.

The Margate City School District data was entered into the US EPA ENERGY STAR's Portfolio Manager database program. The Union Avenue School attained a score of 82, which makes it eligible for a building label. Buildings with scores of 75 or higher may qualify for the ENERGY STAR Building Label.

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

- A Ground Source Heat Pump (GSHP) installation is not recommended as an immediate retrofit project. However, a detailed life cycle analysis of a GSHP system versus a traditional HVAC system is recommended once the existing equipment exceeds the estimated equipment service life.
- Dome-Tech considered three different types of wind turbine technologies that consisted of both building-mounted and traditional ground-mounted variety. 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 Margate City School District decide to pursue a wind turbine project, Dome-Tech recommends commissioning a more detailed study.
- The Margate City School District already has solar systems implemented, and as such, were not evaluated for solar potential opportunities.
- CHP, Fuel Cells, and Micro-turbines were also researched, but are not recommended due to the lack of thermal requirements in the summertime.

Regarding the procurement of utilities, Dome-Tech understands that the Margate City School District is served by four electric accounts behind Atlantic City Electric, under various rate classes, most of which are Annual General Service. Each year, the NJBPU continues to move new large energy users into BGS-CIEP by lowering the demand threshold for electric accounts receiving Secondary service. The district should be aware of this possibility to lower costs. The district is also served by three natural gas accounts behind South Jersey Gas Company. Now is an ideal time to seek longer-term rate stability through a fixed price arrangement through a retail supplier.

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

Sincerely,

Derek James SB

Derek James
Senior Energy Engineer

MARGATE CITY BOE
ECO/ECM Summary

ECM #	Energy Conservation Measures (ECM)	Building	Energy Savings kWh	Energy Savings Therms	Gross Installation Costs*	Avoided Costs (Like In Kind Costs)	Rebates/ Incentives	Net Implementation Costs	Annual Energy Cost Savings*	Annual Operating Cost Savings*	Total Annual Cost Savings*	Simple Pay Back W/O Rebate*	Simple Pay Back With Rebate *	Annual Avoided CO2 Emissions (tons)	Return on Investment (ROI)	Lifecycle Cost Savings*
1	TIME OF DAY OPTIMIZATION	Eugene A Tighe	170,600	15,280	$4,000		$0	$4,000	$48,500	$0	$48,500	0.1	0.1	146	NA	NA
1	TIME OF DAY OPTIMIZATION	William H Ross	79,070	7,170	$4,000		$0	$4,000	$22,610	$0	$22,610	0.2	0.2	68	NA	NA
1	TIME OF DAY OPTIMIZATION	Union Avenue	57,070	4,890	$4,000		$0	$4,000	$15,890	$0	$15,890	0.3	0.3	47	NA	NA
2	MEDIA SETPOINT OPTIMIZATION	Eugene A Tighe	1,030	0	$100		$0	$100	$150	$0	$150	0.7	0.7	0	NA	NA
3	VENDINGMISERS	William H Ross	3,240	0	$470		$0	$470	$490	$0	$490	1.0	1.0	1	NA	NA
3	VENDINGMISERS	Eugene A Tighe	9,710	0	$1,410		$0	$1,410	$1,460	$0	$1,460	1.0	1.0	3	NA	NA
3	VENDINGMISERS	Union Avenue	6,480	0	$940		$0	$940	$970	$0	$970	1.0	1.0	2	NA	NA
6	DOMESTIC HOT WATER HEATER TIMERS	Eugene A Tighe	1,310	60	$1,100		$0	$1,100	$290	$0	$290	3.8	3.8	1	NA	NA
6	DOMESTIC HOT WATER HEATER TIMERS	William H Ross	1,310	30	$1,100		$0	$1,100	$240	$0	$240	4.6	4.6	1	NA	NA
6	DOMESTIC HOT WATER HEATER TIMERS	Union Avenue	650	30	$1,100		$0	$1,100	$150	$0	$150	7.3	7.3	0	NA	NA
4	VENTILATION CONTROL	William H Ross	6,535	3,140	$8,500		$0	$8,500	$5,700	$0	$5,700	1.5	1.5	21	NA	NA
4	VENTILATION CONTROL	Eugene A Tighe	6,080	2,920	$18,700		$0	$18,700	$5,300	$0	$5,300	3.5	3.5	19	NA	NA
4	VENTILATION CONTROL	Union Avenue	6,280	3,020	$5,900		$0	$5,900	$5,470	$0	$5,470	1.1	1.1	20	NA	NA
5	WALK IN COOLER EVAP FAN CONTROLS	William H Ross	5,270	0	$3,200		$0	$3,200	$790	$0	$790	4.1	4.1	2	NA	NA
7	HW SUPPLY RESET STRATEGY	Eugene A Tighe	0	335	$2,300		$0	$2,300	$500	$0	$500	4.6	4.6	2	NA	NA
7	HW SUPPLY RESET STRATEGY	Union Avenue	0	170	$2,300		$0	$2,300	$250	$0	$250	9.2	9.2	1	NA	NA
7	HW SUPPLY RESET STRATEGY	William H Ross	0	170	$2,300		$0	$2,300	$250	$0	$250	9.2	9.2	1	NA	NA
8	PREMIUM EFFICIENCY MOTORS	William H Ross	10,830	0	$13,100		$930	$12,170	$1,620	$0	$1,620	8.1	7.5	4	58.3%	$29,160
8	PREMIUM EFFICIENCY MOTORS	Union Avenue	3,470	0	$4,990		$560	$4,430	$520	$0	$520	9.6	8.5	1	52.7%	$9,360
8	PREMIUM EFFICIENCY MOTORS	Eugene A Tighe	4,160	0	$7,430		$730	$6,700	$620	$0	$620	12.0	10.8	1	40.0%	$11,160
9	LIGHTING	Eugene A Tighe	145,350	0	$153,000		$20,320	$132,680	$21,800	$0	$21,800	7.0	6.1	48	NA	NA
9	LIGHTING	William H Ross	63,260	0	$112,000		$16,760	$95,240	$9,490	$0	$9,490	11.8	10.0	21	NA	NA
9	LIGHTING	Union Avenue	36,500	0	$85,000		$12,280	$72,720	$5,470	$0	$5,470	15.5	13.3	12	NA	NA
10	PUMP OPTIMIZATION	Eugene A Tighe	3,610	0	$5,310		$90	$5,220	$540	$0	$540	9.8	9.7	1	NA	NA
10	PUMP OPTIMIZATION	Union Avenue	2,600	0	$6,130		$130	$6,000	$390	$0	$390	15.7	15.4	1	NA	NA
11	MOTOR EFFICIENCY CONTROLLERS FOR ELEVATORS	William H Ross	3,860	0	$14,000		$0	$14,000	$580	$0	$580	24.1	24.1	1	NA	NA
12	NEW BOILER	Eugene A Tighe	0	8,460	$327,800	$106,200	$1,750	$219,850	$12,700	$0	$12,700	25.8	17.3	50	50.5%	$444,500
12	NEW BOILER	William H Ross	0	5,400	$327,800	$106,200	$1,750	$219,850	$8,090	$0	$8,090	40.5	27.2	32	22.4%	$283,150
12	NEW BOILER	Union Avenue	0	1,230	$125,700	$53,100	$875	$71,725	$1,840	$0	$1,840	68.3	39.0	7	-11.4%	$64,400
Totals		All Schools	628,275	52,305	$1,243,680	$265,500	$56,175	$922,005	$172,670	$0	$172,670	7.2	5.3	513	-9.5%	$ 841,730

Historic Energy Consumption

Utility Usage and Costs Summary **Time-period: March 2008 – March 2009**

SCHOOLS	Electric			Natural Gas		
	Annual kWh	Annual Cost	$ / kWh	Annual Therms	Annual Cost	$ / Therm
Union Avenue School	303,360	$43,161.63	$0.14	24,998	$39,019.11	$1.56
William H Ross III School	855,120	$141,969.51	$0.17	25,660	$39,152.68	$1.53
Eugene A. Tighe School	904,010	$138,309.46	$0.15	41,453	$59,140.03	$1.43
TOTALS/AVERAGE	**2,062,490**	**$323,440.60**	**$0.15**	**92,111**	**$137,311.82**	**$1.50**

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

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

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.
- Buildings with an Energy Star rating/score of 75, or above, are eligible to apply for an official Energy Star Building label.

Facility Name	Total Floor Area	Energy Star Score	Apply for ENERGY STAR	Energy Intensity (kBtu/SF)	Source Energy Intensity
Union Avenue School	48,369	82	Yes	70.2	121.2
William H Ross III School	79,487	47	NA	68.0	155.0
Eugene A. Tighe School	87,718	41	NA	81.1	165.2

Historic Energy Consumption (continued)

Portfolio Manager Sign - In

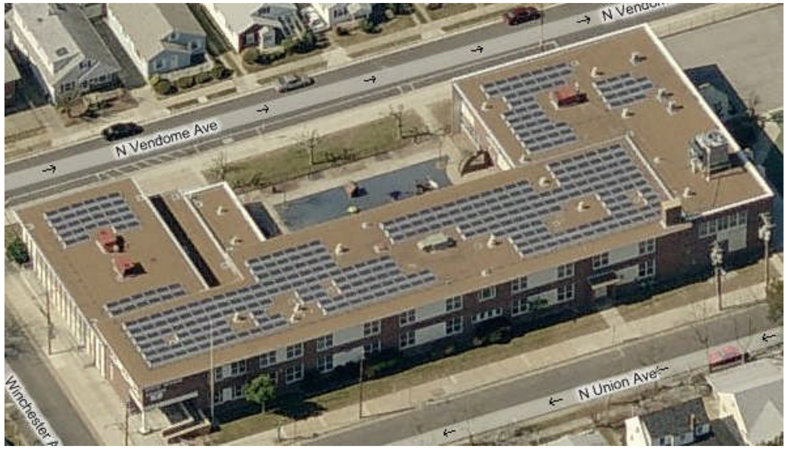
- An account has been created for Margate City Board of Education in Portfolio Manager. You will have received an email to notify you of the generation of this account and shared access with Dome-Tech. Please use this to read your facility information. Please feel free to alter this information when the report is finalized. We would ask that you leave the sign-in information alone until then. Your school'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:	***MargateCityBOE***
Password:	***DTMargateCityBOE***
Email for account:	spalaia@margateschools.org

Facility Description – Union Avenue

- **Building Name:** **Union Avenue School**

Address:	9001 Winchester Avenue
	Margate NJ 08402
Gross Floor Area:	48,369 s.f.
Year Built:	1972
Grades:	Pre-K - 2
# Students/ # Staff:	39 /179



- **Construction Features:**

Facade:	Brick, concrete masonry unit block
Roof Type:	Flat, brown, in good condition
Windows:	Covering 50% of façade, approx. 5-10 years old, metal frame, operable, double pane, with blinds, in good condition

Facility Description – Union Avenue

- **Major Mechanical Systems**
  - All buildings are controlled by a Siemens Apogee central building management system
  - Air Handlers / AC Systems / Ventilation Systems
    - Thirty-four (34) Unit Ventilators
      Chilled water
      Steam and Hot Water
    - Three (3) Electric Unit Radiators
    - Three (3) Fan Coil Units (FCUs) (VAV for front offices)
      Chilled Water Coil
      Hot Water Coil
    - Three (3) Split Air Conditioning Units (ACs)
      DX Cooling
    - Three (3) Packaged DX Roof Top Units (RTUs)
      Indirect Natural Gas Heat
      DX Stage Cooling
    - One (1) Make-up Air Unit (MAU)
    - One (1) Kitchen Exhaust Fan

Facility Description – Union Avenue

- **<u>Major Mechanical Systems (cont.)</u>**
    - One (1) Trane Chiller – 110 ton
    - One (1) Marley Cooling Tower
    - One (1) Condenser Water Pump – 5HP, 365 gpm at 36 feet
    - Two (2) Chilled Water Pumps – 15 HP, 250 gpm at 106 feet

  - Boilers/ Heating Systems
    - One (1) Hot Water Pump
    - Two (2) Superior Boilers – 150 Bhp
      - (150 Bhp) Natural Gas Fired – Low Pressure Steam
    - One (1) Amtrol Steam Converter (Heat Exchanger)
    - One (1) Bock Domestic Hot Water Storage Tank – 100 gallons

Please see Appendix for detailed Equipment Inventory.

Facility Description – Ross School

- **Building Name:** **William H Ross III School**

Address:	101 N Haverford Margate City, NJ 08402
Gross Floor Area:	79,487 s.f.
Year Built:	2000
Grades:	3-5
# Students/ # Staff:	32/222

- **Construction Features:**

Facade:	Brick, in excellent condition
Roof Type:	Flat, built up roll shingle, metal deck, brown, approx. 9 years old, in good condition
Windows:	Covering 50% of façade, metal frame, operable/fixed mixture, double glazed, no shades, in like new condition
Exterior Doors:	Metal, 10% glazing, in like new condition

Facility Description – Ross School

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- **Major Mechanical Systems**

  - Air Handlers / AC Systems / Ventilation Systems
    - Seven (7) Fan Coil Units (FCUs)
    - Twenty-Five (25) Trane Air Handling Units (AHUs)
    - Two (2) Trane Split System Packaged DX RTU – 10 Tons
    - One (1) Trane Chiller – 410 Tons
    - Two (2) Chilled Water Pumps
    - One (1) Marley Cooling Tower
    - One (1) Aurora Condenser Water Pump – 910 gpm; 30 hp
  - Boilers / Heating Systems
    - Five Boiler
      - Three (3) Smith Cast Iron boiler - 125, 000 btu's each.
        - 9 Years old.
      - Two (2) Unilux Natural gas Boiler; Hot Water – 150 Bhp.
    - Two (2) Aurora Hot Water Pumps – 30 HP, 910 gpm at 100 feet.
    - One (1) Bock Domestic Hot Water Storage Tank – 100 gallons.

Please see Appendix for detailed Equipment Inventory.

Facility Description – Tighe School

- **Building Name:** **Eugene A. Tighe School**

  Address: 7804 Amherst Avenue, Margate, NJ 08402

  Gross Floor Area: 87,718 s.f.

  Year Built: 1979

  Grades: 6-8

  # Students/ # Staff: 32/223

- **Construction Features:**

  Facade: Brick, in fair condition

  Roof Type: Flat, built up roll shingle, brown, metal deck, in like new condition

  Windows: Covering 15% of façade, metal frame, double glazed, operable, vertical and pull down shades, approx. 10-15 years old, in good condition

  Exterior Doors: Approximately 45, in good condition

Facility Description – Tighe School

- **<u>Major Mechanical Systems</u>**

  - Air Handlers / AC Systems / Ventilation Systems.
    - Eleven (11) Trane Packaged DX Rooftop Units (RTUs).
      - Indirect Natural Gas Heat.
      - DX Stage Cooling.
    - One (1) Trane Chiller – 400 Tons using R-134a.
    - Two (2) Chilled Water Pumps.
    - One (1) Marley Cooling Tower.
    - One (1) Aurora Condenser Water Pump – 910 gpm; 30 hp.

  - Boilers / Heating Systems
    - Two (2) Superior 150 Bhp natural gas fired, hot water boilers
    - Four (4) Marathon Electric hot water pumps (2-3HP and 2-10HP)
    - Two (2) Bock Domestic Hot Water Storage Tank – 100 gallons each.

Please see Appendix for detailed Equipment Inventory.

Greenhouse Gas Emission Reduction

Implementation of all the ECOs will yield:

- 628,275 kilowatt-hours of annual avoided electric usage.
- 52,305 therms of annual avoided natural gas usage.
- This equates to the following ***annual*** reductions:

- 513 tons of CO_2;

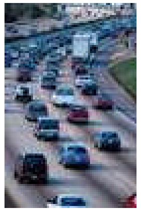
-OR-

- 89 Cars removed from road;

-OR-

- 140 Acres of trees planted annually

The Energy Information Administration (EIA) estimates that power plants in the state of Connecticut emit 0.694 lbs CO_2 per kWh generated.



The Environmental Protection Agency (EPA) estimates that one car emits 11,560 lbs CO_2 per year.

The EPA estimates that reducing CO_2 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.

- The following utility prices provided were used within this study:
  - Electricity Cost ($/kWh): $0.15
  - Natural Gas Cost ($/therm): $1.50

- The average CO_2 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 CO_2 per kWh generated.
  - The EPA estimates that burning one therm of natural gas emits 11.708 lbs CO_2.
  - The EPA estimates that one car emits 11,560 lbs CO_2 per year.
  - The EPA estimates that reducing CO_2 emissions by 7,333 pounds is equivalent to planting an acre of trees.

- Avoided Costs (Like-In-Kind Replacement) are used for capital improvement projects that are not warranted solely based on energy savings. Therefore, avoided costs are the replacement costs for like (capacity, efficiency, etc.) equipment; it is assumed that the existing equipment will be replaced at the end of its useful life. The net implementation cost is the difference between a premium efficiency model/configuration and like-in-kind replacement.

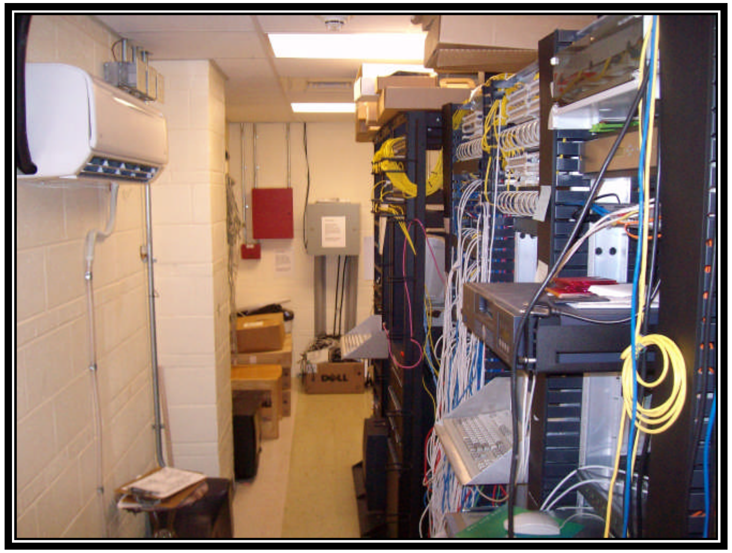
Energy Conservation Measure
ECM #1: Optimize Time of Day Schedules

- Although the school is only occupied from 7:00 am to 5:00 pm, the Building Management System (BMS) currently has the HVAC systems operating from 6:00 am to 11:00 pm
- Optimizing the schedules to better reflect actual building occupancy will reduce heating and cooling costs.
- Dome-Tech recommends programming different space temperature setpoints for unoccupied hours or even eliminating the use of the HVAC equipment for particular zones.

	TOTAL	UNION AVENUE	WILLIAM H ROSS	EUGENE A TIGHE
Estimated Annual Energy Cost Savings:	**$87,000**	$15,890	$22,610	$48,500
Estimated Gross Implementation Costs:	**$12,000**	$4,000	$4,000	$4,000
Potential Rebate/Incentive:	**$0**	$0	$0	$0
Net Estimated Implemtation Costs:	**$12,000**	$4,000	$4,000	$4,000
Simple Payback (yrs) (with & w/o rebate):	**0.1**	0.3	0.2	0.1
Annual Avoided CO_2 Emissions (tons):	**261**	47	68	146

ECM #2: Media Center AC Setpoint Optimization

- The Tighe media center server room has a zone temperature setpoint of 72 ºF. The space is condition by a 36,000 btu/h split air conditioning unit.



- A typical server room setpoint is 78 ºF instead of the current setpoint of 72 ºF, and that is completely safe for the equipment operation.

- Dome-Tech recommends setting the space setpoint to 78 ºF, which will decrease the cooling load on the split unit and generate savings.

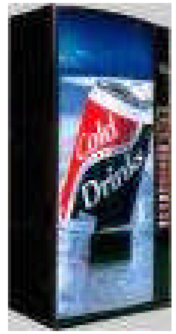
TIGHE	
Estimated Annual Energy Savings:	$150
Gross Estimated Implementation Cost:	$100
NJ Smart Start Rebate:	$0
Net Estimated Implementation Cost:	$100
Simple Payback (years):	0.6
Annual Avoided CO_2 Emissions (tons):	0

ECM #3: Vending Machine Power Management

- Dome-Tech recommends installing a VendMiser vending machine power management device on all 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).



	TOTAL	UNION AVENUE	WILLIAM H ROSS	EUGENE A TIGHE
Estimated Annual Savings:	$2,920	$970	$490	$1,460
Gross Estimated Implementation Cost:	$2,820	$940	$470	$1,410
Potential Rebate / Incentive:	$0	$0	$0	$0
Net Estimated Implementation Costs:	$2,820	$940	$470	$1,410
Simple Payback (yrs): (with & w/o rebate)	1 - 1	1 - 1	1 - 1	1 - 1
Annual Avoided CO_2 Emissions (tons):	6	2	1	3

ECM #4: Domestic Hot Water Optimization

- All observed domestic hot water heaters had an associated circulation pump that circulated the hot water around the school. These pumps had a capacity of 1-2 hp and they operated all hours of the year.

- Dome-Tech recommends scheduling the circulation pumps around the occupancy of the building. Savings will be generated by reducing the hours when the circulation pump operates and reduce the heat loss in the pipes during unoccupied hours.

	TOTAL	UNION AVENUE	WILLIAM H ROSS	EUGENE A TIGHE
Estimated Annual Savings:	$3,130	$640	$1,220	$1,270
Gross Estimated Implementation Cost:	$3,300	$1,100	$1,100	$1,100
Potential Rebate / Incentive:	$0	$0	$0	$0
Net Estimated Implementation Costs:	$3,300	$1,100	$1,100	$1,100
Simple Payback (yrs): (with & w/o rebate)	1.1 - 1.1	1.7 - 1.7	0.9 - 0.9	0.9 - 0.9
Annual Avoided CO_2 Emissions (tons):	7	1	3	3

ECM #5: Excessive Ventilation

- Union, Ross, and Tighe school each have a design airflow of 27,250, 39,000, and 89,600 cfm respectively. Each school has approximately 215 occupants. According to the facility engineer's, the outside air intake of the HVAC is set to 30% of the supply air flow whenever the air handling unit is operational (6AM to 11PM).

- There is an excess in ventilation because the average cfm per person is 20-35 while the current average cfm is 70 (45,675 cfm/650 occupants).

- Dome-Tech recommends reducing the current ventilation rate to code requirements in order to increase energy saving. In addition, Dome-Tech recommends further reducing ventilation rates during the hours when the building is unoccupied by students. Savings will be realized by reducing the ventilation load on the HVAC equipment.

- *When implemented with ECM#2, synergies would occur and savings may not be not cumulative.*

	TOTAL	UNION AVENUE	WILLIAM H ROSS	EUGENE A TIGHE
Estimated Annual Savings:	$36,900	$5,920	$9,880	$21,100
Gross Estimated Implementation Cost:	$58,700	$10,500	$15,000	$33,200
Potential Rebate / Incentive:	$0	$0	$0	$0
Net Estimated Implementation Costs:	$58,700	$10,500	$15,000	$33,200
Simple Payback (yrs): (with & w/o rebate)	1.6 - 1.6	1.8 - 1.8	1.5 - 1.5	1.6 - 1.6
Annual Avoided CO_2 Emissions (tons):	134	22	36	76

ECM #6: Walk-In Cooler Controllers

William H Ross	
Estimated Annual Energy Savings:	$790
Gross Estimated Implementation Cost:	$3,200
NJ Smart Start Rebate:	$0
Net Estimated Implementation Cost:	$3,200
Simple Payback (years):	4.1
Annual Avoided CO_2 Emissions (tons):	2

- The walk-in cooler evaporator fans at Ross run 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 #7: Heating Supply Reset Strategy

- Currently, Ross and Tighe supply 170°F hot water to the heating devices regardless of how cold it is outside or how cold the space is.

- During partial load days when the space heating load requirements are fractional (Sept/April) compared to the dead of winter, the boiler operates to maintain a setpoint that is higher than required to satisfy the heating load.

- Dome-Tech recommends programming the BMS to adjust the heating hot water temperature or steam pressure setpoint during the days when partial loads occur. For example, supply 170°F when the outside air temperature (OAT) is at 0°F and 150°F when the OAT is 50°F. This measure will reduce the amount of heat loss in the pipes and reduce the number of times the boiler has to cycle on/off to satisfy the light loads.

	TOTAL	UNION AVENUE	WILLIAM H ROSS	EUGENE A TIGHE
Estimated Annual Savings:	$1,000	$250	$250	$500
Gross Estimated Implementation Cost:	$6,900	$2,300	$2,300	$2,300
Potential Rebate / Incentive:	$0	$0	$0	$0
Net Estimated Implementation Costs:	$6,900	$2,300	$2,300	$2,300
Simple Payback (yrs): (with & w/o rebate)	6.9 – 6.9	9.2 – 9.2	9.2 – 9.2	4.6 - 4.6
Annual Avoided CO_2 Emissions (tons):	4	1	1	2

ECM #8: Premium Efficiency Motors

	TOTAL	UNION AVENUE	WILLIAM H ROSS	EUGENE A TIGHE
Estimated Annual Savings:	$2,760	$520	$1,620	$620
Gross Estimated Implementation Cost:	$25,520	$4,990	$13,100	$7,430
Potential Rebate / Incentive:	$2,220	$560	$930	$730
Net Estimated Implementation Costs:	$23,300	$4,430	$12,170	$6,700
Simple Payback (yrs): (with & w/o rebate)	9.2 - 8.4	8.5 - 9.6	7.5 - 8.1	10.8 - 12
Annual Avoided CO_2 Emissions (tons):	6	1	4	1

- Most of the existing motors serving the pumps are standard efficiency motors. See the appendix for a detailed list of motors surveyed for this ECO. 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
5	7	85.5%	89.5%	$ 54
7.5	2	85.5%	91.0%	$ 81
10	3	89.5%	91.7%	$ 90
15	4	87.5%	93.0%	$ 104
20	4	89.5%	93.0%	$ 113
30	4	89.5%	94.1%	$ 135

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

ECM #9: Lighting Upgrade

- Although most of the current light fixtures have higher efficiency T-8 fluorescent lamps and ballasts, improved light fixture designs will further reduce lighting energy costs by reducing the total number of lamps and fixtures while maintaining the minimum lighting output as per state codes.
- Most of the current lights in the 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 gymnasiums.
- Many 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%*.

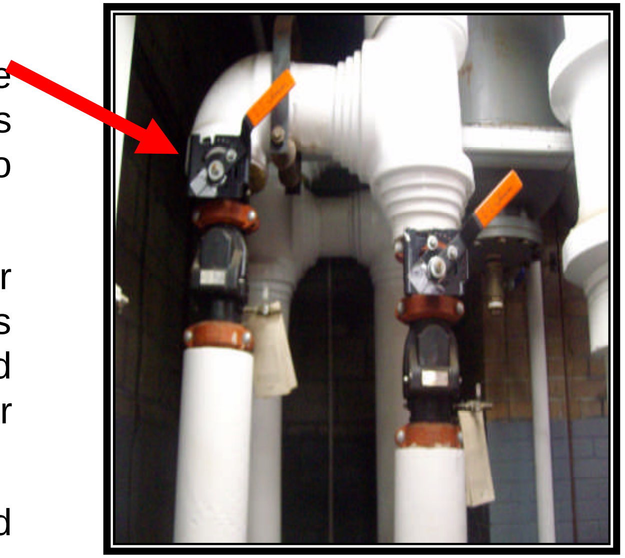
*Source: Turner, Wayne, Energy Management Handbook, 1999.

	TOTAL	UNION AVENUE	WILLIAM H ROSS	EUGENE A TIGHE
Estimated Annual Savings:	$36,760	$5,470	$9,490	$21,800
Gross Estimated Implementation Cost:	$350,000	$85,000	$112,000	$153,000
Potential Rebate / Incentive:	$49,355	$12,275	$16,760	$20,320
Net Estimated Implementation Costs:	$300,645	$72,725	$95,240	$132,680
Simple Payback (yrs): (with & w/o rebate)	9.5 - 8.2	13.3 - 15.5	10 - 11.8	6.1 - 7
Annual Avoided CO_2 Emissions (tons):	81	12	21	48

ECM #10: Pump Optimization (Resize)

	TOTAL	UNION	TIGHE
Estimated Annual Energy Cost Savings:	$930	$390	$540
Estimated Gross Implementation Costs:	$11,440	$6,130	$5,310
NJ Smart Start Rebate:	$220	$130	$90
Net Estimated Implementation Costs:	$11,220	$6,000	$5,220
Estimated Simple Payback:	12	15.4	9.7
Annual Avoided CO_2 Emissions (tons):	2	1	1

- The chilled water and hot water distribution pumps at Union and Tighe have their discharge balancing valves throttled 50% closed.
- Pump discharge balancing valves are typical throttled to provide artificial resistance in a distribution system when the pump is improperly oversized. An oversized pump uses excessive energy to deliver the necessary flow required by the system.
- Dome-Tech recommends either re-sizing the pumps to better match system head and flow requirements or opening the valves 100% and modulating pump speed to maintain required flow and head. Further engineering and analysis is required for either option.
- The implementation costs are based on pump re-sizing and replacement.



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ECM #11: Power Efficiency Controller

- The Ross building has a 15 hp motor the serves the elevator to the board of education office on the 3rd floor. The motor is a standard efficiency motor.

- Power efficiency controllers (PEC) are designed to manage motor efficiency in constant speed systems by varying the power to motor while maintaining a fixed speed. A PEC is essentially a soft start with proprietary technology (voltage/amperage control algorithms). The technology senses a lightly loaded motor's inefficiency and reduces the power to the electric motor while maintaining the motor at full operating speed. In numerous tests by independent third parties, the PEC typically saves 20-40% of the electricity used by motors in appropriate applications.

- A PEC will provide energy savings by reducing the power (KW) drawn by 35% for the elevator.

William H Ross	
Estimated Annual Energy Savings:	$580
Gross Estimated Implementation Cost:	$14,000
NJ Smart Start Rebate:	$0
Net Estimated Implementation Cost:	$14,000
Simple Payback (years):	24.1
Annual Avoided CO_2 Emissions (tons):	1

ECM #12: High Efficiency Boilers

- Ross and Tighe Schools each have two (2) natural gas fire-tube hot water boilers and Union Avenue has two (2) natural gas fired steam boilers.

- The boilers are twenty-one (21) years old and are nearing the end of the equipment service life (ASHRAE states the service life of similar equipment to be 25 years).

- The boiler's age, size, type and configuration 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 condensing boilers, savings will be realized in two ways. In modular boiler applications, multiple smaller boilers are installed to meet the overall building load. Each boiler operates independently, eliminating the "all on/all off" operation of single burner boilers. As building load increases only those units necessary to meet the load are fired. This allows each unit to run at optimal efficiency. Secondly, condensing boilers recover energy from the exhaust gas thus allowing efficiencies of 90% and above.

- The high first cost of a new boiler system preclude this ECM from being justified by economics alone. However, reliability issues warrant consideration of this project as part of a long-term capital improvement plan. Installation of a new boiler would allow boiler runtimes to be equally distributed and would allow for reliable backup capacity should one boiler fail or require repairs.

- High efficiency boilers should be considered when the existing boilers near the end of their useful equipment lives. The cost estimate provided is for the replacement of one of the boilers as the second existing boiler can be used as a standby unit.

ECM #12: High Efficiency Boilers

An Existing Ross School Boiler

Proposed New High Efficiency Condensing Hot Water Boiler

	TOTAL	UNION AVENUE	WILLIAM H ROSS	EUGENE A TIGHE
Estimated Annual Energy Cost Savings:	$22,630	$1,840	$8,090	$12,700
Estimated Gross Implementation Costs:	$781,300	$125,700	$327,800	$327,800
NJ Smart Start Rebate:	$4,375	$875	$1,750	$1,750
Avoided Costs: (Like in Kind Replacement)	$265,500	$53,100	$106,200	$106,200
Net Estimated Implementation Costs:	$776,925	$71,725	$219,850	$219,850
Estimated Simple Payback:	34	39.0	27.2	17.3
Annual Avoided CO2 Emissions (tons):	2	7	32	50

Like-In-Kind Replacement Costs (Avoided Costs) are used for capital improvement projects that are not warranted solely based on energy savings. Therefore, avoided costs are the replacement costs for like (capacity, efficiency, etc.) equipment; it is assumed that the existing equipment will be replaced at the end of its useful life. The net implementation cost is the difference between a premium efficiency model/configuration and like-in-kind replacement.

ECM # 13: Creation of an Energy Awareness & Education Program

- Most of the Margate City Board of Education schools currently have no formal observed program in place.
- Educational institutions are where our nation's youth spend a significant portion of their time. As such, educators can have a potentially large impact on promoting an energy conscious and conservation-minded society that starts at their school, leading to energy cost reductions, environmental benefits, and national energy independence.
- In addition, schools can receive recognition for their efforts and possible media coverage, which can contribute to enhanced school spirit, and individual feelings of accomplishment and connection.

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.

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. All three schools for Margate currently have PV generating technology installed on the roofs of the school.
- 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)

Renewable Energy Technologies: Wind

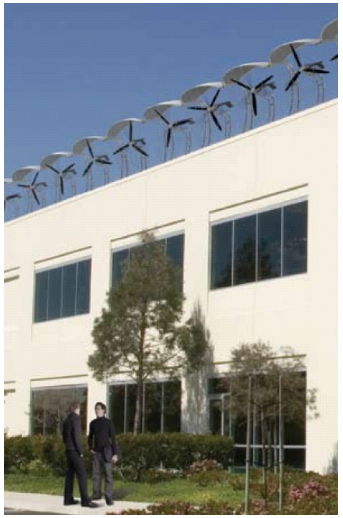
Wind turbines generate electricity by harnessing a wind stream's kinetic energy as it spins the turbine airfoils. As with most renewable energy sources, wind energy is subject to intermittent performance due to the unpredictability of wind resources.

Margate Wind Speed

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 Margate area is 4.9 meters per second. Ideal wind speeds for a successful project should average over 6 meters per second.

For the Margate schools, 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 project economics and wind turbine pros and cons are presented in the following tables:

Wind Turbine Economics

	Building Integrated	Ground Mount 5 kW	Ground Mount 50 kW
Gross Installation Cost Estimate	$97,500	$124,800	$250,000
NJJ SSB Rebate	$43,156	$56,779	$112,090
Net Installation Cost Estimate	$54,344	$68,021	$137,910
Annual Energy Savings	$2,023	$4,074	$20,667
Simple Payback	26.9 yrs.	16.7 yrs.	6.7 yrs.
System Capacity	20 kW	21 kW	50 kW
Annual Avoided Energy Use	13,486 kWh	27,157 kWh	137,781 kWh
Annual CO2 Emmisions, Therms	5	10	48
% of Annual Electric Use*	1.5%	3.0%	15.2%

Wind Turbine Pros & Cons

Pros	Cons
➢Annual reduction in energy spend and use can be potentially reduced by almost $14,000 (10% reduction). ➢Typical equipment life span is 15-30 years. ➢Reduction of annual greenhouse gas emissions by 4-28 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 10 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 Margate City BOE decide to pursue a wind turbine project, Dome-Tech recommends commissioning a more detailed study.

Renewable Energy Technologies: CHP/Cogeneration

- CHP (combined heat and power) or cogeneration is the use of a heat engine to simultaneously generate both electricity and useful heat.

- Fuel Cells are electrochemical conversion devices that operate by catalysis, separation 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 back in, combining them with the protons and oxidant, producing waste products (usually water and carbon dioxide).

- Microturbines are rotary engines that extract energy from a flow of combustion gas. They can be used with absorption chillers to provide cooling through waste heat rather than electricity. Microturbines are best suited for facilities with year-round thermal and/or cooling loads.

- These technologies are not recommended for Margate Schools due to the lack of waste heat applications available in the summertime.

Utility Tariff and Rate Review: Electricity

- **Accounts and Rate Class:** The District's three schools are served by four electric accounts behind Atlantic City Electric (ACE) under rate classes Annual General Service (AGS).

- **Electric Consumption and Cost:** Based on the one-year period studied, the total annual electric expenditure for the District is about $323,000 and the total annual consumption is about 2,062,000 kilowatt-hours (kWh).

- **Average/Effective Rate per kWh:** For the one year period studied, the Township's average monthly cost per kilowatt-hour ranged from 9.78 ¢/kWh to 18.43 ¢/kWh, inclusive of utility delivery charges. The Township's overall, average cost per kilowatt-hour during this period was 15.00 ¢/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. 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 District's three schools are served by three natural gas accounts behind South Jersey Gas Company under rate classes Basic Gas Supply Service-General Service (BGSS-GSG).

- **Natural Gas Consumption and Cost:** Based on the one-year period studied, the total annual natural gas expenditure for the District is about $137,000 and the total annual consumption is about 92,000 therms (th). Natural gas is used predominantly throughout the winter period for heating purposes.

  - Retail Energy Supplier: For the one-year period studied, the District was supplied with natural gas from Pepco Energy at a fixed rate of $1.50 per therm.

- **Average/Effective Rate per Therm:** For the one year period studied, the District's average cost per therm ranged from $1.43 to $1.56 per therm, inclusive of utility delivery charges. The District's overall, average cost per therm during this period was $1.50 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.

- 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.

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 the summer of 2009, we have seen customers with BGS-FP accounts save approximately 10-20% in projected energy costs by switching to retail energy supplier. If the District were able to secure this type of agreement, this would represent an annual savings of approximately $123,000 - $246,000. 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.

- Natural Gas
  - Based on current and recent market conditions, and actual bid processes run by Dome-Tech for various clients during the summer of 2009, 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 District is currently supplied natural gas from Pepco under a third-party retail energy contract.

- 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.

- 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.)

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- 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

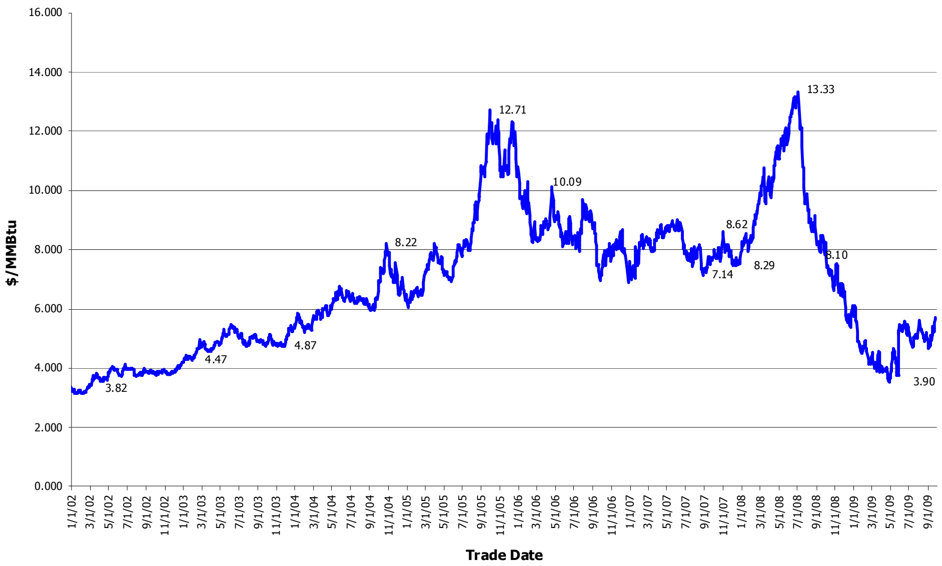
**Note: Not every Supplier serves customers in all utility territories within New Jersey*

Historical Energy Futures Settlement Prices

Dome-Tech, Inc.

- 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

- **Issue:** The Union facility has approximately 32 unit ventilators. The filters are pass their service lifespan and they are excessively loaded with dust particles.
- **Impact:** Excessively loaded filters tend to increase the differential pressure across the filter bank, therefore, reducing the amount of discharge air to condition the space and increasing fan energy consumption. Bypassed dirt can clog and reduce heat transfer over clean cooling and heating coils.
- **Recommendation:** Dome-Tech recommends replacing the filters to reduce energy consumption and improve indoor air quality.

- **Issue:** Corrosion of RTU condenser fins due to proximity to salt water.
- **Impact:** Reduction in condenser heat rejection efficiency.
- **Recommendation:** Clean new condenser fins once per month to prolong life. Existing fins are now to fragile, due to corrosion, to be able to clean.

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

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

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

Next Steps

- **<u>The following projects should be considered for implementation:</u>**
  - Time of Day Optimization – All Schools
  - Install Domestic Hot Water Heater Timers – All Schools
  - Adjust Ventilation Controls – All Schools
  - Lighting upgrades – All Schools
  - Vending machine power management – All Schools
  - Start Energy Awareness Program – All Schools
  - Energy Procurement (Electricity & Gas) - All Schools
  - Retro-Commissioning Opportunities - All Schools

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