

The Better Buildings, Better Plants Program is a national partnership initiative that challenges industry to set and meet ambitious energy-saving targets. Across the United States, manufacturers spend more than \$200 billion each year to power their plants.¹ The industrial sector has the potential to invest more than \$100 billion in cost-effective, energy-efficiency technologies by 2020, which would result in annual energy savings of almost \$50 billion.² U.S. Department of Energy (DOE) data demonstrates that many facilities can save 15% or more annually through projects with payback periods of less than three years.³

Better Plants Partners are working with DOE to capture these cost-effective, energy-saving opportunities and demonstrate that strong energy management practices are good for business, good for the economy, and good for the environment. More than 120 companies, representing close to 8% of the total U.S. manufacturing energy footprint, are partnering with DOE to establish energy performance baselines based on DOE guidance and consistent with ISO 50001 (the recently finalized international energy management standard); set goals to improve the energy efficiency of their manufacturing operations, usually by 25% over 10 years; develop energy management plans; and report their progress once a year to DOE. The Energy Department provides technical assistance and national recognition to partners that join the program.

Better Plants 2013 Snapshot

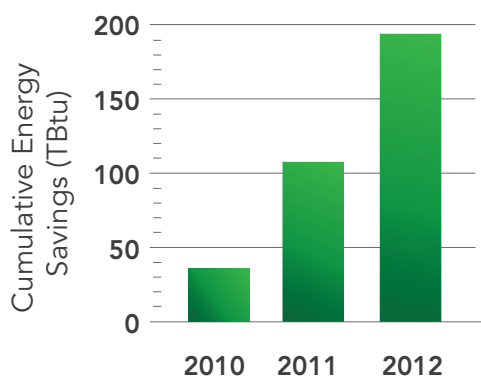
(Table 1)

Accomplishment	Total
Number of Partner Companies	123
Approximate Number of Plants	1,750
Percent of U.S. Manufacturing Energy Footprint	7.9%
Reported Savings	
Cumulative Energy Savings (TBtu)	190
Cumulative Cost Savings (Million)	\$1,000
Average Energy Intensity Improvement in 2012	2.7%

Partners have reported about 190 trillion British thermal units (TBtu) and \$1 billion cumulatively in energy savings (see Table 1). Each year, the average energy intensity improvement rate across the program has exceeded the 2.5% per year benchmark rate required to stay on track with the program's long-term 25% goal. Cumulative energy savings experienced by Better Plants Partners are expected to reach more than 1,000 TBtu and close to \$5.5 billion, assuming all Partners meet their 10-year energy intensity targets. Additionally, several companies, including AT&T, Cummins, Metal Industries, TE Connectivity, and United Technologies Corporation, have already exceeded their 25% energy intensity reduction goal and maintained that level of improvement for at least two consecutive years.

Cumulative energy savings reported by Partners, 2010–2012

(Figure 1)



Weighted Average Energy Intensity Improvement Reported by Partners, 2010–2012

(Table 2)

Year	% Improvement
2010	4.3%
2011	3.7%
2012	2.7%

Representing a Diverse Industry Mix

Program Partners represent and provide strong examples for achievable energy savings for a variety of U.S. industries, including some of the most energy-intensive sectors, such as chemicals, food and beverage, and forest and paper products. The chemicals industry has the highest representation within the program, accounting for about 15% of the total number of participating companies (see Table 3). Overall, Better Plants Partners represent industry sectors that consume about 77% of all energy used in the U.S. manufacturing sector. Currently, the program includes partners that represent close to 15% of the U.S. chemicals manufacturing industry's energy consumption and 23% of the U.S. transportation equipment manufacturing industry's energy consumption.⁴ Underrepresented industries in Better Plants include textile mills and petroleum and coal products. DOE will be working to expand participation from these underrepresented sectors over the next year.

Partners are also diverse in size, with small, one-plant operations participating, as well as large, multinational corporations. The average estimated energy spend per company is about \$60 million per year, though the range is considerable, with the smallest companies spending less than \$1 million and the largest more than \$100 million (see Figure 2 below).

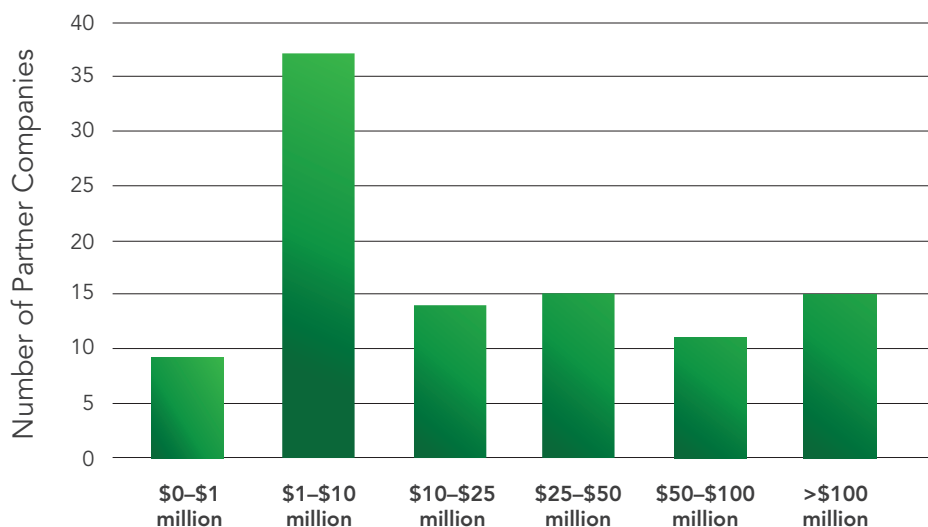
Number of Partners by Industry, August 2013

(Table 3)

Industry	Total Program Partners
Food	9
Beverage and Tobacco Products	2
Paper	10
Printing and Related Support	4
Chemicals	18
Plastics and Rubber Products	5
Nonmetallic Mineral Products	5
Primary Metals	17
Fabricated Metal Products	6
Industrial Machinery	10
Computer and Electronic Products	5
Electrical Equipment, Appliances, and Components	7
Transportation Equipment	13
Furniture and Related Products	3
Miscellaneous	7
Other	2
Total	123

Estimated annual energy spend for Better Plants Partners

(Figure 2)



Understanding the Numbers

The energy savings cited in this Progress Update are based on DOE-reviewed individual annual reports submitted by Better Plants Partners. Program-wide energy savings in a given year are calculated by applying reporting companies' weighted average energy intensity improvement rate to the total baseline year energy consumption for those same companies. Cumulative energy savings are calculated by summing previous years' program-wide energy savings and accounting for the persistence of those savings over time. For the purposes of estimating the benefits of the program, these savings are adjusted to account for energy savings that would have been expected to occur on a "business-as-usual" basis, based on data compiled by the DOE Energy Information Administration (EIA). To arrive at estimated cost savings, DOE multiplies the energy savings by energy cost data also provided by EIA.

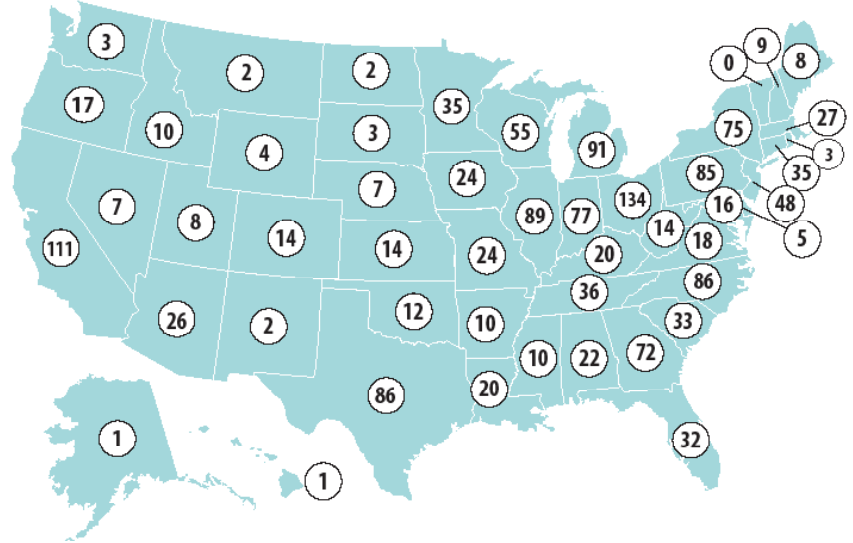
Representing a Diverse Industry Mix

Program Partners have manufacturing facilities located across nearly all 50 states (see Figure 3). The states with the greatest concentration of Program Partners are California, Illinois, Michigan, North Carolina, Ohio, Pennsylvania, and Texas.

The Better Plants Program continues to grow, with 12 new companies making corporate-wide commitments to energy efficiency in the last year. See Table 4 below for a list and brief description of new partners.













Distribution of plants participating in Better Plants

(Figure 3)



Companies that Joined Better Plants over the Last 12 months

(Table 4)

 ArcelorMittal	<p>ArcelorMittal USA is part of ArcelorMittal, the world’s leading steel and mining company, supplying quality steel to the automotive, construction, appliance and packing markets.</p>
 Commercial Metals Company	<p>Commercial Metals Company and its subsidiaries manufacture, fabricate, and recycle steel and metal products in the United States and strategic international markets.</p>
 Ford	<p>Ford Motor Company, a global manufacturer based in Michigan, manufactures or distributes automobiles across six continents. Ford joined at the Better Plants Challenge level.</p>
 GOLDEN RENEWABLE ENERGY, LLC	<p>Golden Renewable converts waste products—such as grease, algae, and wood chips—into fuel.</p>
 MOTOR HARLEY-DAVIDSON CYCLES	<p>Harley-Davidson fulfills dreams of personal freedom through the experience and lifestyle of premium heavyweight motorcycles.</p>
 INTERNATIONAL PAPER	<p>International Paper, a global paper and packaging company, manufactures a variety of products—ranging from office paper and food packaging to recycling products and bulk packaging.</p>
 JBT Corporation	<p>JBT Corporation provides technology solutions to the food processing and air transportation sectors.</p>
 Johnson Controls	<p>Johnson Controls is a global diversified technology and industrial leader serving building and automotive customers in more than 150 countries. Johnson Controls joined at the Better Plants Challenge level.</p>
 LENNOX INTERNATIONAL	<p>Lennox International delivers innovative climate control solutions for the heating, air conditioning, and refrigeration markets.</p>
 TEXAS INSTRUMENTS	<p>Texas Instruments is one of the world’s largest semiconductor companies.</p>
 TPC Group	<p>TPC Group LLC provides chemical products to multinational chemical and petroleum-based firms.</p>
 VOLVO	<p>The Volvo Group is one of the world’s leading manufacturers of trucks, buses, construction equipment, and marine and industrial engines. The company initially pledged one plant when it first joined the program but expanded its commitment this year to cover all U.S. manufacturing sites.</p>

Sharing Hands-on Technical Expertise

Better Plants Partners benefit from technical assistance provided by DOE experts. In-Plant Trainings (INPLTs) are an important aspect of this technical assistance. INPLTs are system-specific workshops that train participants on how to identify, implement, and replicate energy-saving projects. Technical expertise gained through the INPLTs help companies overcome a series of critical barriers to adopting energy management practices and technologies, including lack of technical expertise, insufficient senior management buy in for implementing energy-saving projects, and difficulty coordinating actions and best practices across several plants within a company.

On average, 20 individuals from a variety of different facilities participate in each INPLT, enabling the event's benefits to spread beyond the walls of the host plant to outside attendees. Since the first INPLT was hosted by Brown Printing Company in April 2011, there have been 27 INPLTs held, with 11 conducted during this year. In total, INPLTs have attracted close to 475 participants and led to the identification of more than 1.2 Tbtu in energy savings (more than \$6.5 million in cost savings). These events provide Better Plants Partners with the knowledge and skills needed to advance energy management in their facilities, as well as valuable opportunities to make connections with peers and other industrial stakeholders.

A range of partners have found value in participating in INPLTs, especially those that have involved several plants in the training. Michele Mazza, Energy Program

In-Plant Training Cumulative Results as of July 2013

(Table 5)

Trainings	Totals
INPLTs conducted to date	27
Energy Savings Identified/Results	
Total identified savings at host plants (MMBtu/yr)	1,260,000
Identified energy cost savings at host plants	\$6,700,000
Participants	
Total participants	473
Energy System Type	
Compressed air	11
Process heating	7
Steam	3
Pumps/fans	5
Paper machines	1

Manager for Owens Corning's Building Materials Group noted, "The tools and training applied during the INPLT will be an invaluable experience for the training of participants going forward. The Newark plant isn't the only one benefiting from the training and recommendations."



Participants pose during the field portion of a Cummins INPLT in March 2013. Photo courtesy of Cummins.

Stepping up to the Better Plants Challenge

In December 2011, DOE provided its manufacturing partners with an opportunity to increase their commitment to energy efficiency by stepping up to the Better Buildings, Better Plants Challenge. The Better Plants Challenge is the industrial component of the Better Buildings Challenge, which was launched under the umbrella of President Obama's Better Buildings Initiative (BBI). BBI is a broad, multistrategy initiative designed to reduce the energy intensity in the commercial and industrial sectors by 20% by 2020, catalyze revolutionary change in energy use, achieve billions in energy bill savings, and create high-quality American jobs.

Thirteen manufacturers (identified on page 7 of this report), representing more than 300 plants, have joined the Better Plants Challenge. These Challenge Partners set the same energy-efficiency targets as partners in the Better Plants Program; however, Challenge Partners make additional commitments



Assistant Secretary for Energy Efficiency and Renewable Energy Dr. David Danielson provides remarks during the Better Plants Challenge recognition ceremony during the Industrial Energy Technology Conference in May 2013.

to publicly share their energy performance data and conduct showcase projects that are near-term demonstrations of significant energy savings at an individual plant or building.

Completed showcase projects include:

NISSAN

Nissan built a new paint plant at its Smyrna, Tennessee, facility that is expected to be 30% more energy efficient than the plant it replaced. Learn more: www4.eere.energy.gov/challenge/showcase/nissan/paint-plant.



Cummins is initiating a deep energy retrofit at its Jamestown Engine Plant in Lakewood, New York. This \$23.8 million project combines energy-efficiency measures and needed infrastructure upgrades, which together are expected to reduce annual energy costs by 14%. Learn more: www4.eere.energy.gov/challenge/showcase/cummins/jamestown-engine-plant.



Employees in Nissan's new paint plant. Photo courtesy of Nissan.



Aerial view of Cummins' Jamestown Engine Plant. Photo courtesy of Cummins.

Stepping up to the Better Plants Challenge

Challenge Partners also share “implementation models,” which are market-leading approaches to overcoming barriers to advancing energy efficiency within their organizations. Implementation models documented so far include:



Alcoa is linking leadership pay to the achievement of incremental energy-efficiency targets. By providing financial rewards to business leaders who set aggressive energy reduction goals and successfully achieve those targets, Alcoa is helping ensure energy-efficiency initiatives receive adequate attention from senior leaders, even as they juggle other critical business priorities. Learn more: www4.eere.energy.gov/challenge/implementation-model/alcoa.



Legrand North America is installing submeters in its 14 domestic facilities to collect actionable energy data that will be communicated to its workforce. The submeters are being used to help energy personnel better understand the company’s energy use and uncover new opportunities for energy-efficiency improvement. The data will also be tied into a broader employee engagement initiative that seeks to empower Legrand workers to make energy management part of their day-to-day activities. Learn more: www4.eere.energy.gov/challenge/implementation-model/legrand.

Next Steps

DOE will continue working with partners to advance energy efficiency in the industrial sector and demonstrate that sound energy management practices make good business sense. Priorities for next year include advancing strategic energy management by promoting ISO 50001 and Superior Energy Performance (SEP) through two key mechanisms:

- *The Better Buildings Initiative: Industrial Strategic Energy Management Accelerator* (“Industrial SEM Accelerator”). DOE is expanding the Better Buildings Initiative to engage leaders in a set of Better Buildings Accelerators designed to demonstrate specific innovative approaches, which—upon successful demonstration—would accelerate investment in energy efficiency. The Industrial SEM Accelerator is designed to demonstrate SEP as a practical and cost-effective energy-efficiency program offering. Signatories to this Accelerator are utilities and energy-efficiency program administrators that agree

to deploy SEP to a set of industrial customers across their service territories.

- *The SEP Enterprise-Wide Scaling Project* (scaling project). Through the scaling project, DOE will work with a select number of Better Plants Partners to scale SEP across their corporations to drive deeper energy reductions. The goal of the scaling project is to help Better Plants Partners transition from pursuing SEP certification at a single facility to adopting it at multiple facilities and ultimately across all or most facilities within the company to save even more energy.

Additionally, DOE will continue to recruit new companies to the Better Plants Program and work with existing partners to explore how to engage key business partners, such as suppliers and customers, on energy efficiency.

Companies interested in partnering with DOE on the Better Plants Program should e-mail BetterPlants@ee.doe.gov.

- **3M**
- **Alcoa**
- Amcor Rigid Plastics North America
- ArcelorMittal USA
- Arkema
- AT&T
- Ball Corporation
- Bentley Prince Street, Inc.
- BIC APP North America
- BPM Inc.
- Bradken
- Bridgestone Americas
- **Briggs & Stratton**
- Brown Printing Company
- Buck Company
- Buckeye Technologies Inc.
- CalPortland Company
- Cargill Regional Beef of Milwaukee
- Carlton Forge Works
- Carus Chemical Company
- Celanese Corporation
- Chippewa Valley Ethanol Company
- Citrus World, Inc.
- Commercial Metals Company
- Cree, Inc.
- **Cummins, Inc.**
- Dahlgren & Company, Inc.
- Daikin McQuay
- Darigold
- Davisco Foods International, Inc.
- Denison Industries
- Didion Milling
- DSM North America
- Duke Manufacturing Company
- Earth2O
- Eastman Chemical Company
- Eaton Corporation
- Eck Industries
- Flambeau River Papers
- Flying Foods Group
- **Ford Motor Company**
- General Aluminum Mfg. Company
- General Dynamics Ordnance and Tactical Systems
- **General Electric**
- General Motors
- Golden Renewable Energy, LLC
- Goodyear Tire and Rubber Company, US Tire Plants
- Grand River Printing
- Graphic Packaging International
- **HARBEC Inc.**
- Harley-Davidson Motor Company
- Harrison Steel Castings Co.
- Haynes International
- HNI Corporation
- Holcim (US) Inc.
- Huntsman Corporation
- Ingersoll Rand
- Intel
- International Paper
- JBT Corporation
- Johnson & Johnson
- **Johnson Controls, Inc.**
- Kenworth Truck Company
- Kingspan Insulated Panels, Inc.
- Land O' Lakes
- **Legrand North America**
- Lennox International
- Lockheed Martin
- Lufkin Industries, Inc.
- Manitowoc Grey Iron Foundry
- Mannington Mills
- Marquis Energy, LLC
- McCain Foods USA
- MeadWestvaco Specialty Chemicals
- MedImmune, LLC
- Metal Industries, Inc.
- Mohawk Industries
- Navistar, Inc.
- Neenah Foundry
- **Nissan North America**
- OMNOVA Solutions
- OSRAM SYLVANIA
- Owens Corning
- PaperWorks Industries, Inc.
- Patrick Cudahy
- Patriot Foundry & Castings
- PepsiCo
- PPG Industries
- Procter & Gamble
- Quad/Graphics, Inc.
- Raytheon Company
- Republic Conduit
- Revstone Castings Fairfield
- Roche Diagnostics
- RockTenn-Harrison

- **Saint-Gobain Corporation**
- **Schneider Electric**
- Serious Materials
- Shaw Industries Group, Inc.
- Solberg Manufacturing, Inc.
- Sony DADC
- Spirax Sarco, Inc.
- Steelcase, Inc.
- Sunoptics Prismatic Skylights
- TE Connectivity
- Texas Instruments Inc.
- Textron Inc.
- The Dow Chemical Company
- **The J.R. Simplot Company**
- The Sherwin-Williams Company
- The Shredder Company
- The Step2 Company
- Thilmany Papers
- ThyssenKrupp Elevator
- Toyota Motor Engineering and Manufacturing North America
- TPC Group LLC
- United Technologies Corporation
- Verso Paper Corp.
- Volvo Group North America
- Waupaca Foundry, Inc.
- Weyerhaeuser
- Whirlpool Corporation
- World Kitchen, LLC

Companies in **bold** are part of the Better Plants Challenge. For more information go to: eere.energy.gov/challenge/.

Endnotes

- ¹ U.S. Energy Information Administration, Annual Energy Outlook 2013, www.eia.gov/oiaf/aeo/tablebrowser/#release=AEO2013&subject=3-AEO2013&table=3-AEO2013®ion=1-0&cases=ref2013-d102312a.
- ² McKinsey & Co., Unlocking Energy Efficiency in the U.S. Economy, July 2009.
- ³ Energy savings and payback periods are calculated from energy audit data in the U.S. Department of Energy's Industrial Assessment Center database.
- ⁴ Representation from individual U.S. manufacturing industries is based on net source energy consumption (not including feedstock energy use) of respective industries as determined by the 2010 Manufacturing Energy Consumption Survey.