



Advice and
financial incentives
to become more
Energy Efficient

Efficiency New Brunswick supports energy management information systems (EMIS) as comprehensive business systems that industry can use to drive down energy costs.

Flakeboard followed Efficiency NB's "structured EMIS path" and conducted an EMIS Audit which revealed savings of as much as \$1 million in energy costs over a 3 year evaluation period at its St. Stephen plant, one of eight Flakeboard plants.

With technical, financial and training assistance from Efficiency New Brunswick, Flakeboard is now in the process of implementing its energy management information system.

"In the past energy was always thought of as a given expense and not a controllable item. Not anymore!"

*—Pat Burke
Electrical Systems Coordinator*

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Flakeboard anticipates big savings with its EMIS



Flakeboard Company Limited is a world-scale producer of composite wood products. Using lumber industry by-products and under-utilized wood species once landfilled or burned as waste by forestry operators or sawmills, Flakeboard manufactures a variety of particleboard, medium density fibreboard (MDF) and FIBREX® thin high density MDF.

Flakeboard already had an energy-metering program at its St. Stephen plant, however Pat Burke, electrical systems coordinator, says that the company wanted to move that system ahead.

"Our mill is composed of many sub mills and has grown relatively slowly over time," explains Burke. "Because of this, many of the energy services overlapped and it was difficult to allocate the costs for energy to our different mills."

With increasing energy costs, Burke says it was necessary for the company to understand the breakdown of the energy used by each of the mill's lines to determine a cost per unit. "Flakeboard is focusing on saving energy and producing as much product as we can with the least amount of energy."

At a meeting of the Canadian Manufacturers and Exporters in late 2007, Burke met with Efficiency New Brunswick staff and began discussions about how best to implement a long-term energy-saving program.

Getting started

In September 2008, with funding and on-site support from Efficiency NB and the buy-in of company management, Flakeboard, engaged Enviros, a UK consulting firm to conduct an EMIS Audit.

Burke says that the EMIS Audit was necessary to determine more exact energy savings as well as an estimate of the funds required to implement a full EMIS. That audit revealed that \$1 million in energy savings could be achieved over a 3 year evaluation period at the St. Stephen mill and it was key to getting management's approval to move Flakeboard further along the EMIS process.



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“Efficiency NB was very helpful in reviewing and commenting on the completed EMIS Audit to ensure that we were getting all that was required and for Flakeboard to qualify for Efficiency NB funding,” says Burke. “They also provided on-site training about the process to senior management, which helped me obtain a commitment to proceed.”

Based on the results of the EMIS Audit and EMIS Implementation Plan, senior management committed a budget of \$270,000 for software development, purchasing new meters and training.

Implementing the EMIS

Following the EMIS Audit, an EMIS Implementation Plan was conducted in accordance with Efficiency NB’s phased process to establish baseline data, determine the types of meters that would be necessary, and to develop software specifications, employee training plans, targets and an implementation timeline.

Flakeboard’s EMIS is divided between energy account centres (EACs), metering and inputs, data analysis and reporting software, data capture and integration, and management systems.

Energy Account Centres

Although Flakeboard’s EMIS is not yet fully operational, Burke says that targets will be developed for each of its 12 EACs and the operators and managers at each EAC will be challenged to meet or exceed those targets. Energy account centres include energy-using (electricity, oil, water, compressed air) production processes at each of the mill’s various processing and finishing lines where meaningful energy use is concentrated.



Electrical metering at Flakeboard’s St. Stephen plant.
Photo courtesy of Flakeboard.

Metering & Input

There are two main electrical transformers at the St. Stephen mill that are then sub-metered by approximately 40 power quality meters. Fourteen additional oil meters were added, along with seven additional gas meters and meters for water and compressed air. The energy meters are combined with production rates, temperatures, etc. to facilitate calculations in the software to determine the performance of each EAC.

Data Analysis & Reporting Software

Tying the metered data together is a Web-based software RtEMIS developed by ADM Systems Eng. a New Brunswick Company. The software divides the company into corporate, site, department and energy account centres. Employees will use the system to access information from anywhere within the mill. The software shows the detailed energy targets for each of the mill line's EACs and identifies potential savings and losses in both dollars and energy units.

Below is a screen capture of the electricity consumption for one of the plant's finishing lines. The software shows the day-to-day electricity consumption, the percentage of the target reached, how much energy has been consumed, and the cost, as well as cumulative savings.



Installing new electrical meters. Photo courtesy of Flakeboard.



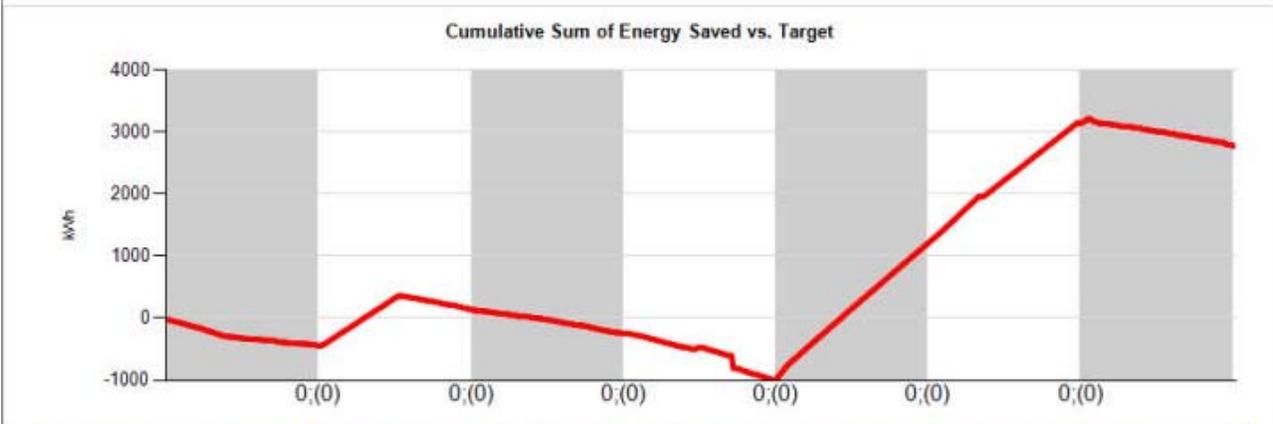
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St. Stephen Finishing PB Finishing Diefenbacher Press, Electricity



Start Date: 10/28/2009 8:00:00 AM

End Date: 11/4/2009 8:00:00 AM



Time	% of Target	Savings vs. Target	CuSum Savings	kWh	Cost	CuSum Cost
10/28/2009	114.94%	-\$16.11	-\$16.11	2706	\$121.21	\$121.21
10/29/2009	81.33%	\$29.60	\$13.49	2858	\$128.04	\$249.24
10/30/2009	111.30%	-\$18.10	-\$4.61	3923	\$175.74	\$424.98
10/31/2009	113.85%	-\$21.82	-\$26.42	4006	\$179.46	\$604.44
11/1/2009	63.68%	\$49.29	\$22.87	2419	\$108.35	\$712.79
11/2/2009	42.26%	\$91.12	\$114.00	1485	\$66.52	\$779.31
11/3/2009	88.80%	\$17.61	\$131.61	3126	\$140.03	\$919.34
11/4/2009	112.45%	-\$7.52	\$124.09	1377	\$61.71	\$981.04

Graphic courtesy of Flakeboard.



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Data Capture & Integration

All of the metering and inputs are connected via Ethernet and additional information is pulled from a variety of PLCs and HMI (human machine interface) stations. Flakeboard standardized ModBus for its communications protocols and connect using Modbus OPC Servers.

Management Systems—People & Processes

As part of the EMIS Implementation Plan, a comprehensive training needs analysis was conducted and a training plan developed aimed at the major roles in the management system, namely the *energy management champion*, the *steering committee* and the *EAC owner/operating teams*. Flakeboard has started its training program for each of these three levels, with all operating teams and plant coordinators receiving *Spot the Energy Savings Opportunities* training, jointly funded by Efficiency NB and Natural Resources Canada. With assistance from Efficiency NB, Flakeboard also developed a 'train the trainer' program that will allow Flakeboard employees to train all of the company's 200 employees. "Having Efficiency NB's help has cut our costs for training considerably and allows us to schedule that training on our own time," says Burke.

Challenges & Benefits

Many of the challenges Flakeboard faced in implementing the EMIS came from finding the right system components. The software, for example, was developed from scratch and took longer than anticipated. "Communication and protocol device drivers gave us significant challenges, but we simply worked through the issue," says Burke.

Finding knowledgeable meter suppliers was also a challenge. "A lot of people sell equipment, but don't necessarily know exactly what it can and can't do. We overcame that through exhaustive searching and we didn't take the first available unit," says Burke. "Some compromises had to be made to our requirements. For example, the electrical meters that we settled on required additional components to make them work."

Other challenges arose from being one of the first industrial companies in New Brunswick to undergo an EMIS Audit and EMIS Implementation Plan. "Efficiency NB was just developing its EMIS Audit Guide when we started so it might have been better for us if the guide had been finished before we began," says Burke. "Having said that, Efficiency NB was very helpful in reviewing the information from our consultant and making sure that we got what we needed."

With respect to benefits, Burke says that the most obvious has been a heightened energy awareness among all employees. "When we began, a lot of our fan, compressed air and lighting systems used to stay on all the time. At first, we didn't capture any of that, but once we started shutting them down when they weren't needed we could actually hear the air leaks from the compressed air systems," recalls Burke. "Staff have become much more aware of the potential energy savings and are already changing their work habits." He also noted that since Flakeboard has a team-sharing program related to its annual bonuses, employees have a vested interest in reducing costs.



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“We’re using a personal approach to train our employees,” says Burke. “Many of the things they do to reduce energy costs at the mill they can do at home. If they can relate it to their home energy usage, they’ll naturally bring that mindset to work.”

Burke also says that the EMIS process has changed the way industry sees energy. “In the past energy was always thought of as a given expense and not a controllable item,” he says. “Not anymore!”

Advice to Others

Burke says that the two most important components of Flakeboard’s EMIS are the metering to gather the data and the people to act on that data. “Reliability of the data is key,” Burke stresses. “It must be replicable and the system needs to be as simple to use as possible so that people understand the process.”

“Having an energy team can lessen the workload, don’t leave it up to one person. To build this system requires a huge amount of time,” says Burke. “It requires a dedicated group of people to complete the process. Everyone needs to buy into the process.”

Burke listed several other skills necessary to the EMIS process. In terms of conducting an EMIS Audit, he recommends having:

- A knowledge of the mill’s systems, all of the sources of energy, and where to obtain existing data
- Details of energy rates and contracts for electricity, gas, oil, water, etc.
- Report writing, including research and auditing skills.

In terms of implementing an EMIS system, he further recommends:

- Statistical data analysis skills, including how to set appropriate targets
- Knowledge of systems energy auditing, interpretation of energy performance and the theory and calculations for heating systems, fans, pumps, etc.
- Training, action planning and technical problem solving skills.

Next Steps

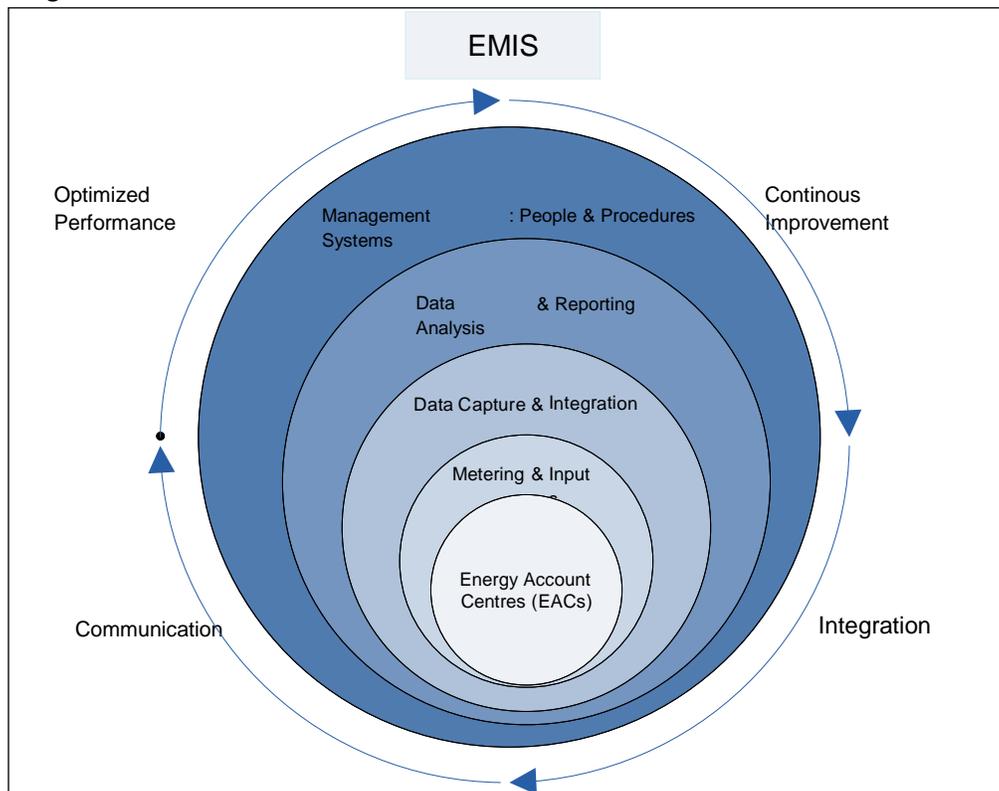
Employee training is underway and adjustments to the software and data capture need to be made before Flakeboard’s EMIS becomes fully operational, likely by the end of 2009 or early 2010.

“Our senior managers [CEO, CFO and COO] want to ensure that the data is accurate first so that they can fully understand where energy is being used within our eight plants,” explains Burke. “We will then be able to determine the energy cost per component for making our product at each facility, which will allow us to set targets and eliminate wasted energy.”

This case study is part of Efficiency New Brunswick’s industrial program. The program is designed to help accelerate industry investments in energy efficiency. By using energy-reducing practices and new equipment that lowers energy intensity, the program allows industry members to manage energy costs over the long term, while improving day-to-day competitiveness.

How Efficiency New Brunswick defines EMIS

Efficiency NB’s definition of EMIS encompasses both *people* and *process* management systems so that industry can manage energy, create energy account centres (EACs) and assign management accountability to EAC owners. It also provides data analysis and reporting tools for transforming energy metering and input data (weather, temperature, production rates, etc.) into performance reports and real-time metrics that can be used to take action. This definition of EMIS goes beyond the simple monitoring of energy to a truly comprehensive continuous improvement business system, as depicted in the diagram below:



For more information about the *structured EMIS path*, download Efficiency NB’s Industrial Program Program Guide at: www.energycnb.ca/enb/1659/Large-Industrial-Program.