Maranacook Community High School

The purpose of MCHS is to create an environment where every individual can flourish academically and socially. Through respect, knowledge and responsibility, the school community promotes character building, skill development, and personal fulfillment.

Middle School

Manchester Elementary

Readfield School

Mount Vernon Elementary

MEASUREMENT AND VERIFICATION

6-Months Savings Report
2009

Submitted By: Jose M. Veiga
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85 John Road
Canton, MA 02021

PROJECT OVERVIEW

Client:	**MARANACOOK SCHOOL DISTRICT**
Contact:	**Richard Abramson & Mark Doyon**
6-Month Reporting Period:	**September 29, 2008 – March 28, 2009**
12-Month Reporting Period:	**September 29, 2008 – September 28, 2009**
Contract Term:	**12 Years**

EXECUTIVE SUMMARY

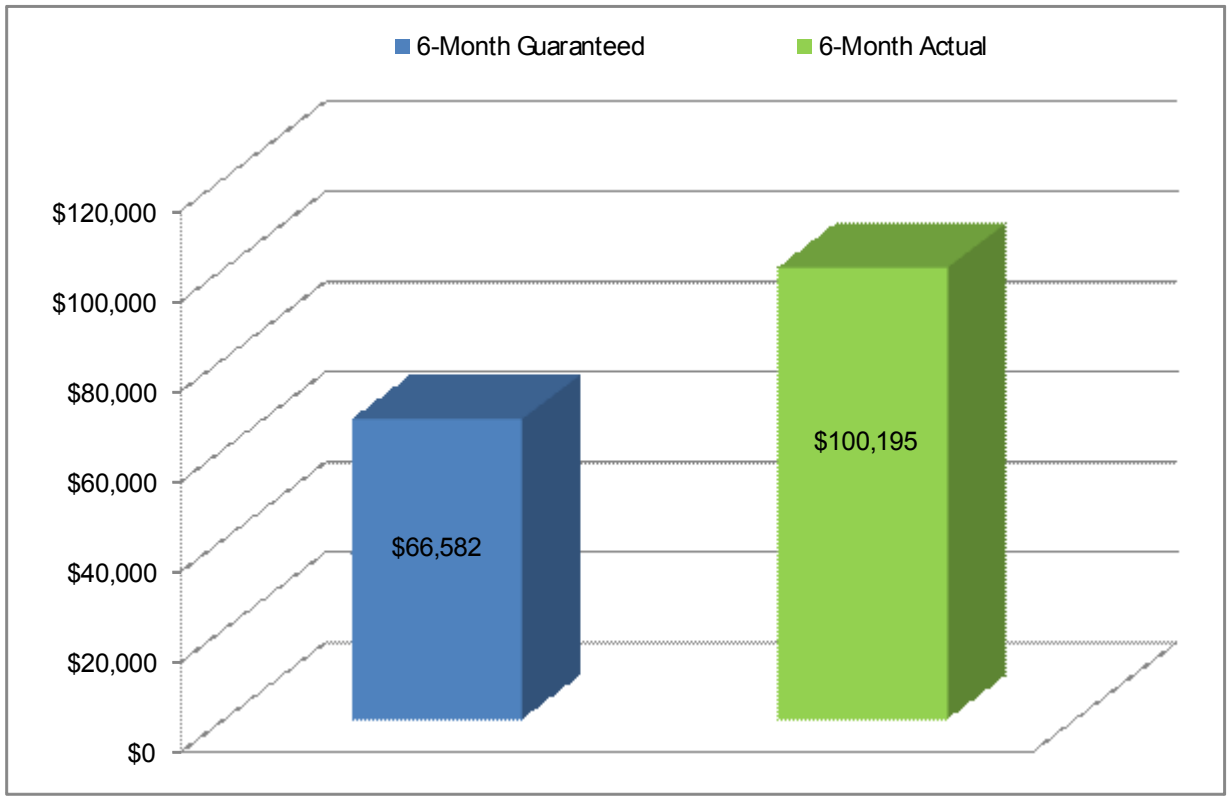
Overview

This Performance Assurance (PA) report summarizes the energy savings that occurred during the past six months of the Performance Contract project implemented by Siemens.

6-Months: **09/29/08 – 03/28/09**

Siemens is pleased to inform Maranacook School District that the verified energy savings for the first 6-Months of the performance assurance period is $100,195. The total projected 6-Month savings guarantee was $66,582. Siemens exceeded the savings over the initial 6-Month guarantee by $33,613. This additional savings was in part attributed to a greater cost of #2 Fuel oil price. Please note that all unit savings and cost savings was adjusted to reflect six months.

6-Month Savings Comparison



6-Month Energy Savings

Date	Electricity (kWh)	#2 Fuel Oil (Gal)
6-Month	258,057	16,680

Greenhouse Gas Emission Report for 6-Month

Electricity Savings

SIEMENS

MARANACOOK SCHOOLS

45 Millard Harrison Dr.
Readfield, Maine

Based on an expected annual savings of 258057 kWh of Fossil Fuel Generated Electricity

This will prevent the following greenhouse gases from being released into the atmosphere:

260,380 lbs
Carbon Dioxide (CO2)

368 lbs
Nitrogen Oxide (NOx)

639 lbs
Sulfur Dioxide (SO2)

Your greenhouse gas emissions savings are equivalent to:

1
Acres of forest preserved from deforestation

1
Railcars of coal burned

22
Cars removed from the road for one year

275
Barrels of oil burned

The table below summarizes the savings per FIM for 6-Months.

Location: High School & Middle School

		6-Month Guaranteed				6-Month Actual				Difference
FIM #	Description	kWH	#2 Oil	Propane	$ Savings	kWH	#2 Oil	Propane	Cost Savings	$ Savings
1	Lighting and Lighting contols	62,371			$8,690	65,922			$9,515	$825
2	Lighting Controls	15,844			$2,147	16,173			$2,597	$449
3	Energy Management System		8,176		$19,477		9,085		$36,720	$17,243
4	Motor Replacement	3,197			$441	3,553			$512	$71
5	Variable frequency Drives	75,211			$10,379	83,568			$11,984	$1,605
6	Building Envelope Improvement		2,073		$4,833		2,073		$8,350	$3,518
7	Vending Machine Control	10,055			$1,388	10,055			$1,444	$56
8	Ice Machine Replacement	2,278			$314	2,278			$328	$14
9	Electric to Propane conversion	17,966		-770	$638	17,966		-770	$748	$109
10	Spray Nozzle Replacement		133		$312		133		$544	$232
11	Return air duct for AHU3	89	650		$1,508	89	650		$2,559	$1,052
	Total	**187,012**	**11,032**	**-770**	**$50,126**	**199,604**	**11,941**	**-770**	**$75,301**	**$25,174**

Location: Readfield Elementary

		6-Month Guaranteed			6-Month Actual			Difference
FIM #	Description	kWH	#2 Oil	$ Savings	kWH	#2 Oil	$ Savings	$ Savings
1	Lighting	16,876		$2,329	15,801		$2,336	$7
2	Lighting Controls	4,616		$637	5,309		$785	$148
3	Energy Management System		1,344	$3,091		1,493	$6,114	$3,023
5	Building Envelope		529	$1,216		529	$2,165	$949
	Total	**21,492**	**1,873**	**$7,274**	**21,110**	**2,022**	**$11,400**	**$4,126**

The table below summarizes the savings per FIM for 6-Months

Location: Manchester Elementary School

		6-Month Guaranteed			6-Month Actual			Difference
FIM #	Description	kWH	#2 Oil	$ Savings	kWH	#2 Oil	$ Savings	$ Savings
1	Lighting Retrofit	18,193		$2,511	19,905		$2,929	$418
2	Lighting Controls	4,145		$572	4,751		$699	$127
3	Energy Management System		627	$1,442		1,254	$2,556	$1,115
4	VFD for the HW pumps	2,828		$390	2,828		$416	$26
5	Building Envelope Improvement		310	$713		620	$1,264	$551
	Total	**25,166**	**937**	**$5,628**	**27,484**	**1,874**	**$7,864**	**$2,236**

Location: Mount Vernon Elementary

		6-Month Guaranteed			6-Month Actual			Difference
FIM #	Description	kWH	#2 Oil	$ Savings	kWH	#2 Oil	$ Savings	$ Savings
1	Lighting	6,719		$927	6,455		$1,048	$121
	Lighting Control	3,118		$430	3,405		$553	$123
2	Energy Management System		562	$1,292		624	$2,595	$1,303
3	Variable frequency Drives	2,911		$402			$525	$124
4	Building Envelope		218	$502		218	$908	$406
	Total	**12,748**	**780**	**$3,554**	**9,859**	**843**	**$5,630**	**$2,077**

1. Guaranteed Savings Types

Guarantee Types. There are four guarantee options to measure and verify savings: Option A - Measured Capacity, Option B - Measured Consumption, Option C - Main Meter Comparison, and Option D - Stipulated.

a. Option A - Measured Capacity. This approach is intended for Facility Improvement Measures where a one-time measurement for specific equipment or systems instantaneous baseline energy use, and a one-time measurement for specific equipment or systems instantaneous post-implementation (Post) energy use can be measured. Baseline and Post energy consumption is calculated by multiplying the measured end use instantaneous capacity (i.e. – kW, Gal/hr, BTU/hr) by stipulated hours of operation for each mode of operation (i.e. – hours, week, month). The calculations for energy consumption were defined in the Measurement and Verification article of Exhibit C. The work sequence required for data collection, evaluation, and reporting was defined in the Performance Assurance Technical Support Program article of Exhibit A.

b. Option B - Measured Consumption. This approach is intended for Facility Improvement Measures where continuous periodic measurements for specific equipment or systems baseline energy use, and continuous periodic measurements for that equipment or systems post-implementation (Post) energy use can be measured. The calculations for energy consumption were defined in the Measurement and Verification article of Exhibit C. Periodic inspections and consumption measurements of the equipment or systems will be necessary to verify the on-going efficient operation of the equipment and saving attainment. The predetermined schedule for data collection, evaluation, and reporting was defined in the Performance Assurance Technical Support Program article of Exhibit A.

c. Option C - Main Meter Comparison. This approach is intended for measurements of the whole-facility or specific meter baseline energy use, and measurements of whole-facility or specific meter post-implementation (Post) energy use can be measured. The methodology to establish baseline and Post parameter identification, modeling approach and baseline or model adjustments was defined in the Measurement and Verification article of Exhibit C. Periodic inspections of baseline energy usage, operating practices, and facility and equipment, and meter measurements of the will be necessary to verify the on-going efficient operation of the equipment, systems, practices and facility, and saving attainment. The predetermined schedule for data collection, evaluation, and reporting was defined in the Performance Assurance Technical Support Program article of Exhibit A.

d. Option D - Stipulated. This approach is intended for Facility Improvement Measures where the end use capacity or operational efficiency; demand, energy consumption or power level; or manufacturer's measurements, industry standard efficiencies or operating hours are known in advance, and used in a calculation or analysis method that will stipulate the outcome. Both CLIENT and SIEMENS agree to the stipulated inputs and outcome(s) of the analysis methodology. Based on the established analytical methodology the savings stipulated will be achieved upon completion of the Facility Improvement Measures Work and that no further measurements or calculations will need to be performed. The methodology and calculations to establish the savings values was defined in the Measurement and Verification article of Exhibit C.

2. Utility Rate Structure and Escalation Rates

2.1 Rate

Below are the utility costs which was used to calculated savings for the past 6-Months.

	Rates	
Locations	kWh	Oil Gallons
HIGH SCHOOL	$0.1441	$4.096
MIDDLE SCHOOL	$0.1430	$3.917
BUS GARAGE	$0.1536	
MANCHESTER ELEMENTARY	$0.1471	$4.078
MT VERNON ELEMENTARY	$0.1624	$4.158
READFIELD ELEMENTARY	$0.1478	$4.094