

NRM's Remote Site Manager (RSM)™ — Harvard University Dining Services

Since 1995, NRM has been installing its flagship product, CoolTrol®, in walk-in coolers and freezers for a wide range of customers. In 2003, NRM launched Remote Site Manager (RSM), enabling customers to monitor, diagnose, control and alarm their refrigeration, HVAC and lighting equipment over the Internet.

Overview

In 2008, in conjunction with Harvard University's Green Campus initiative, Harvard Dining Services began using NRM's Remote Site Manager system for improved monitoring and control for 35 walk-in coolers and freezers in the main kitchen and bakery as well as five additional dining facilities.

NRM performed detailed energy audits of all the refrigeration equipment and made a series of recommendations for improved energy efficiency. NRM additionally worked with NSTAR, Harvard's utility provider, to maximize energy incentives and reduce the cost to Harvard. NRM technicians performed the entire installation and commissioning of the system, providing Harvard with a turnkey solution that produced immediate and measurable results.



Harvard Dining Services began using NRM's Remote Site Manager in 2008, as part of their Green Campus initiative.

Energy Savings

The RSM system and associated NRM improvements generate 216,676 kWh, or approximately \$35,000 in annual electric savings according to NSTAR-approved calculations. Using the Energy Information Administration guideline of 1.37 pounds of carbon per kWh¹ consumed, this translates into a reduction of nearly 300,000 pounds of carbon emissions annually. This also resulted in an overall payback of less than three years based on direct electricity savings alone.

(continued)

Annual Energy Savings Resulting from NRM's Improvements:

- \$35,000 in electric savings
- Reduction of nearly 300,000 pounds of carbon emissions

Payback with RSM:
Less than 3 years

¹ Energy Information Administration. Electric Power Annual 2005, Table 5.1 (October 2006)

Moreover, real-world historical data collected by RSM indicates that runtime reductions have actually exceeded the savings projections. (See screen capture below).

phones instantly alert key personnel to issues requiring attention. In addition to direct energy savings, RSM provides benefits and cost savings in the areas of loss prevention, administration, operations and maintenance, and food safety/quality assurance.

Description	Control	Status	Space	Evap	SP	D4He	Mode	Defrost	Sol	Fan	Door	Amps	Starts 24 Hr.	% Run 24 Hr.	% Run 7 Days						
CE-1	-	On	4	2	4	6.4	Run	Off	On	On	Closed	4.6	75	82	76	38.9	39.7	51.7	37.2	38.4	51.5
CE-1	-	On	36	34	23	35.4	Run	Off	Off	Off	Closed	0.3	35	35	119	13.4	14.4	31.3	14	15.1	31.3
E-1	-	On	7	2	5	8	Run	Off	On	On	Closed	24.8	49	50	85	41.4	42.7	54.3	42.2	43.5	54.8
E-2	-	On	2	-6	-2	2.3	Run	Off	On	On	Closed	31.4	89	89	89	37.2	38.1	52	41.8	42.8	54.8
E-3	-	On	38	37	38	39.8	Run	Off	Off	Off	Closed	0.3	29	30	58	61.9	40.3	70.7	58.2	39.4	67.3
E-4	-	On	40	38	40	41.3	Run	Off	Off	On	Closed	0.3	40	40	110	17.3	19.1	39.7	17.3	19.3	39.4
E-5	-	On	36	35	27	37.4	Run	Off	Off	Off	Closed	0.2	60	60	118	16.8	18.2	35.3	15.5	16.9	34.8
E-6	-	On	41	39	28	38.9	Run	Off	Off	Off	Closed	1.0	58	58	106	32.6	34.4	49.2	32.6	34.4	48.9
E-9	-	On	37	35	26	36.2	Run	Off	Off	Off	Closed	0.2	34	34	124	8	9.4	26.3	6	7.1	24
T-1	-	On	36	33	26	37.4	Run	Off	Off	Off	Closed	0.2	39	39	91	40.5	46.8	54.2	38.2	44.6	51.9
T-2	-	On	40	35	25	37.1	Run	Off	On	On	Closed	12.0	46	47	47	64.5	64.4	73.4	78.5	77.4	84.1

Highlighted columns show actual runtimes. This indicates average runtime reductions of approximately 50.65%, compared with projected reductions of 46.07%.

Additional Savings and Benefits

In addition to the direct energy usage reductions from the utility-incentivized measures, RSM has provided a number of additional bottom-line benefits. RSM's sophisticated monitoring and energy alerts uncover mechanical problems early, and significantly improve diagnostics and repair verification.

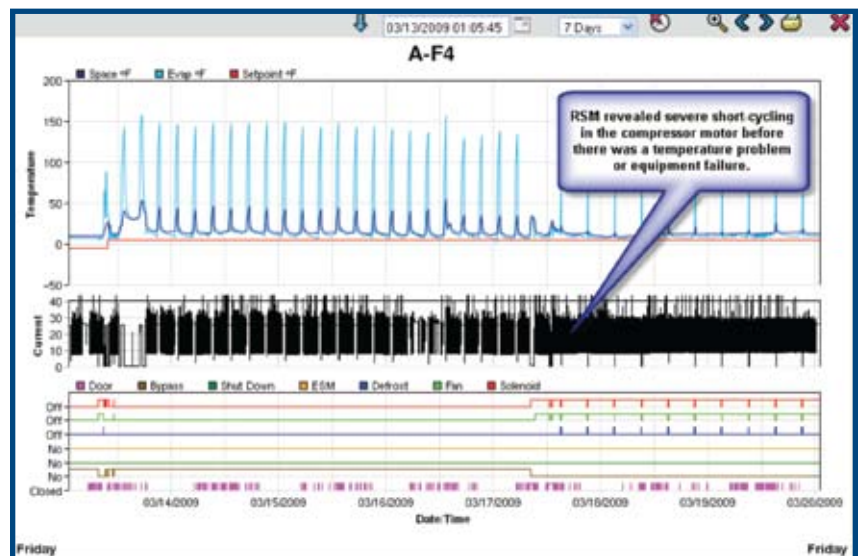
Bob Leandro, Harvard Dining Services Director of Facilities, cites this example in the Annenberg dining hall freezer: "We would have burnt the compressor out, and we would never have picked it up if not for RSM." Not only did RSM save the compressor, which is a multi-thousand-dollar repair in itself, but potentially a freezer's worth of product that might have been lost otherwise. (see screen capture on the right)

RSM allows Harvard personnel and service providers to remotely monitor and manage the refrigeration equipment from any computer with internet access via a simple point-and-click browser-based interface. Powerful automated alarms to email and cell

These benefits are somewhat harder to quantify than direct energy savings from runtime and wattage reductions, but they are no less obvious and significant to the people responsible for real-world operations. In Bob's words, "This is very slick—I love it."

Summary

RSM has delivered a powerful and cost-effective solution that has reduced Harvard's carbon footprint significantly while reducing costs and improving overall operating efficiency. NRM's comprehensive installation, commissioning, and training made for a transition that "went very smoothly," according to Leandro, who remarks that NRM's support has been "fabulous ... very, very good."



RSM monitoring saved a multi-thousand-dollar-repair on a compressor in the Annenberg Dining Hall freezer. "We would never have picked it up if not for RSM," says Leandro. "You can start to see if there's a problem, and you can get to that problem before there is a catastrophic failure."