

# Nestlé USA Saves Energy with New Condensing Economizer System

**CASE STUDY**

Focus on Energy,<sup>SM</sup> a statewide service, works with eligible Wisconsin residents and businesses to install cost-effective energy efficiency and renewable energy projects. We provide technical expertise, training and financial incentives to help implement innovative energy management projects. We place emphasis on helping implement projects that otherwise would not get completed, or to complete projects sooner than scheduled. Our efforts help Wisconsin residents and businesses manage rising energy costs, protect our environment and control the state's growing demand for electricity and natural gas.

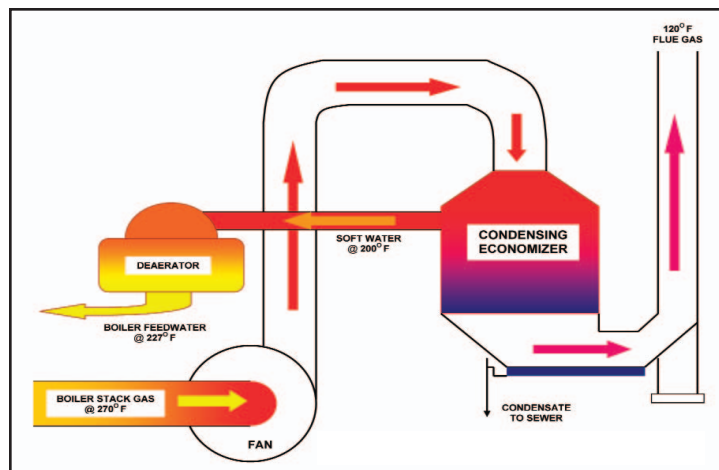
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With today's high energy costs, it's no surprise that companies are searching diligently for better ways to improve energy efficiency. With a financial incentive from Focus on Energy, Wisconsin's energy efficiency and renewable energy program, Nestlé USA's infant formula plant in Eau Claire was able to turn what had once been wasted air into daily energy savings of \$550 with the installation of a condensing economizer system. The condensing economizer captures the latent heat from water vapor in the flue gas.

Nestlé first began to investigate installing a condensing economizer system in early 2005. These systems transfer a substantial amount of sensible and latent heat from the hot flue gases to the boiler make-up water. In Nestlé's case, the energy is used to pre-heat cold boiler water. Rising natural gas prices—which jumped by nearly 90 percent since 2001—made the equipment a top priority and a financial incentive from Focus on Energy meant that system payback would be less than three years.

Working with the Protherm Corporation (St. Louis, Mo.), Nestlé USA installed a condensing economizer system on two water tube boilers: the condensing economizer was chosen because it extracts heat that cannot be recovered by a conventional economizer alone. Protherm recommended that the system's fan be controlled by a variable frequency drive (VFD) to optimize energy efficiency. "These controls mean the fan only operates when there's a sufficient level of heat to warrant it," said John Weisehan, P.E., of Protherm Corporation. "Other systems throttle the flow with a damper instead of slowing down the fan."

Net energy savings for the project were 13,500 million Btus, which equals the natural gas savings less the corresponding increase in



**FIGURE 1:** Schematic of heat flow through condensing economizer system.

PROJECT SUMMARY	
Project Cost	\$340,000
Therm Savings	141,864
Energy Savings	\$110,675
Focus Incentive	\$40,386
Energy Payback	2.7 years

electricity used by the economizer fan. All estimated savings were based on a very conservative average load of 37 percent and are expected to be higher during the heating season. A Focus on Energy Measurement and Verification (M&V) study conducted in April 2006 showed that actual savings were very close to projected.

**THE OPPORTUNITY**

Many of Nestlé's production processes rely on heated water; water comes out of the main at roughly 50°F and requires a substantial amount of energy to heat.

The company had considered installing a condensing economizer system in the past to heat water more efficiently, but relatively low natural gas prices and high equipment costs made the payback period prohibitively long.

**THE SOLUTION**

Rising natural gas prices meant that it was critical to install more energy efficient equipment, and the Focus on Energy financial incentive helped tip the purchase decision. Nestlé's new system has a number of energy-optimizing features including a condensing economizer and a VFD-controlled economizer fan. The system draws hot flue gases from the boiler stacks and recycles it to preheat boiler make-up water. "Using the exhaust to preheat the make-up water can add as much as 120 degrees of heat—and creates substantial energy savings," said Kelly Kavanagh, an Energy Advisor with Focus on Energy.

**Nestlé Food Company** is headquartered in Vevey, Switzerland and is the world's largest food and beverage company, with 250,000 employees worldwide. The Eau Claire facility is a branch of Nestlé USA, the company's U.S. division. Nestlé USA has partnered with Focus on Energy since 2002, with efficiency upgrades at locations throughout Wisconsin including Eau Claire, Hager City, Jefferson, Burlington and Stoughton. Improvements at the Eau Claire plant alone have saved nearly \$200,000 in energy costs, and this facility received the Governor's Award for Excellence in Energy Efficiency in March 2006. This award recognizes the company's efforts to reduce dependence on fossil fuels, stimulate the economy and preserve the environment.

### PROJECT BENEFITS

*"Beyond the huge energy savings, our new condensing economizer system helps our operation run more smoothly with little worry of being able to meet our steam needs."*

– Larry Willi, Facilities Engineer, Nestlé USA, Eau Claire

Pre- and post-installation measurements by Focus on Energy showed an annual savings of nearly 142,000 therms, which is offset somewhat by an increase in electricity use of 208,823 kilowatt hours per year to operate the economizer fan. The net energy savings are 13,500 million Btus per year. Post-installation measurements were taken during April 2006; system savings are expected to be even higher during the heating season.

The estimated cost to develop and install the economizer was \$340,000 and the project qualified for a \$40,386 Focus on Energy financial incentive. Annual energy savings were estimated at \$110,675 based on a blended rate of \$0.05 kWh and \$0.80 per therm (which was a two-year cost average at the time) and this figure includes the deduction for increased electrical use by the economizer fan.

In addition, the ability to more rapidly deliver hot water to the production process helps to ensure that production flows smoothly. "It's almost like increasing your boiler capacity," said Kavanagh.

### PROJECT TEAM

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| <ul style="list-style-type: none"> <li>■ <b>Nestlé USA</b><br/>Project management and installation</li> <li>■ <b>Focus on Energy</b><br/>Project grant, post-installation M&amp;V inspection</li> <li>■ <b>Protherm (St. Louis, MO)</b><br/>System design</li> </ul> | <ul style="list-style-type: none"> <li>■ <b>The Aarell Company</b><br/>Controller design</li> <li>■ <b>Allen-Bradley</b><br/>Programmable logic controller</li> <li>■ <b>Xcel Energy</b><br/>Energy supplier</li> </ul> |
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New condensing economizer and exhaust stack.

### HOW CAN FOCUS ON ENERGY HELP YOU?

*"The implementation grant from Focus on Energy, along with the presence and support of the of their Energy Advisor, helped us move this project to high priority."*

– Larry Willi, Facilities Engineer

Looking for ways to improve energy efficiency at your production facility? Focus on Energy can help. Our experienced and knowledgeable industry-specific Energy Advisors can offer best practice support in a number of areas including project evaluation assistance, measurement and evaluation of savings, financial assistance for stalled projects, training opportunities, tools to manage energy and third-party reviews.

Focus on Energy also provides grants to support feasibility studies and project implementation. Our network of Program Allies is an excellent resource for product design, development and installation.

To learn more, call 800.762.7077 or visit [focusonenergy.com](http://focusonenergy.com).

