



Briggs &amp; Stratton Facility Energy Team, November, 2010

*Courtesy of Briggs & Stratton*

## Briggs & Stratton: Putting All Energy Efficiency Options on the Table

Briggs & Stratton manufactures internal combustion engines, as well as yard and home power products for customers in more than 100 countries on 6 continents.<sup>1</sup> Briggs & Stratton is also a company that makes full use of any and all available resources to reduce energy intensity. To date, Briggs & Stratton has been successful in reducing its energy use by 37.1 million kilowatt hours (kWh)\*. The company was able to achieve this reduction by leveraging support from a variety of resources, including the U.S. Department of Energy's (DOE's) Industrial Technologies Program (ITP), American Recovery and Reinvestment Act (ARRA) of 2009 funds, Wisconsin's Focus on Energy program, the New York State Energy Research and Development Authority program, and the company's own experienced energy efficiency staff.<sup>2</sup> These resources have been instrumental in helping Briggs &

Stratton facilitate the implementation of hundreds of energy efficiency projects. From 2007 to 2010, Briggs & Stratton saved more than \$2.87 million through energy efficiency projects across all of its facilities worldwide.<sup>3</sup>

### Energy Efficiency Progress

Briggs & Stratton has made industrial energy efficiency a priority, largely due to the company's annual energy costs totaling approximately \$20 million. ITP's *Save Energy Now* LEADER Pledge—a 10 year, 2.5% annual energy intensity reduction target—provides a focus for the company's sustainability commitments and a clear goal for its energy management programs. Briggs & Stratton now tracks energy usage at most of its manufacturing facilities, and has implemented energy efficiency projects at 17 facilities in North America alone. From 2007 through 2009, Briggs & Stratton decreased its energy intensity<sup>†</sup> from 18.4 units<sup>‡</sup> to 16.5 units.

<sup>†</sup> Energy intensity is measured by the amount of energy used divided by the number of production units.

<sup>‡</sup> Units are defined as energy used per production units, or energy intensity.

\* From fiscal year 2007 to 2010.

Briggs & Stratton has leveraged all available resources to implement energy management and industrial energy efficiency projects, as well as capitalize on all available renewable energy opportunities in order to meet its LEADER Pledge goal. The company is relying on the implementation of industrial energy efficiency projects—such as lighting; boilers and heating, ventilation, and air conditioning (HVAC); aluminum smelting; power regeneration; heat recovery; and compressed air controls and system components—to meet the bulk of its LEADER commitment.<sup>4</sup>

Overall, Briggs & Stratton aims to maximize the implementation of every energy efficiency opportunity. The Briggs & Stratton energy management program closely tracks the U.S. Environmental Protection Agency's (EPA's) ENERGY STAR® model program. ENERGY STAR® created Guidelines for Energy Management, which consist of the following seven steps:

1. Make Commitment
2. Assess Performance
3. Set Goals
4. Create Action Plan
5. Implement Action Plan
6. Evaluate Progress
7. Recognize Achievements.<sup>5</sup>

To supplement its energy management program, Briggs & Stratton also tracks and publishes energy metrics according to standards established by the Global Reporting Initiative—a nonprofit organization dedicated to helping organizations and businesses prepare standardized sustainability reports.<sup>6</sup> Recent energy data are catalogued in the Briggs & Stratton 2008 Sustainability Report.<sup>87</sup>

### Industrial Energy Efficiency with a Team Approach

In January 2008, Briggs & Stratton hired a formal corporate energy manager to aid and expand its efficiency efforts. In addition, to further enhance the company's commitment to energy efficiency, Briggs

& Stratton began holding energy team meetings at all of its manufacturing facilities to discuss company energy issues. The meetings, which are held every two to four weeks, offer team members a forum to propose and discuss new energy efficiency projects.<sup>8</sup> Energy teams are comprised of the corporate energy manager, corporate environmental department, the facility plant manager, facility energy leader (FEL), as well as other team members from across the plant. Plant managers select other team members at their discretion, including employees who can represent their plant and assess specific energy efficiency opportunities. Other team members may include maintenance personnel; members of the tax, legal, communication, environmental, and marketing departments; engineering staff; and research and development personnel.

Briggs & Stratton also holds corporate-wide energy meetings once a month with its FELs to discuss the status of each facility's energy efficiency progress. At these meetings (typically held via conference call, with an in-person meeting once per year), each FEL thoroughly discusses its facility's efficiency efforts with all participants, including the corporate energy manager and the Briggs & Stratton corporate environmental department. Topics covered at the corporate-wide meetings include recently-completed, ongoing, and upcoming projects; funding; technical, corporate, or cross-facility support needs; challenges; valued vendors and contacts; and new energy efficiency ideas being considered.<sup>9</sup>

Many new ideas are discovered by employees after the implementation of a new project, or even just from walking around the facility. All employees provide their managers with project ideas, which then get passed along to the Briggs & Stratton Corporate Energy Manager Richard Feustel. According to Mr. Feustel, "The bottom line is that all energy efficiency projects are discussed, regardless of their return on investment. Payback has a priority, but it does not hold back discussion and brainstorming for improved efficiency."<sup>10</sup> This open communication allows for an uninhibited review process, which helps team members easily assess staff efficiency project recommendations. As recommendations are received, the energy team brainstorms ways to leverage and improve suggested projects to yield an acceptable payback period. Facility energy teams also learn from projects

<sup>8</sup> Briggs & Stratton produces a sustainability report every two years. The 2010 report should be available later in 2011.

that are proposed but not implemented for one reason or another, identifying crucial issues today and project needs for the future.

## Energy Efficiency Projects

### Wauwatosa Steam and Heating System Project

Outside funding has allowed Briggs & Stratton to implement large-capital projects that may have normally been overlooked due to significant capital investments or extended payback periods. Outside funds can alleviate these issues and clear roadblocks for the implementation of projects with significant savings potential. For example, the steam and heating system project at the company's Wauwatosa, Wisconsin, facility had a project cost of \$2,581,168. The steam and make-up air HVAC unit system provides heat for one million square feet of space across three buildings. The old system resulted in significant efficiency losses because the facilities have changed uses over the years, yielding new steam requirements that the old system was not built to meet. This project was awarded an ARRA grant of approximately \$1.3 million, significantly offsetting the initial capital investment

#### Briggs & Stratton Wauwatosa, Wisconsin Steam and Heating System Project

Project Cost = \$2,581,168  
 ARRA Grant = \$1,290,584  
 Project Energy Savings = 962,257 therms/year and 1,457,935 kWh / year  
 Simple Payback Period = 2.58 years

and installation costs. The project involved replacing the old high-pressure steam boiler and large make-up air HVAC units with appropriately sized and more efficient hot water boilers; low-pressure steam boilers; and make-up air HVAC units. The project is estimated to save 962,257 therms of natural gas and 1,457,935 kWh of electricity annually. The anticipated payback period is 2.58 years,\*\* including energy and maintenance savings. The entire project will increase the facility's energy efficiency by 42%.<sup>11</sup>

### Milwaukee Test Engine Power Regeneration Project

Another energy efficiency project being undertaken by the company's Burleigh production facility in Milwaukee, Wisconsin, involves a test engine power regeneration system. The project utilizes mechanical output from the research and development testing of engines to create electrical energy for the facility (proof of concept stage). To help mitigate project costs, Wisconsin's Focus on Energy program supplied Briggs & Stratton with a \$113,600 grant, which is about half of the project's total cost (\$249,500). The project employed 12 test stands for small engines

#### Briggs & Stratton Milwaukee, Wisconsin, Test Engine Power Regeneration Project

Project Cost = \$249,500  
 WI Focus on Energy Grant = \$113,600  
 Energy Cost Savings = \$68,000/year  
 Simple Payback Period = 1.88 years

Courtesy of Briggs & Stratton



The Briggs & Stratton Wauwatosa, Wisconsin, facility's new steam and heat boiler system.

Courtesy of Briggs & Stratton



The Briggs & Stratton Milwaukee, Wisconsin, facility's new engine power regeneration system.

\*\* Simple payback is calculated by project cost divided by project savings per year to determine the payback term in years.

from 10 to 40 horsepower, which are connected to alternating current motors with variable frequency drives to produce electricity. The project benefits are two-fold: it produces energy and it includes controls and data-collection equipment to monitor engine health, which helps to determine engine failure issues for research and development purposes. The project is estimated to save more than \$68,000 a year, with a simple payback period of 3.55<sup>††</sup> years.<sup>12</sup>

### Lighting Retrofit Project

Briggs & Stratton has implemented lighting projects at 17 of its owned or leased facilities, 9 of which are manufacturing facilities. The lighting projects employed low-cost solutions, such as using natural light during daytime hours and using motion sensors to light work areas only when in use, resulting in an attractive project payback period of a little over one year. Briggs & Stratton was able to obtain grants from Wisconsin's Focus on Energy program (\$650,000) and the New York State Energy Research and Development Authority program (\$12,750) to help fund lighting retrofit projects in both states. The projects also earned more than \$1.2 million in federal tax deductions for energy efficiency upgrades through the Recovery Act.<sup>13</sup> Ultimately, the projects led to the installation of more than 12,600 new energy efficient lighting fixtures, reducing the facilities' previous lighting energy use by 50%, which is the equivalent of powering 1,544 residential homes every year.

Other project benefits included a 40% longer bulb life, a 20% improvement in lighting quality, and a better work environment for employees. The improvement in lighting quality serves as visual evidence of an energy efficiency project benefiting the company, while the maintenance staff has appreciated the reduced burden of frequently replacing dim high intensity discharge light bulbs. To inform employees of the lighting projects' benefits, Briggs & Stratton developed posters that showed before and after pictures of the company's facilities. The posters illustrate the savings being achieved through the lighting retrofit and also note the outside entities that provided grant funds to offset project costs.

<sup>††</sup> Simple payback is calculated by project cost divided by project savings per year to determine the payback term in years. Once Focus on Energy grant funds are received, Briggs & Stratton believes it will reduce the project cost to make the payback period only 1.88 years.

### Targeted Energy Efficiency Assessments

Following the company's LEADER Pledge, ITP conducted energy assessments at several Briggs & Stratton facilities. Briggs & Stratton implemented savings recommendations from the assessments at two of its high-energy-use facilities in Murray, Kentucky, and Poplar Bluff, Missouri.

ITP sent a technical expert to the Briggs & Stratton Murray, Kentucky, facility to investigate three manually operated air compressors that were found to be inefficient and sometimes left unnecessarily operational overnight. The energy assessment determined that the air compressors could operate more efficiently by utilizing an automated system involving unit controls and a sequencer. The project has a one-year payback period and is expected to save the company \$250,000 annually. Briggs & Stratton plans to implement all compressed air assessment recommendations in less than one year.

The Poplar Bluff, Missouri, energy assessment—conducted in September 2010—addressed the facility's process heating system. The assessment identified eight opportunities for a combined total energy savings of 48,356 million British thermal units (Btu) or \$386,850 per year. The eight projects will be implemented by a Briggs & Stratton-hired contractor over the next two years, with one project already complete. The identified efficiency opportunities include the following:

- Improving the combustion ratio in a melting furnace to optimize operating efficiency at various production rates
- Preheating scrap prior to melting
- Implementing modifications to furnace door operations.

This project provides many additional benefits for Briggs & Stratton, as it is likely to be replicated across furnace units at the company's other facilities.<sup>14</sup> In addition, Poplar Bluff personnel were trained to use DOE's Process Heating Assessment and Survey Tool, which the facility will continue to use to identify improvement opportunities related to the thermal efficiency of heating equipment.

## Briggs & Stratton Energy Efficiency Philosophy

Briggs & Stratton leverages past project successes to implement energy efficient technologies and processes that work. Energy facility leaders across the company are educated about successes so they can improve upon processes at other facilities. Briggs & Stratton utilizes many other resources to learn about new energy efficiency concepts, such as Wisconsin's Focus on Energy technical research and engineering support. In addition, Alabama Power, Georgia Power, and Tennessee Valley Authority have provided calculations and technical research on various projects, and contract engineering firms have commissioned and managed large-scale projects for Briggs & Stratton. Other resources include trade journals, the Association of Energy Engineers, and contacts made with other *Save Energy Now* LEADER Companies at ITP-hosted events like the 3M and Nissan Showcases.

## Summary

Briggs & Stratton recommends that any hesitant manufacturing company interested in industrial energy efficiency “get off the fence and get moving.” The projects that Briggs & Stratton has implemented have saved the company money and improved its bottom line—from 2007 through fall 2010, Briggs & Stratton has reduced energy costs by \$2.87 million.<sup>††</sup> Other benefits Briggs & Stratton found when it started implementing industrial energy efficiency projects include a reduced carbon footprint and recognition as an environmental steward.

Briggs & Stratton has made significant energy efficiency improvements, both before and after it signed the *Save Energy Now* LEADER Pledge in September 2009. From 2007 to 2010, the company achieved a gross energy reduction of 9.8%. Additionally, during that same time period, Briggs & Stratton was able

to decrease its energy intensity by 3.3% per year.<sup>15</sup> Briggs & Stratton has developed a critical model for efficiency improvement by reviewing all potential energy efficiency projects and leveraging outside resources to reduce payback periods to acceptable levels, ensuring project implementation.

## Endnotes

- <sup>1</sup> Briggs & Stratton, *3M Save Energy Now LEADER Showcase Presentation* by Richard Feustel.  
<http://3mdoeshowcase.govtools.us/Documents/Briggs&Stratton.pdf>
- <sup>2</sup> Briggs & Stratton, *3M Save Energy Now LEADER Showcase Presentation* by Richard Feustel.  
<http://3mdoeshowcase.govtools.us/Documents/Briggs&Stratton.pdf>
- <sup>3</sup> Briggs & Stratton, *3M Save Energy Now LEADER Showcase Presentation* by Richard Feustel.  
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<http://3mdoeshowcase.govtools.us/Documents/Briggs&Stratton.pdf>
- <sup>5</sup> Energy Star, *Guidelines for Energy Management Overview*.  
[http://www.energystar.gov/index.cfm?c=guidelines.guidelines\\_index](http://www.energystar.gov/index.cfm?c=guidelines.guidelines_index)
- <sup>6</sup> Global Reporting Initiative, *What is GRI?*  
<http://www.globalreporting.org/AboutGRI/WhatIsGRI/>
- <sup>7</sup> Briggs & Stratton, *2008 Sustainability Report*.  
<http://www.basco.com/-/media/BASCO/Sustainability.ashx>
- <sup>8</sup> Briggs & Stratton, *3M Save Energy Now LEADER Showcase Presentation* by Richard Feustel.  
<http://3mdoeshowcase.govtools.us/Documents/Briggs&Stratton.pdf>
- <sup>9</sup> *Communication with Richard Feustel. January 3, 2011.*
- <sup>10</sup> *Communication with Richard Feustel. January 3, 2011.*
- <sup>11</sup> Briggs & Stratton, *Steam and Heating System Project Summary*.
- <sup>12</sup> Briggs & Stratton, *Test Engine Power Regeneration Project*.
- <sup>13</sup> Briggs & Stratton, *Lighting Project Summary*.
- <sup>14</sup> Briggs & Stratton, *Process Heat Assessment – Poplar Bluff, MO*.
- <sup>15</sup> Briggs & Stratton, *3M Save Energy Now LEADER Showcase Presentation* by Richard Feustel.  
<http://3mdoeshowcase.govtools.us/Documents/Briggs&Stratton.pdf>

<sup>††</sup> All facilities worldwide.