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The following pages will outline a case study, which shows the benefits in energy and cost savings of properly installed mechanical insulation.

Insulation is a proven means for conserving energy, reducing greenhouse gas emissions, increasing process productivity, providing a safer and more productive work environment, controlling condensation (which can lead to mold growth), supporting sustainable design technology and a host of other benefits.

Mechanical insulation does all of this, while providing a return on investment (ROI) rate, which is seldom rivaled. Despite the proven ROI, insulation is often overlooked and its benefits undervalued. Insulation is truly the lost or forgotten technology. Can you think of a more important time than now to think about how insulation can help you?

An insulation system is a technology, which needs to be engineered and maintained throughout the entire process. Several studies have estimated roughly 10 to 30 percent of all installed insulation is now missing or damaged.

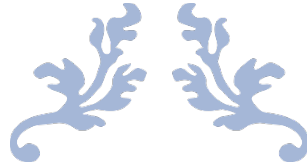
The practice of not replacing or maintaining an insulation system in a timely and correct manner reduces the full benefits of insulation, and in return, decreases the ROI. In many cases, significant other issues - such as excessive energy loss, corrosion under insulation (CUI), mold development, increased cost of operations and reduced process productivity or efficiency - develop.

You can learn more on www.MechanicalInsulatorsLMCT.com, where additional case studies can be viewed.

Please do not hesitate to contact me should you have any additional questions.
Thank you,

Peter Ielimi

Executive Director
Mechanical Insulators Labor Management Cooperative Trust



INSULATION ENERGY APPRAISAL FINAL REPORT

For
Birchmount School
Moncton, New Brunswick



Presented by:
Joshua Sherrard
Heat & Frost Training Centre
1041 Bayside Drive
Saint John, NB
E2J 4Y2

Executive Summary

The insulation energy appraisal evaluated the performance of mechanical rooms at your facility. All piping is currently insulated with 1-inch thick fiberglass insulation. Based on the analysis findings, the appraiser calculated a) the cost of operating line with existing insulation; b) the cost to operate with 1-inch-thick fiberglass vs 1 ½ thick fiberglass. He also calculated emission saving if each facility was properly insulated. These calculations are summarized below.

Energy Cost

Heat loss at Birchmount facility listed at 35,387 Kbtu per year
An estimated 5 year saving of \$ 19,953.45, and a simple payback return on investment in 1.2 years

Energy/Emissions Savings

Co₂ reduction at Birchmount facility 18.68 Mt per year

Insulation and Energy Efficiency

Insulation systems improve the energy efficiency of a plant and reduce the level of emissions of greenhouse gases into the atmosphere. Systems that have an upgraded insulation system can achieve an even more dramatic increase in savings. A properly selected, installed and maintained insulation system can, in many cases, provide an excellent return on investment and quick payback through cost savings. When compared to other conservation measures, the payback is often very quick - usually less than six months. The savings are significant in terms of reduced energy use, increased efficiency, and reduced greenhouse gas emissions.

Conclusion

The appraiser commends Birchmount facility on upkeeping and maintaining their insulation systems. The Birchmount facility insulation system is very well maintained also, and the finding show a relatively positive energy efficiency. Our analysis show that though each facility is believed to be insulated with proper thicknesses. But due to facility maintenance, there are some areas that, if insulated to meet the rest of facility insulation standards, would be able to significantly reduce their energy loss and reduce the level of greenhouse gas emissions.

Limitations:

We have used information provided to us from various sources but information such as operational heating cycles and cooling cycles are based on conversations with maintenance personnel.

Disclaimer:

The results of the insulation energy audit are estimated based upon the data supplied or determined during the audit process and the 3E programs calculations. The results are not guaranteed nor warranted and may vary depending upon information provided and actual operating conditions. The results are intended to portray a reasonable estimate of potential energy savings and emissions reduction with the use of an upgraded and maintain insulation system.

Please contact the undersigned should you have questions about this report

Best regards,

Joshua Sherrard
Energy Appraiser
506 635 8609

ENERGY AUDIT BIRCHMOUNT SCHOOL



Total Heat Loss
5 year savings
of
\$ 19,953.45

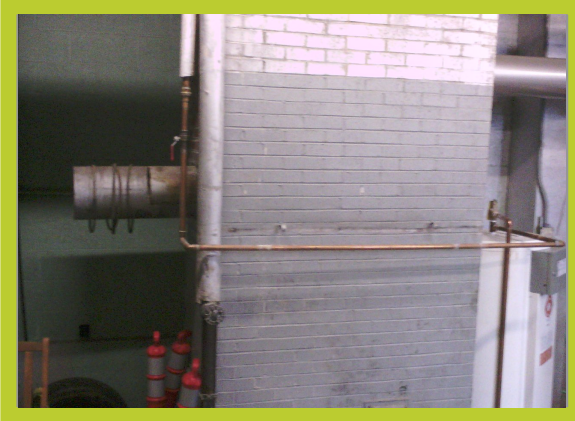
CO₂ Reduction of
18.68 MT/Year

Benefits:

- Simple payback period
- CO₂ Reduction
- Personnel safety

*Audit Done By:
Joshua Sherrard
Certified Thermographer
Certified 3E Plus Auditor*

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

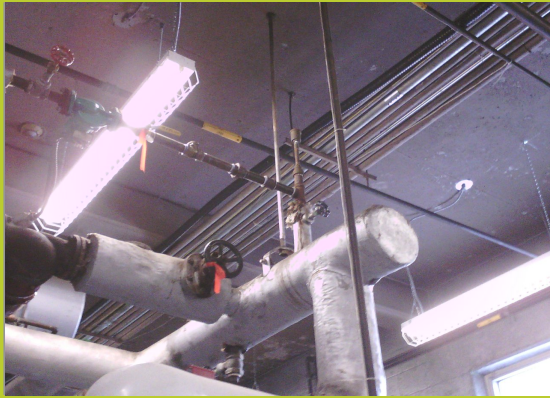
110°F
67°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8760
85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	110	6174	\$ 81.72	\$ 81.72	\$ 408.60	0.36
1	74	1152	\$ 15.12	\$ 66.60	\$ 333.00	0
1.5	72	936	\$ 12.42	\$ 69.30	\$ 346.50	0

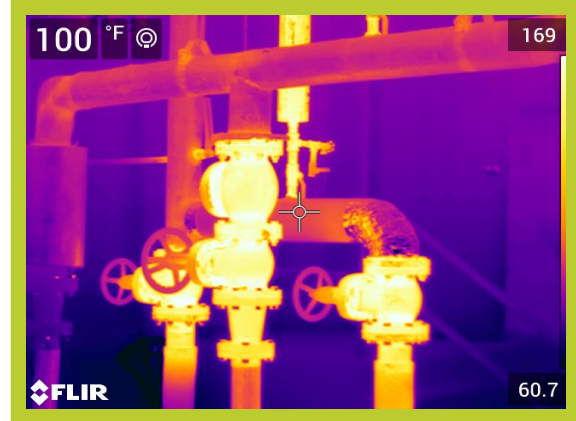
Boiler Room



Operating Temperature,	136°F	Emittance of Surface	0.95
Ambient Temperature,	67°F	Expected Useful Life of Insulation System	20 yrs.
Insulation selected	Fiberglass	Operating hours per year	8760
		Efficiency of fuel Conversion%	85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	136	7152	\$ 94.44	\$ 94.44	\$ 472.2	0.48
1	77	1236	\$ 16.32	\$ 78.12	\$ 390.60	0.12
1.5	74	1008	\$ 13.32	\$ 81.12	\$ 405.60	0.12

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

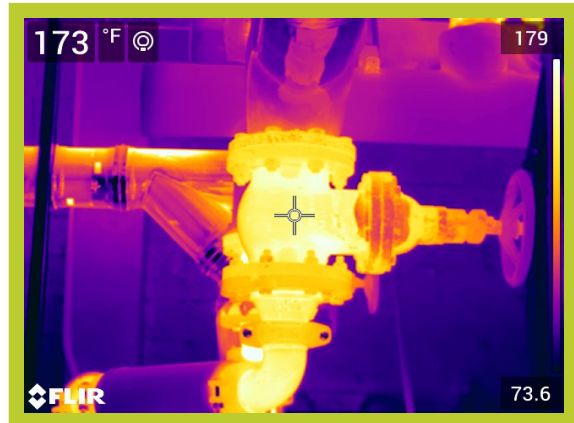
168°F
67°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8760
85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	168	92256	\$ 1218.72	\$ 1218.72	\$ 6093.60	5.76
1	81	10858	\$ 143.52	\$ 1075.20	\$ 5376.00	0.72
1.5	77	7968	\$ 105.12	\$ 1113.60	\$ 5568.00	0.48

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

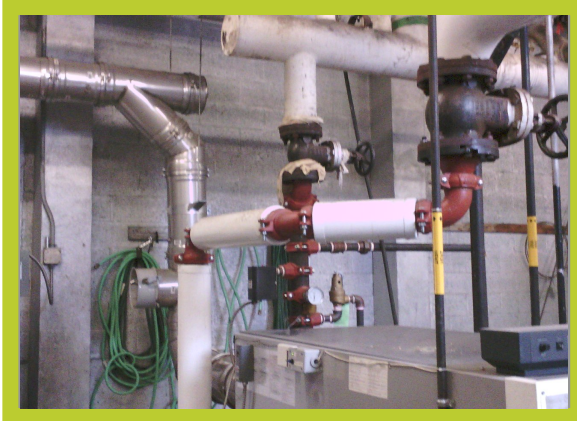
175°F
67°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8760
85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	175	11610	\$ 153.36	\$ 153.36	\$ 766.80	1.12
1	82	1428	\$ 18.87	\$ 134.49	\$ 672.45	0.12
1.5	78	999	\$ 13.20	\$ 140.16	\$ 700.80	0.08

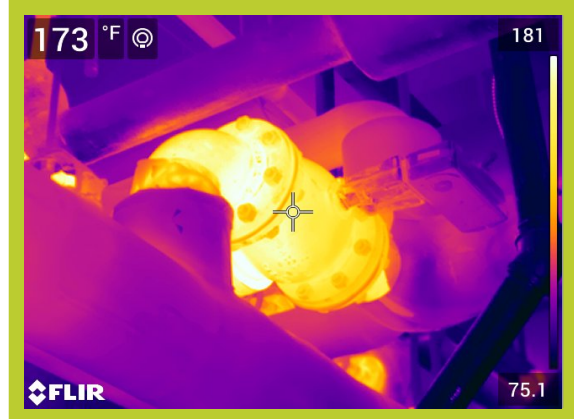
Boiler Room



Operating Temperature,	168°F	Emittance of Surface	0.95
Ambient Temperature,	67°F	Expected Useful Life of Insulation System	20 yrs.
Insulation selected	Fiberglass	Operating hours per year	8760
		Efficiency of fuel Conversion%	85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	168	5115	\$ 1108.35	\$ 1108.35	\$ 5541.75	5.13
1	80	699	\$ 139.59	\$ 968.76	\$ 4843.80	0.54
1.5	76	525	\$ 101.52	\$ 1006.83	\$ 5034.15	0.54

Boiler Room



Operating Temperature,	180°F	Emittance of Surface	0.95
Ambient Temperature,	67°F	Expected Useful Life of Insulation System	20 yrs.
Insulation selected	Fiberglass	Operating hours per year	8760
		Efficiency of fuel Conversion%	85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	180	9540	\$ 126.03	\$ 126.03	\$ 630.15	0.6
1	83	1164	\$ 15.39	\$ 110.64	\$ 553.20	0.06
1.5	76	861	\$ 11.37	\$ 114.66	\$ 573.30	0.06

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

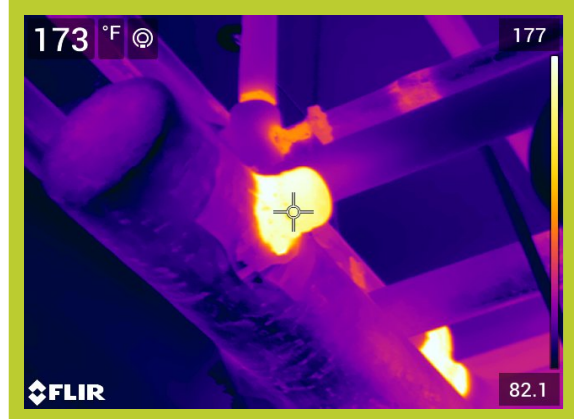
175°F
67°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8760
85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	175	43515	\$ 574.83	\$ 574.83	\$ 2874.15	2.7
1	82	4995	\$ 66.06	\$ 508.77	\$ 2543.85	0.27
1.5	78	3645	\$ 48.15	\$ 526.68	\$ 2633.40	0.27

Boiler Room



Operating Temperature,	173°F	Emittance of Surface	0.95
Ambient Temperature,	67°F	Expected Useful Life of Insulation System	20 yrs.
Insulation selected	Fiberglass	Operating hours per year	8760
		Efficiency of fuel Conversion%	85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	173	5439	\$ 71.85	\$ 71.85	\$ 359.25	0.33
1	80	699	\$ 9.24	\$ 62.61	\$ 313.05	0.03
1.5	76	525	\$ 6.93	\$ 64.92	\$ 324.60	0.03

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

165°F
67°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8760
85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	165	6633	\$ 87.60	\$ 87.60	\$ 438.00	0.14
1	80	810	\$ 10.71	\$ 76.89	\$ 384.45	0.02
1.5	76	612	\$ 8.10	\$ 79.5	\$ 397.50	0.01

Boiler Room



Operating Temperature,
Ambient Temperature,
Insulation selected

105°F
67°F
Fiberglass

Emittance of Surface
Expected Useful Life of Insulation System
Operating hours per year
Efficiency of fuel Conversion%

0.95
20 yrs.
8760
85%

THICKNESS	TEMPERATURE	HEAT LOSS	FUEL COST \$/yr	1styr SAVINGS.	5yr. SAVINGS	CO2 EMMISSIONS
0	104	2322	\$ 30.60	\$ 30.60	\$ 153.00	0.18
1	72	432	\$ 5.67	\$ 24.93	\$ 124.65	0
1.5	70	306	\$ 4.05	\$ 26.55	\$ 132.75	0

Results

Simple Payback Period, yrs	1.2
Internal Rate of Return (IRR or ROI)	81.8%
Net Present Value,	\$74,920

Calculations

Year	Investment	Annual Savings	Annual Cash Flow	Cumulative Cash Flow
0	\$-4,880	\$0	\$-4,880	\$-4,880
1	\$0	\$3,990	\$3,990	\$-890
2	\$0	\$3,990	\$3,990	\$3,100
3	\$0	\$3,990	\$3,990	\$7,090
4	\$0	\$3,990	\$3,990	\$11,080
5	\$0	\$3,990	\$3,990	\$15,070
6	\$0	\$3,990	\$3,990	\$19,060
7	\$0	\$3,990	\$3,990	\$23,050
8	\$0	\$3,990	\$3,990	\$27,040
9	\$0	\$3,990	\$3,990	\$31,030
10	\$0	\$3,990	\$3,990	\$35,020
11	\$0	\$3,990	\$3,990	\$39,010
12	\$0	\$3,990	\$3,990	\$43,000
13	\$0	\$3,990	\$3,990	\$46,990
14	\$0	\$3,990	\$3,990	\$50,980
15	\$0	\$3,990	\$3,990	\$54,970
16	\$0	\$3,990	\$3,990	\$58,960
17	\$0	\$3,990	\$3,990	\$62,950
18	\$0	\$3,990	\$3,990	\$66,940
19	\$0	\$3,990	\$3,990	\$70,930
20	\$0	\$3,990	\$3,990	\$74,920