

Energy and **CDM**

Investment Grade Energy Audits for Government Facilities

Matthew Goss, P.E., C.E.M, C.E.A, LEED®AP (BD+C)

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Agenda

- Introduction
- What is an “Investment Grade Energy Audit”
- Case Study
- Questions



Investment Grade Energy Audits (IGA)

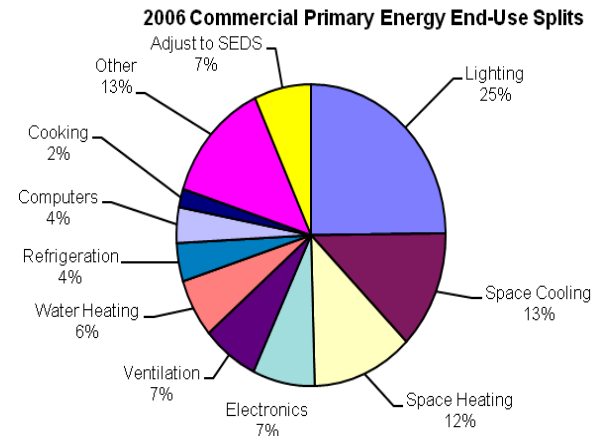
- Identify Realistic Energy Conservation Opportunities
 - Inspection/Assessment
 - Analysis/Modeling
- Identify Associated Costs
 - Operating & Maintenance
 - Construction Costs
 - Financing Mechanisms

“An IGA Should give you the information you need to make a sound financial decision!!”



What's in an IGA?

- Facility Energy Analysis
 - Lighting
 - Process Equipment
 - HVAC & Water Heating Equipment
 - Other (plug loads)
- Dynamic Modeling of Energy Use & Savings (Validation)
 - Yearly Energy Savings
 - Peak Energy Savings



Case Study – Township of Manalapan

- Buildings Included In Audit
 - Municipal Building & Police Headquarters
 - Dreyer Farm House
 - Dreyer Snack Bar
 - (2) Recreation Garages
 - Kuschick Pavilion
 - Department of Public Works Office
 - Department of Public Works Garage
 - Department of Public Works Mechanic/Maintenance Shop
 - Senior Citizen's Center
 - Teen Center & Police Gym



Table ES-1: Ranking of Recommended ECRM's

Overall Ranking (Based on Simple Payback)	ECRM	Engineer's Opinion of Probable Construction Cost	Project Annual Energy Savings	Projected Annual Energy Cost Savings	Simple Payback Period (years)
1	Main Building - Boiler Control Implementation	\$300.00	5,674 therms	\$7,376.00	<0.1
2	Teen Center/Police Gym - Boiler Control Implementation	\$300.00	811 therms	\$1,046.00	0.3
3	Dreyer Farm House - Lighting Upgrade	\$82.00	1,367 kWh	\$287.00	0.3
4	Main Building - Lighting Upgrade	\$63,464.00	126,203 kWh	\$19,789.00	3.2
5	Kuschick Pavilion - Lighting Upgrade	\$3,602.00	3,934 kWh	\$985.00	3.7
6	Main Building - Economizers	\$48,849.00	65,312 kWh	\$10,240.00	4.8
7	Senior Center - Lighting Upgrade	\$10,116.00	11,053 kWh	\$1,947.00	5.2
8	Maintenance Garage Small - Lighting Upgrade	\$955.00	483 kWh	\$120.00	7.9
9	DPW Mechanic Shop - Lighting Upgrade	\$6,356.00	2308 kWh	\$662.00	9.6
10	Maintenance Garage Large - Lighting Upgrade	\$2,024.00	824 kWh	\$206.00	9.8
11	Main Building- Chiller Upgrade	\$133,180.00	69,000 kWh	\$10,820.00	12.3
12	DPW Office - Boiler Upgrade	\$7,367.00	378 therms	\$593.00	12.4
13	DPW Office - Lighting Upgrade	\$10,804.00	4,964.96	\$813.00	13.3

Case Study – Township of Manalapan

- Utility Bill Analysis
 - Electrical Usage
 - Yearly Consumption
 - Peak Usage
 - Rate/Tariff Review
 - 3rd Party Power Provider
 - Natural Gas & Fuel Oil Use

Table 3.1-1: GS Rate Tariffs

Customer Charge (3 Phase)	\$11.65/Month
Transmission Charge	\$0.004938/kWh
Annual Demand Charge	\$3.16/kW
Summer Demand Charge	\$6.94/kW
Winter Distribution kWh Charge (Oct-May)	\$0.004958/kWh
Summer Distribution kWh Charge (Jun-Sept)	\$0.061999/kWh
Societal Benefits Charge	\$0.006444/kWh
System Control Charge	\$0.000078/kWh



Township of Manalapan – Utility Bill Analysis

Figure 3.1-2: Main Building Natural Gas Usage

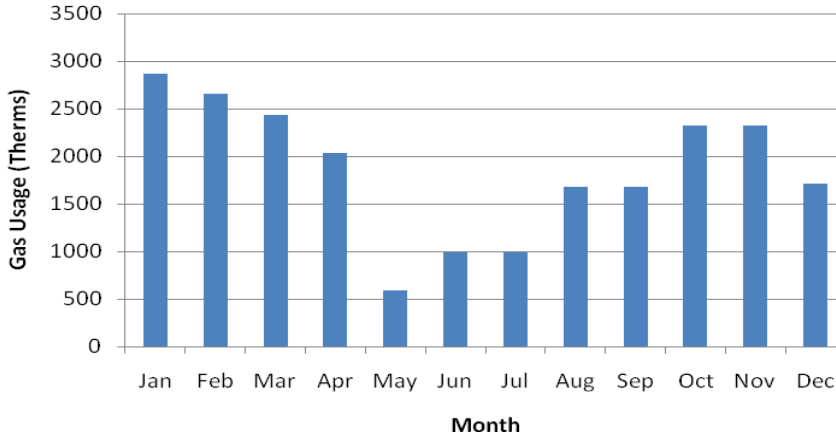
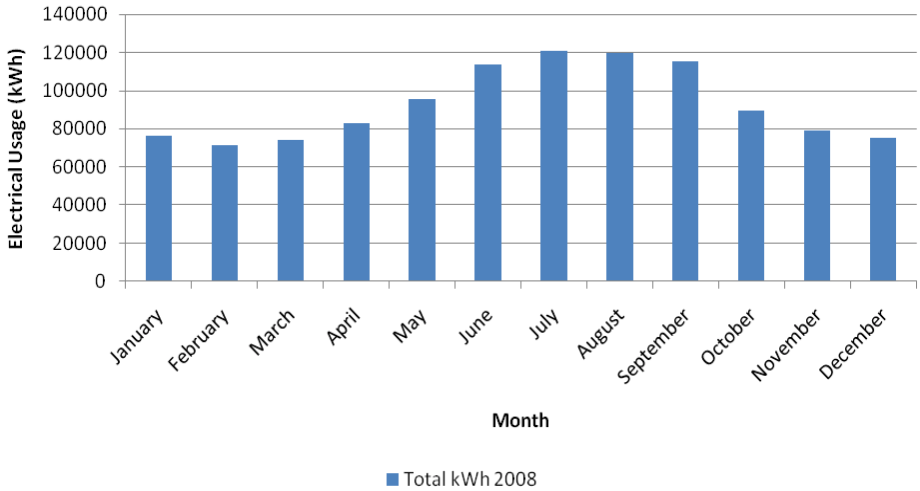


Figure 3.1-1: Main Building Electrical Usage



Township of Manalapan – Identification of Opportunities

- Identification of Opportunities
 - Lighting
 - LED Lighting
 - Occupancy Sensors/Controls
 - Ballast & Light Improvements
 - HVAC
 - Equipment Replacements
 - Control System Replacement

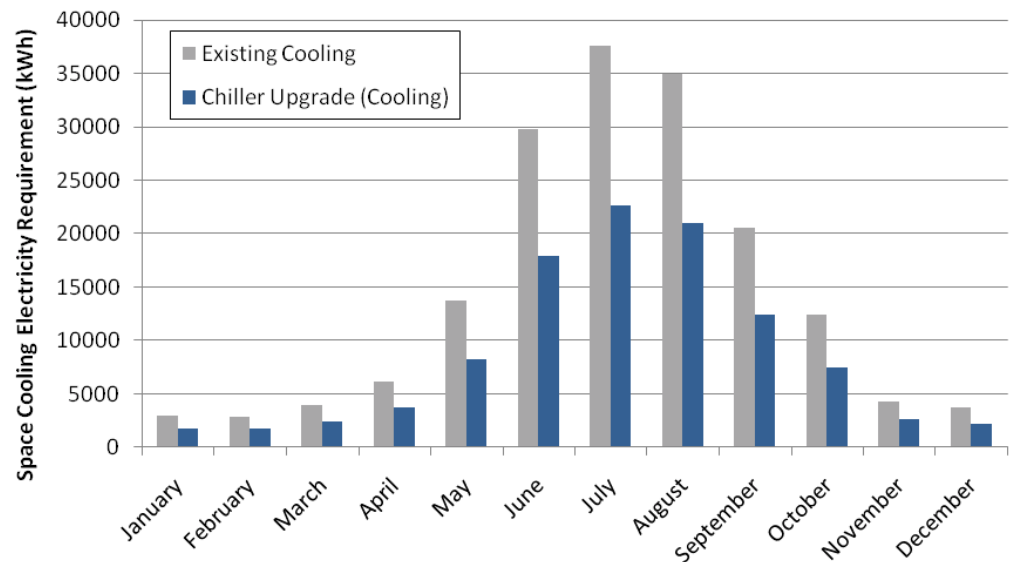


Township of Manalapan – Energy Opportunity Analysis

Table 4.2-2: Main Building Chiller Upgrade Savings

Existing Annual Cooling Electricity Use (kWh)	173,100
Proposed Annual Cooling Elec. Use (kWh)	104,100
Annual Savings (kWh)	69,000
Annual Savings (\$)	\$10,820.00
Estimated Upgrade Cost	\$137,500
Simple Payback	12.7 years

Figure 4.2-4: Main Building Chiller Upgrade Savings



Manalapan – Equipment List

Table 4.2-5: HVAC Equipment Service Lives

Tag	Description	Capacity (MBH)	Approximate Age (Years)	ASHRAE Expected Life (Years)
AHU-1	Air Handling Unit	380	26	15
AHU-2	Air Handling Unit	180	26	15
AHU-3	Air Handling Unit	140	26	15
AHU-4	Air Handling Unit	270	26	15
AHU-5	Air Handling Unit	270	26	15
ACC-1	Chiller	1440	26	23
B-1	Boiler	960	26	30



Manalapan – Construction Cost

CDM

15 British American Boulevard
 Latham, New York 12110
 Phone (518) 782-4500
 Fax (518) 786-3810

PROJECT CONSTRUCTION COST ESTIMATE

Location: Manalapan, NJ
 Estimate by: AJF
 Checked by: JM

ITEM	DESCRIPTION	QTY	UNIT	MATERIAL UNIT COST	MATERIAL SUBTOTAL	QTY	UNIT	LABOR COST	LABOR SUBTOTAL	TOTAL
	Main Building/Police									
1	Energy Efficient T8 Ballast	324	ea.	\$ 35.00	\$ 11,340.00	338	ea.	\$ 51.00	\$ 17,138.00	\$ 28,478.00
2	Fluorescent Lamps	880	ea.	\$ 5.00	\$ 4,400.00	0	ea.		\$ -	\$ 4,400.00
3	26W Compact Fluorescent Bulb	26	ea.	\$ 15.00	\$ 390.00	0	ea.			\$ 390.00
4	Compact Fluorescent Ballast	142	ea.	\$ 35.00	\$ 4,970.00	142	ea.	\$ 51.00	\$ 7,242.00	\$ 12,212.00
5	57W Compact Fluorescent Bulb	142	ea.	\$ 15.00	\$ 2,130.00		ea.		\$ -	\$ 2,130.00
6	Infrared Occupancy Sensor	43	ea.	\$ 35.00	\$ 1,505.00	43	ea.	\$ 25.00	\$ 1,075.00	\$ 2,580.00
7	Ultrasonic Occupancy Sensor	4	ea.	\$ 90.00	\$ 360.00	4	ea.	\$ 25.00	\$ 100.00	\$ 460.00
	Subtotal				25,095.00				25,553.00	

SUBTOTAL = \$ 50,648.00
 MARKUP % = \$ 0.15
 MARKUP = \$ 7,597.20
 SUB-TOTAL w/ OH & P = \$ 58,245.20
 CONTINGENCY % = 0.20
 CONTINGENCY = \$ 11,649.04
 BUDGET COST ESTIMATE = \$ 69,894.24





Questions??

