Partnering with Industry to Save Energy and Drive Innovation

The United States industrial sector accounts for roughly one-third of the nation's energy consumption.[1] Working with partners across this sector, The U.S. Department of Energy (DOE) through the Better Plants Program is driving innovation, cost savings, and the sharing of solutions that accelerate progress. More than 220 companies partner with DOE in the Better Plants Program. These companies represent more than 3,200 facilities across all 50 states and, as partners, have adopted ambitious energy as well as water and waste reduction goals. Partners further demonstrate leadership by sharing solutions and ideas with others. DOE supports them by providing technical expertise, convening peer exchange opportunities, and highlighting successful solutions.

To date, Better Plants partners have saved more than $6 billion dollars and 1.3 quadrillion Btus of energy. Almost 60 partners have met their initial energy reduction goals and many have gone on to set new goals with DOE. Twenty-two new companies joined the Better Plants Program this year and more than a dozen partners joined a newly launched waste pilot designed to deliver further and deeper cost and energy savings.

Above: Volvo Group North America opens up its Hagerstown, Maryland, powertrain facility for a tour for other Better Plants partners.

Figure 1: Cumulative Energy Savings Over Time

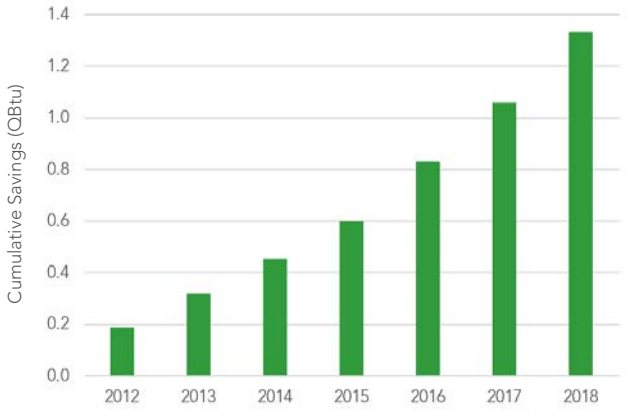
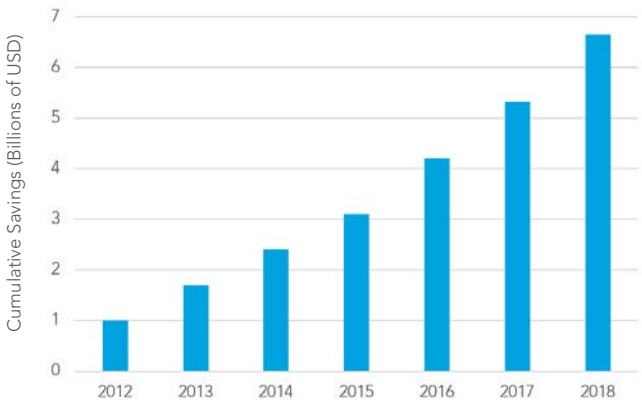


Figure 2: Cumulative Cost Savings Over Time



$6.7 Billion Dollars in Energy Savings	**1.3** QBtu in Energy Savings	**3,200** Approximate Number of Facilities
222 Number of Partner Companies	**12%** Approximate % of U.S. Manufacturing Energy Footprint	**2.6%** Average Annual Energy Intensity Improvement Rate

[1] U.S. Energy Information Administration, Use of energy explained: Energy use in industry, https://www.eia.gov/energyexplained/index.php?page=us_energy_industry

New Partners

In the past year, DOE welcomed 22 partners into the Better Plants Program, including eight suppliers of Challenge partner **Volvo Group North America** that joined as part of the Supply Chain Initiative (see page 14 for more information). The Challenge also grew by two partners, with the addition of **Xerox** and **Bristol-Myers Squibb**. More than 220 industrial companies and water and wastewater treatment organizations now partner with Better Plants to reduce energy intensity.

Autoliv is the world's largest automotive safety supplier, with sales to all major car manufacturers.

Deschutes Brewery is a family and employee-owned maker of craft beer and hand crafted ales.

Estée Lauder is a manufactruer of skin care, makeup, and fragrance products.

Flowers Foods is a producer of fresh packaged bakery foods, including top brands Nature's Own, Tastykake, and Wonder.

Graham Packaging Company is a leader in plastic and blow molded packaging solutions.

Intralox LLC is a creator of comprehensive conveyance solutions, including conveyor belting and conveyor equipment.

Michels Corporation is a leading infrastructure and utility contractor.

Mitsubishi Electric Automotive America is a manufacturer of electric and electronic automotive components.

Ozinga Brothers is a fourth-generation family business and provider of concrete, bulk materials, and energy solutions.

Saputo Dairy Foods is a producer of a variety of dairy and non-dairy extended shelf-life products.

Shape Corporation is an engineer and manufacturer of metal and plastic products.

Sugar Creek Packing Co. is a manufacturer of food solutions for large national brands.

Tyson Foods is a modern, multi-national, protein-focused food company.

United Mechanical and Metal Fabricators, Inc. is a precision metal manufacturing company.

Two leading industrial companies have joined the Better Plants Challenge, committing to publicly share energy performance data and solutions in addition to setting an ambitious energy intensity reduction goal.

Bristol-Myers Squibb is a global biopharmaceutical company whose mission is to discover, develop, and deliver innovative medicines that help patients prevail over serious diseases.

Xerox is a print technology and intelligent work solutions leader focused on helping people communicate and work better.

This year, Better Plants Challenge partner **Volvo Group North America** joined four other partners in sponsoring a cohort of their suppliers to join Better Plants as part of the Supply Chain Initiative.

Alumalloy Metalcastings is a modern permanent mold foundry and machining shop.

Bendix Commercial Vehicle Systems is a developer and supplier of automotive safety technologies, energy management solutions, air brake charging, and more.

Commercial Vehicle Group is a global supplier of complete cab systems in the heavy-duty truck, construction and agricultural equipment markets.

Custom Glass Solutions is a manufacturer of glass products for RVs, construction and agriculture equipment, and public and commercial transportation.

Durable Products Inc. is a leading source for custom manufactured rubber and polyurethane products.

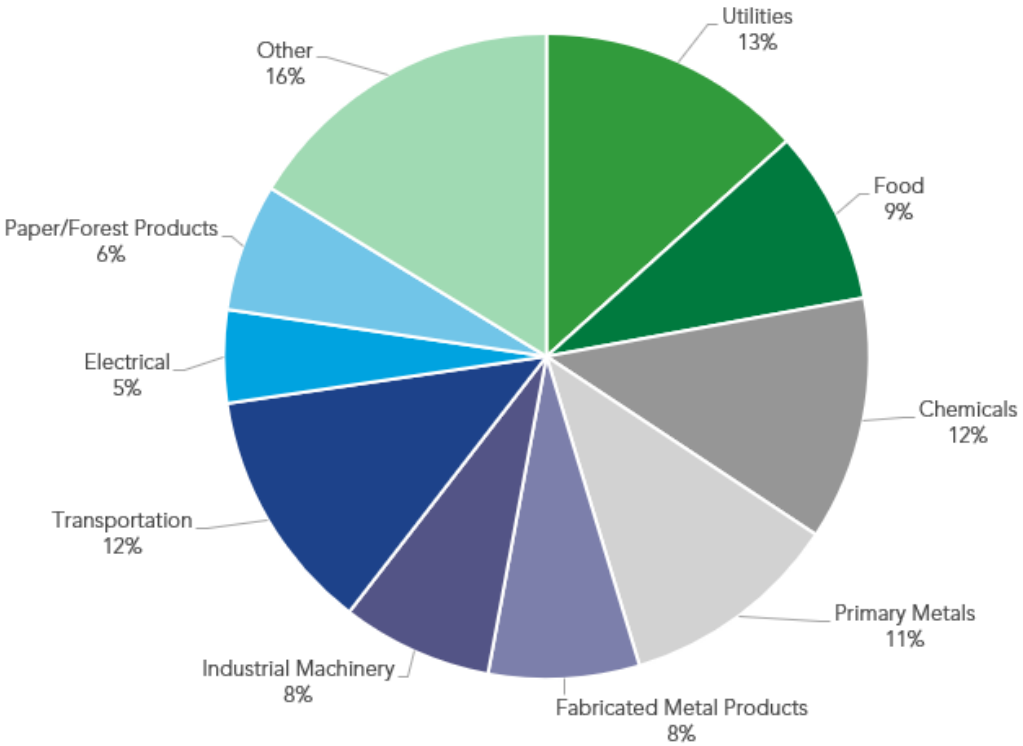
GB Manufacturing is a metal stamper and fabricator with flexible and complex manufacturing capabilities.

MEKRA Lang is a leading manufacturer of rear view vision systems for commercial vehicles.

Titan X Engine Cooling Inc. is a global supplier of powertrain cooling solutions to commercial vehicles.

2019 Better Plants Partners by Sector

Better Plants attracts partners from across the industrial sector. While the partner sectors may be different, the challenges they face are often alike. The diversity of the program contributes to an expanding collection of real-world solutions and best practice examples and makes the Better Buildings, Better Plants Summit (see page 8) a valuable convening for networking and knowledge transfer.



Leading the Way: Goal Achievers

Five Challenge partners and two Program partners achieved their ambitious energy intensity reduction goals in the past year. Sixty energy goals have now been met and exceeded by Better Plants partners, who are paving the way for the rest of the industrial sector. Many goal achievers have gone on to set additional energy goals.

2019 Better Plants Challenge Goal Achievers

26%
energy intensity improvement in four years

37%
in six years

20%
in six years

25%
in ten years

26%
in six years

2019 Better Plants Program Goal Achievers

28%
in eight years

27%
in eight years

Above: Bucks County Water and Sewer Authority (BCWSA) CEO Ben Jones and General Manager John Butler receive a goal achiever trophy from Assistant Secretary of Energy Daniel Simmons.

How Did They Achieve Their Goal? TE Connectivity's Compressed Air Solution

At **TE Connectivity's** facility in Lickdale, Pennsylvania, the manufacturing process is heavily reliant on compressed air for production. The plant's compressed air system serves multiple pneumatic processes including plastic parts molding, electroplating, metal stamping, and part assembly. As part of a holistic system assessment, multiple improvements were identified that were implemented in five phases over several years.

By the end of the five-phase project, the plant was able to reduce the system pressure by 22 psig, which lowered compressed air energy costs by 11%. In addition, the compressed air system was able to adequately serve the plant with four to five units operating instead of all eight; **annual energy costs were reduced by $223,000**.

Learn more at: https://bit.ly/2lCzxNF

Partners in Action

Eastman Chemical Showcases Upgrade

DOE Assistant Secretary Daniel Simmons paid a visit to **Eastman Chemical's** Corporate Headquarters and Tennessee Operations – the company's largest facility, with 7,000 employees – in May 2019. The visit focused on the site's upgraded natural gas compression system, which is the subject of the partner's showcase project. Learn more at https://bit.ly/2MNy7ev.

Cummins Hosts First "U.S. Innovation Gateway" Competition

Cummins, Inc. hosted a competition enabling businesses and entrepreneurs to pitch ideas to help the company meet its water, waste, and energy reduction goals. Sixty-six proposals were whittled down to nine finalists, who got a chance to make an in-person, 10-minute presentation to a panel of judges – including Better Plants' Eli Levine – at the Gateway's Finalist Day. The winning idea involved enhancing cooling tower operations to reduce water and energy usage. Learn more about the novel competition here: https://bit.ly/30gQexo.

Partners Engage Their Employees

Recognizing that awareness of ambitious energy goals can engage more people who might have helpful ideas, Better Plants partners have begun to put up facility posters to highlight their energy efficiency pledges. Saving energy requires an all-hands-on-deck effort and many companies have driven significant savings from ideas off the factory floor.

2019 Better Practice Award Winners

The Better Practice award recognizes partners for innovative and industry-leading accomplishments in implementing and promoting practices, principles, and procedures of energy management.

Winners of both the Better Practice and Better Project awards are recognized in person at the annual Better Buildings, Better Plants Summit as well as other industry conferences. Speaking opportunities and other special promotional opportunities are also given to award winners. Better Plants strives to highlight all applications, regardless of ultimate award status, by converting them into case studies published online.

Above: Better Practice and Better Project Award Winners; 2019 Better Buildings, Better Plants Summit.

Here are the 2019 Better Practice award winners:

BENTLEY

For using an Energy as a Service model to finance lighting and water retrofits with an ahead-of-schedule expected payoff

Celanese

For implementing the Celanese Energy Community program and engaging and educating 98% of the company workforce on energy reduction

Des Moines Water Works
Water You Can Trust for Life

For installing energy monitors to provide staff with real-time energy data and saving $185,000 a year in energy costs

Lineage

For implementing a flywheeling algorithm to optimize refrigeration compressor operation, reducing a facility's energy costs by 39%

SAINT-GOBAIN

For launching "Compress It," a voluntary competition between facilities to identify and repair compressed air leaks that led to $2.5 million in annual energy savings

TOYOTA

For implementing an Energy Savings Company process in North America that has uncovered annual energy savings opportunities totaling 3% portfolio-wide

2019 Better Project Award Winners

The Better Project award is presented to partners for outstanding accomplishments in implementing industrial energy, water, and waste projects at individual facilities. **Here are the 2019 Better Project award winners:**

For upgrading two plate and frame water/ammonia heat exchangers and saving more than $157,000 in annual energy costs

For installing variable fan drives on 12 cooling tower fans, with estimated annual energy cost savings of more than $229,000

For devising a process to develop specialized versions of a chemical product and reducing production energy costs by 42%, or $725,000 annually

For using a packaged supplier to make utility upgrades at three different sites, shortening the project schedule by as much as 10 months and reducing costs by 20% compared to a traditional stick-built approach

For its Resource Recovery and Electrical Energy solids recovery facility project that produces its own electricity on-site, reducing annual energy costs by an estimated 50%, or $2 million

For implementing a chilled water optimization project that has saved 3,000 MWh in annual facility electric energy consumption

For installing a condensing economizer to recover energy from a boiler stack, reducing site fuel usage by 10%

2019 Better Buildings, Better Plants Summit

Nearly 650 attendees from the public, private, and industrial sectors gathered for the 2019 Better Buildings, Better Plants Summit in Arlington, Virginia, on July 10 and 11, 2019. This year's summit featured dynamic discussions around emerging technologies and trends, workforce development, resilience planning, and more.

U.S. Secretary of Energy Rick Perry, at right, provided a keynote address recognizing goal achievers and announcing a new waste reduction pilot (see page 15). Other highlights included:

Tours of AstraZeneca and Volvo Group Facilities

Summit participants toured the local industrial facilities of partners AstraZeneca and Volvo Group North America. Learn more about the tours of AstraZeneca's Gaithersburg, Maryland, campus here: https://bit.ly/2TuHJfN and Volvo Group's Hagerstown, Maryland, facility here: https://bit.ly/2Tuh4zp.

Better Practice and Better Project Award Winners

2019 Better Practice and Better Project award winners (see pages 6 and 7) were given an opportunity to share their energy efficiency success stories via rapidfire, TED Talk-style presentations. The topics included innovative ammonia heat exchangers, packaged utility systems, Energy as a Service financing models, and much more.

Interactive, Out-of-the-Box Industrial Track Sessions

In response to partner feedback on past Summit programming, Better Plants developed new session formats for this year's event. For example, "Challenge the Champions" enabled audience members to pose tough energy efficiency questions to experienced energy managers, and a round-robin workshop let attendees move in and out of small breakout groups discussing renewables, water, waste, and science-based targets.

Ask-an-Expert on Industrial Topics

Technical experts from the National Laboratories and DOE, with expertise spanning a wide range of efficiency topics, were available at the Summit to answer questions and discuss energy performance challenges and trends. Focus areas included energy assessments, water efficiency, industrial process heating, and waste heat recovery.

In-Plant Trainings

In-Plant Trainings (INPLTs) are **multi-day, hands-on workshops** held at partner facilities that **train participants on how to identify, implement, and replicate energy-saving projects.** INPLTs, hosted by Better Plants partners and led by DOE-certified energy experts, focus on a wide variety of topics, ranging from traditional industrial systems like compressed air and pumps to topics such as the treasure hunt exchange and water and wastewater treatment. As of this past year, the Better Plants Program has hosted over **120 INPLTs** with over **2,160 participants**, helping to identify over **$41 million dollars** in energy cost savings opportunities.

NEW

IN-PLANT TRAINING: Water Efficiency

One of the newest INPLTs offered through Better Plants is a series on water savings. Piloted by ArcelorMittal, Saint-Gobain Corporation, and Owens Corning, the new water efficiency INPLT will provide attendees with the following benefits:

1. Participants will be able to create a water balance for their facility to understand where water is coming from, where it's going, and how it's traveling throughout the plant.

2. Participants will learn how to calculate the true cost of water use, taking into account what is paid to local municipalities, as well as energy, heating, and treating processes.

3. This training will teach participants how to audit their plant to look for water savings opportunities and reduce water consumption in a facility.

4. Training on the DOE's Plant Water Profiler tool (page 15).

120
Number of INPLTs Conducted to Date

2,160
Number of Participants in INPLTs

$41
Million Dollars in Potential Energy Cost Savings

Each INPLT is a unique opportunity to help companies **train and empower their staff** on optimizing industrial systems and highlighting their commitment to reliable and sustainable production. There is a wide range of trainings to choose from that fall into the categories listed below. For more information on **upcoming INPLTs**, scan the QR code below.

- Industrial Systems (i.e., steam, pumps, etc).
- Treasure Hunts
- Energy Management with 50001 Ready Tools
- Water Savings
- Water and Wastewater for treatment facilities

INTERESTED IN ATTENDING AN UPCOMING INPLT?

Open the camera on your smartphone and hold it up to the QR code to be re-directed to our calendar of upcoming INPLTs.

Connecting with the National Labs at the 2019 Technology Days

Hosted at Lawrence Livermore National Laboratory (LLNL) and Lawrence Berkeley National Laboratory (LBNL), the 2019 Technology Days welcomed representatives from more than two dozen private companies. During the tours held at LLNL and LBNL labs, attendees were given the opportunity to explore relevant research, technological capabilities, and potential partnerships in energy efficiency and other impactful areas.

Each of the Department of Energy's 17 National Lab facilities are equipped with unique technologies and specializations for partners to take advantage of. Attendees of the 2019 Technology Days were able to explore the following facilities while on tour:

Lawrence Livermore National Lab (LLNL)

- Advanced Manufacturing Lab
- Combustion Lab
- Fiber Draw Tower
- High Performance Computing
- Modular and Sustainable Supercomputing Facility
- National Atmospheric Release Advisory Center
- National Ignition Facility

Lawrence Berkeley National Lab (LBNL)

- Data Centers
- FLEXLAB
- Reacting Flow Applications Lab

Learn more about the lab capabilities featured at the 2019 Technology Days https://bit.ly/2MCcRIK

At the 2019 Technology Days, LLNL's Associate Director for Engineering, Anantha Krishnan, reviewed breakthroughs in advanced manufacturing that could **positively impact the industrial sector**. The development of an Advanced Manufacturing Lab (AML), which debuted in the lab's Livermore Valley Open Campus in 2018, allows scientists to work shoulder-to-shoulder with private companies in an open environment. Not only do these labs promote cross-sector collaboration, their missions also help to push new advanced manufacturing technologies that partners can take advantage of, such as precision engineering, 3D printing, microfabrication, carbon fiber composite materials, neural implants, and much more.

"We set a bold and challenging goal to improve our energy intensity and are very interested in exploring how National Lab innovation and expertise can help get us there."

– **Rishabh Bahel**, Energy Engineer, ArcelorMittal

ArcelorMittal

Left: Officials from the DOE's Office of Energy Efficiency and Renewable Energy joined representatives from more than two dozen private companies on a visit to Lawrence Livermore National Laboratory on April 9 for the 2019 Better Plants Technology Days. Center and Right: The group experienced first-hand demonstrations of new technologies under development throughout the lab visits.

Partnering with the National Labs

The Department of Energy's National Labs offers unparalleled opportunities for **public/private partnerships** in research, testing, and publication. Through the National Labs' 17 user facilities, independent groups can benefit from available equipment and services for the advancement of independent research projects. Additionally, Technical Account Managers regularly facilitate meetings for Better Plants partners with lab experts to explore areas of collaboration. Manufacturers who partner with DOE through the Better Plants Program should feel like they can leverage everything DOE has to offer, which includes the 'Crown Jewels of American Innovation', the National Labs.

Better Plants has created an online **National Lab Innovation Portal** (see QR code below) to make it easier to learn about the opportunities for public/private partnerships in research, testing, and additional benefits offered by the National Labs. These research centers tackle the most critical scientific challenges of our time and possess unique instruments and capabilities – many of which are found nowhere else in the world. Through the National Labs' user facilities, independent groups can take advantage of equipment and expertise to advance private projects.

Top: Oak Ridge National Lab (ORNL), Oak Ridge, TN
Bottom: A look at the ultrasonic drier technology under development at ORNL.

INTERVIEW: PARTNERING WITH THE NATIONAL LABS

Bristol-Myers Squibb

Why did your company decide to partner with the National Labs?
It was during a visit to Washington, D.C. that our team was first introduced to the benefits of working with the Better Plants Program and Challenge. The team at the DOE arranged a custom meeting and agenda for our group to visit Oak Ridge National Lab and explore new solutions and meet with technical experts.

How has this partnership with the National Labs added value to your business?
Aside from exploring new solutions and technologies, bringing staff from several different departments within our company to visit the national labs has helped strengthen our company culture and understand challenges across different areas of our business.

What are some new technologies that you have been exploring with the labs?
We've been exploring various supply chain and cold storage solutions, looking at regression models and testing new tools. We've seen a lot through the labs, but there's also the sense that there's so much more that we can achieve and gain exposure to.

"Visiting the labs and seeing things first-hand and getting to sit down and speak with professionals who not only have experience with research capabilities but also our line of business was invaluable to our team. It was very helpful to have someone to work with that can be a bridge between the labs and private companies and help elevate our discussions."

- **Bill Perhacs**, Associate Director, Global Energy, Bristol-Myers Squibb

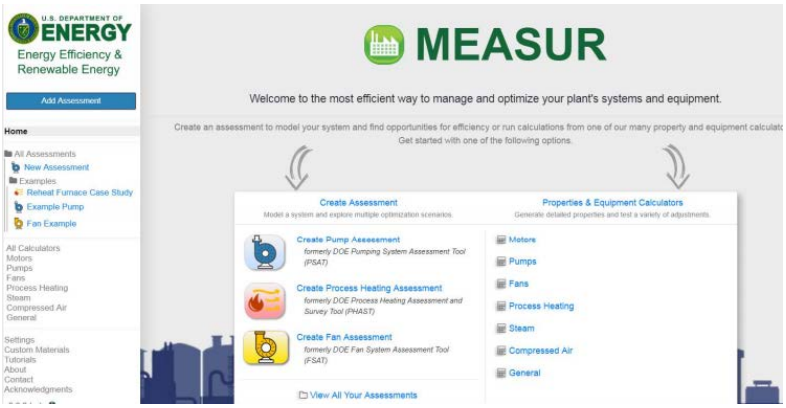
LOOKING TO FIND A NATIONAL LAB?

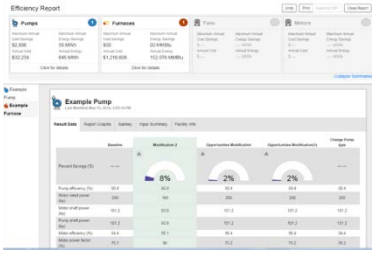
Open the camera on your smartphone and hold it up to the QR code to be re-directed to our listing of DOE laboratories.

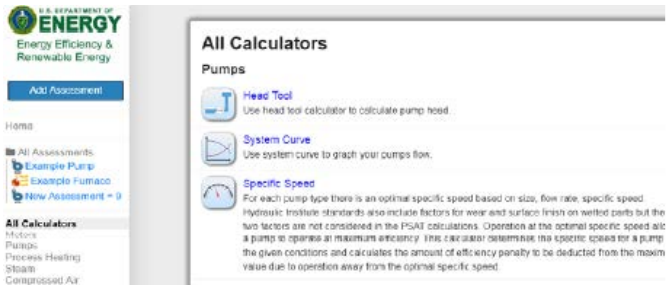
Tools for Partners

DOE works to provide Better Plants partners with helpful tools and resources to overcome barriers and identify opportunities to save energy. Highlighted below are a few of the new and updated resources available to partners.

MEASUR







MEASUR is a software tool suite that allows end users (such as energy engineers or facility personnel) to create a model using facility data that will **optimize** and improve the energy systems for industrial facilities. Using plant-specific operating data, MEASUR estimates how much energy each piece of equipment uses annually – plus the estimated annual energy costs.

The software can **analyze most major energy support systems** found within industrial plants, including: compressed air, fans, process heat, pumps, and more. Through the various system modeling modules and 40+ **equipment calculators**, users can analyze and quantify energy savings. Over the past year there have been several additions to the software, including a **steam module** and a **treasure hunt module** to help plants find low or no-cost energy savings opportunities.

ReOpt™ Software

ReOpt™ is a decision support model that is used to optimize energy systems for facilities and microgrids by recommending an optimal mix of **renewable energy**, conventional generation, and **energy storage technologies**. This platform helps users meet their cost savings and energy performance goals for technologies such as wind, photovoltaics (PV), solar hot water, biomass, waste to energy, diesel and natural gas, and more. This tool can be applied to a variety of **energy optimization projects**, including: renewable energy screenings, microgrids, campus planning, energy and water nexus, and more.

WHERE CAN YOU FIND THESE TOOLS?

Open the camera on your smartphone and hold it up to the QR code to be re-directed to the DOE Tools and Trainings page.

Diagnostic Equipment Program

The **Diagnostic Equipment Program (DEP)** enables partners to borrow 16 different kinds of tools to collect energy data and improve equipment performance. Through the DEP, partners can test tools before deciding to purchase their own or help justify the cost of purchasing tools by demonstrating their value first-hand. In the past year, new options have been added to the program, including ultrasonic flow meters for plant water diagnostics. **Volvo, Raytheon**, and **Leggett & Platt** are just a few of the partners that have taken advantage of these resources:

- Air Flow Measurement
- Combustion Analysis
- Data Logging
- Distance Measurement
- Electric Power Logging
- Electric Power Measurement
- Electric Voltage Measurement
- Event Logging
- Flow Meters
- Light Meters
- Pressure Measurement
- Speed Measurement
- Thermal Imaging
- Temperature Measurement
- Troubleshooting
- Water Chemistry

DOE Better Buildings Financing Navigator

The **DOE Better Buildings Financing Navigator** helps users explore a wide array of financing choices and identify relevant **financing options** for their energy projects. It can help anyone who wants to access financing for energy projects or learn more about the marketplace in general. Additionally, users can access the larger Better Buildings Challenge **Financial Ally community**, which connects banks and lenders that are looking to make financial investments in energy projects. Accomplish the following with the financing navigator:

View financing recommendations based on your needs

Explore a library of financing options & Ally Solutions

Browse fact sheets and financing resources

The Navigator features a primer geared specifically for the industrial sector, highlighting unique barriers, common financing solutions, industrial case studies, and more.

WHERE CAN YOU FIND THESE TOOLS?

Open the camera on your smartphone and hold it up to the QR code to be re-directed to the DOE Tools and Trainings page.

Supply Chain Initiative: An Update

Industrial supply chains are a key element of the U.S. manufacturing base, accounting for approximately 70% of manufacturing jobs and facilities and up to 85% of the energy consumption before final product assembly.[2] In addition, many of the manufacturing companies that make up much of the industrial supply chain base tend to be small- to medium-sized manufacturing (SMM) firms. As a result, facilitating energy efficiency in supply chains and generating resources for SMMs can yield significant impacts not only in improving energy performance in the industrial sector, but also in enhancing U.S. economic competitiveness and domestic energy resilience.

As a result, DOE launched a supply chain pilot in 2014 that became the supply chain initiative in 2016. Better Plants is working with several large partners to facilitate energy efficiency adoption within their supply chain. Through this initiative, five partners are each sponsoring a cohort of their suppliers to join Better Plants. These five sponsors are: **Legrand, UTC, Lockheed Martin, Honda North America** and, the most recent supplier sponsor with eight suppliers, **Volvo Group North America**. Together, these five cohorts include 38 Better Plants partners representing 17% of all partners. In addition to setting energy saving goals and developing energy management plans, suppliers receive focused technical assistance including individualized training on baselining, access to Industrial Assessment Center (IAC) energy assessments (see page 17), and customized webinars on everything from DOE software tools to starting a corporate waste efficiency program.

"We are excited to expand our longstanding cooperation with the U.S. Department of Energy by becoming a sponsor of the Better Plants Supply Chain cohort. Sustainability is a key strategic focus for the Volvo Group. The cohort, and it's goal of 25% energy reduction in 10 years, will greatly support the ambitions of Volvo Trucks North America and Mack Trucks toward sustainability in North America."

- **Manuel Marielle**, Senior Vice President, Volvo - North America Purchasing

VOLVO

SUPPLIER PROFILE: Cardington Yutaka

Cardington Yutaka joined Better Plants with the **Honda North America** supply chain cohort in 2016. An automotive parts supplier of torque converters, catalytic converters, and exhaust systems, the company has received an IAC assessment and began capitalizing on the recommendations. By the end of 2017 Cardington had a 19% cumulative improvement in energy intensity and the following year was able to meet the program goal.

Above: Cardington Yutaka's headquarters in Cardington, Ohio.

Some of its most impactful energy-saving measures included compressed air system improvements that enabled the plant to lower the operating pressure by 10 psig, installing Variable Speed Drives (VFD) on cooling towers and baghouse fans, and installing v-notched belts serving the baghouse fans. They also developed a new type of brazing oven that enabled them to increase torque converter output by 50% while reducing CO_2 emissions. Not content to rest on its laurels, Cardington Yutaka doubled down and set a new goal in 2019 and joined the Challenge level in Better Plants.

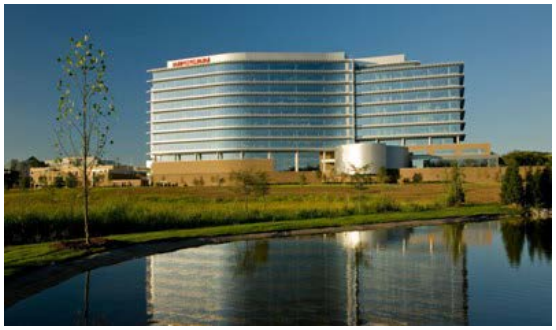
"The Better Plants Program has been very supportive every step of the way to help CYT achieve our reduction goals. We could not have had the success if not for this support." – **Joe Harris**, Manager, Cardington Yutaka

Cardington Yutaka Technologies Inc.

[2] P. Delforge and D.B. Goldstein, "Adding Energy Savings in the Supply Chain," ACEEE Summer Study on Energy Efficiency in Industry, 2015, http://aceee.org/files/proceedings/2015/data/papers/4-55.pdf.

Water Savings Initiative: An Update

The Better Plants Water Savings Initiative was born out of the fact that since transporting and treating water requires energy, saving water saves energy. Additionally, the efficient use of water can also lead to a more reliable water supply and improved water quality. Through the initiative, Challenge partners set goals to save water (in addition to energy) and receive recognition and technical support. The 11 initiative partners are **Bentley Mills**, **BD**, **Cummins**, **Electrolux**, **Ford Motor Company**, **General Motors**, **HARBEC, Inc.**, **Nissan North America**, **Saint-Gobain Corporation**, **Toyota**, and **UTC**.



Nissan North America's headquarters features a pond, refilled from a well, that irrigates 40% of the property.

Saint-Gobain Corporates Utilizes Plant Water Profiler Tool

The Plant Water Profiler (PWP) is a comprehensive tool, currently in Excel format, designed to help sustainability teams at manufacturing plants:

1. **Understand** the procurement, use, and disposal of water in their facilities;
2. **Be cognizant** of the true cost of water, including the costs associated with water procurement, treatment, and consumption and water disposal; and
3. **Identify opportunities** to reduce water use and save money in the process.

Saint-Gobain Corporation, which has committed to decrease water discharges by 80% by 2025, put the PWP to good use at a subsidiary facility in North America. Several potential water and cost savings opportunities were identified based on eliminating unknown losses and maximizing recirculation in the cooling and condensing system that contributes the most to the facility's water use and the true cost of water. The facility was encouraged to purchase more submeters and consider adding more capability to existing cooling systems. Company-wide, water submeters are being recommended for a target list of additional facilities and a questionnaire is being developed to help sites determine where the PWP can be applied.

Open the camera on your smart phone and hold it up to the QR code to be re-directed to the Water Profiler Tool.

PILOT PROGRAM: Waste Reduction

In 2019, DOE, through Better Buildings, Better Plants launched a **Waste Reduction Pilot** to help partners reduce waste, improve energy performance, and reduce operating costs. Similar to the DOE Water Savings Pilot, this program will provide a platform for industry leaders to demonstrate what is achievable in waste reduction. Additionally, the insights gained from this pilot will help DOE understand real world barriers, details, and successes in waste reduction, which can aid other organizations in developing or improving their own programs. **The Better Plants Waste Reduction Pilot gives partners an opportunity to:**

- **Formalize their commitment** to waste reduction by setting a public goal in partnership with DOE.
- **Network with peers** to share waste reduction solutions through webinars, national conferences, and other means.
- **Share guidance** on issues such as waste data tracking and waste management best practices.
- **Earn recognition** for waste reduction progress and accomplishments.

2019 Waste Pilot Partners

NSK
J.M. Martin & Co. EST. 1833
FMC
Schneider Electric
SugarCreek
PPC Innovate. Connect. A BELDEN BRAND
LA DWP Los Angeles Department of Water & Power
VOLVO
Flowers Foods
United Technologies
HARBEC
Johnson Controls
Electrolux

50001 Ready

The DOE 50001 Ready Program **recognizes facilities and organizations that practice ISO 50001-based energy management**. Participants can use the online 50001 Ready Navigator software tool to establish and self-attest to implementing an energy management system for their facility using the structure of ISO 50001. Facilities or organizations that go on to obtain ISO 50001 certification and achieve sustained excellence using their energy management systems may also then get certified to Superior Energy Performance (SEP) 50001. Some illustrative efforts from partners are below.

3M

3M now has 30 sites certified to ISO 50001, and built on its existing ISO 9001 and ISO 14001 processes to develop an enterprise-wide SharePoint system to house its standardized energy management tools and resources.

ArcelorMittal

The 50001 Ready process provided a platform for **ArcelorMittal's** Cleveland plant to establish a robust and committed energy team of 15+ staff members across all its operating units. The ArcelorMittal Cleveland plant was the first 50001 Ready partner to re-attest their system and be recognized for a second year in the program.

Charter Steel

Charter Steel's corporate managers used the 50001 Ready Navigator tool to monitor their ISO 50001 efforts at multiple facilities, finding it especially helpful in identifying staff training needs and raising energy awareness among plant personnel.

General Motors

General Motors customized all the Navigator task guidance for several different types of its production facilities, leading to 50001 Ready recognition for over 20 GM facilities in the U.S. (and counting).

50001 Ready
U.S. DEPARTMENT OF ENERGY

Better Plants Partners with 50001 Ready-Recognized Facilities

Steelcase, COMAU, GM, Charter Steel, Quad/Graphics, ArcelorMittal

Better Plants Partners with SEP-Certified Facilities

3M, AstraZeneca, Cummins, Des Moines Water Works (Water You Can Trust for Life), Ingersoll Rand, HARBEC (Technical Innovation with Environmental Responsibility), NISSAN, VOLVO, Schneider Electric

Updates to the 50001 Ready Navigator

The 50001 Ready Navigator is constantly being updated to increase capabilities:

- **Multi-Site Functionality** – Navigator users can now manage multiple implementation projects together under a single "central office" organizational umbrella
- **Navigator Partner Platform** – utilities and other U.S. -based implementers can now manage and oversee their 50001 Ready cohorts in a version of the Navigator customized for their users
- **Navigator 3.0** – the Navigator is being restructured to better align with the changes issued in the ISO 50001: 2018 standard, with a full transition by the end of 2019

Hold your smart phone camera up to the QR code to be re-directed to the 50001 Navigator.

Industrial Assessment Centers

DOE Industrial Assessment Centers (IACs) **help small and medium sized** U.S. manufacturers save energy, improve productivity, and reduce waste by providing no-cost energy assessments conducted by university-based teams of engineering students and faculty. Currently, there are 28 Centers at universities across the country. In addition, DOE selected three new Extension Centers, Colorado State University, University of Delaware, and Case Western Reserve University, that will assist manufacturers in relatively underserved areas. These new members of the IAC team will begin operations in September 2019. After each site visit, the IAC team provides a comprehensive report with specific details on all identified opportunities for improving energy performance, including applicable rebates and incentives.

To date, IACs have conducted over 18,800 assessments with more than 142,000 associated recommendations; **average recommended yearly energy cost savings equals more than $137,000**.

Industrial Assessment Center
U.S. DEPARTMENT OF ENERGY

IAC Energy Assessments for Honda Supplier Cohort

Summary of Assessments	Results
Number of Assessments	12
Number of Recommendations	87
Average Percentage Savings per Plant	6.9%
Average Cost Savings Potential	$109,000
Average Simple Payback	1.7
Total Potential Savings	$1,307,000

IAC Industrial Control Systems Cybersecurity Assessment Tool

This new tool features 20 simple questions to characterize industrial controls systems and plant operations and provides a high-level assessment of risk (high, medium, or low). A companion User Guide provides additional context for the questions included in the tool, to help clients understand how certain business practices lead to cybersecurity risk.

Hold your smart phone camera up to the QR code to be re-directed to the Assessment Tool.

Combined Heat and Power

Combined Heat and Power (CHP) is an efficient and clean approach to generating on-site electric power and useful thermal energy from a single fuel source. **DOE's CHP Technical Assistance Partnerships (TAPs) are available to help identify CHP market opportunities** through vendor, fuel, and technology-neutral assessments of CHP viability. Additionally, CHP TAPs help provide technical assistance to end-users and stakeholders considering CHP and guide them through the project development process from initial CHP screening to installation.

Better Plants partner **Procter & Gamble**, one of the largest consumer goods companies in the world, recognizes how CHP can improve plant energy performance and ensure greater resiliency. DOE's Mid-Atlantic CHP TAP supported P&G, who has developed a 64MW CHP Plant, fired from its own on-property shale gas source, in Mehoopany, Pennsylvania. In addition, P&G commissioned a 54MW biomass CHP plant in Albany, Georgia, the largest biomass CHP plant in Georgia. This CHP plant also supports the nearby Marine Corps Logistics Base facility, which accepts the excess steam produced to generate an additional 8.5 MW of electricity. This is the backbone of the base's new microgrid.

DOE's Southeast CHP TAP is collaborating with P&G to identify and evaluate additional CHP opportunities throughout their North American portfolio.

CHP Technical Assistance Partnerships

INTERESTED IN LEARNING MORE ABOUT TECHNICAL ASSISTANCE PARTNERSHIPS (TAPs)?

Open the camera on your smartphone and hold it up to the QR code to be re-directed to the TAP website page.

Partners as of September 2019

3M*

AbbVie Inc.

Agropur

Alcoa Inc.

Alexandria Renew Enterprises

Alumalloy Metalcastings

Amcor Rigid Plastics

American Mitsuba Corp.

ArcelorMittal USA*

Armstrong Flooring

Asama Cold Manufacturing

AstraZeneca

AT&T*

Autoliv

Avon Lake Regional Water

Ball Corporation

BD

Bendix Commercial Vehicle Systems

Bentley Mills*

Bosch Rexroth

BPM, Inc.*

Bradken*

Bridgestone Americas, Inc.

Briggs & Stratton Corporation

Bristol-Meyers Squibb

Bucks County Water and Sewer Authority*

C. F. Martin & Company*

CalPortland Company*

Campbell Soup Company

Cardington Yutaka Technologies*

Carlton Forge Works

Cascade Engineering Technologies, Inc.

Celanese Corporation*

Chapco Inc.

Charleston Water System

Charter Steel*

Chippewa Valley Ethanol Company

Citrus World, Inc.

City of Grand Rapids Water Resource Recovery Facility

City of Phoenix Water Services Department

City of Roseville, Environmental Utilities Department

Clearwater Engineering, Inc.

Co-Operative Industries Aerospace and Defense

Coilplus Inc.

Comau LLC*

Commercial Metals Company

Commercial Vehicle Group

Cooper Standard

Cummins, Inc.*~

Custom Glass Solutions

Daikin Applied Americas*

Darigold

Delta Diablo

Denison Industries

Des Moines Water Works

Deschutes Brewery

Didion Milling

Dixline Corporation

Donsco Inc.

Dow Chemical Company

DSM North America

Durable Products

Durex Inc.

EARTH$_2$O

Eastman Chemical Corporation

Eaton Corporation*

Eck Industries

Electrolux

Encina Wastewater Authority*

Estée Lauder

Expera Specialty Solutions*

Fiat Chrysler Automobiles

Flambeau River Papers

Flowers Foods

FMC Corporation

Ford Motor Company

GB Manufacturing

General Aluminum Manufacturing Company

General Dynamics Ordnance and Tactical Systems Scranton Operation*

General Electric

General Mills*

General Motors~

General Stamping and Metal Works, Inc.

GKN Aerospace

Golden Renewable Energy, LLC

Goodyear Tire and Rubber Company, U.S. Tire Plants

Graham Packaging

Graphic Packaging*

HARBEC, Inc.*

Harley-Davidson

Harrison Steel Castings Co.

Harva Company

Haynes International

HNI Corporation

Holcim (US) Inc.*

Honda North America

Huntsman Corporation

Imerys Carbonates North America

Ingersoll Rand*

Ingevity*

Intel

International Paper

Intertape Polymer Group

Intralox LLC

Ithaca Area Wastewater Treatment Facility

J.R. Simplot*

JBT Corporation

Jedco, Inc.

Johnson & Johnson*

Johnson Controls*

Johnson Matthey Emission Control Technologies Division

Kent County Department of Public Works

Kenworth Truck Company

Kingspan Insulated Panels, Inc.*

KEY

Bold – Better Plants Challenge Partner

Underline – New Partner

Asterisk* – Energy Goal Achiever

Tilde~ – Water Goal Achiever

Partners as of September 2019

Krage Manufacturing

KYB Americas Corporation

L'Oréal USA

Land O' Lakes

Leggett & Platt

Legrand North America*

Lennox International*

Lineage Logistics

Lockheed Martin

Los Angeles Bureau of Sanitation

Los Angeles Department of Water & Power

Lynam Industries Inc.

Magnetic Metals Corp.

MAHLE Engine Components USA, Inc.

Manitowoc Grey Iron Foundry

Mannington Mills

Marquis Energy

Marquis Energy Wisconsin

Massachusetts Water Resources Authority

MB Aerospace East Granby

McCain Foods USA, Inc.

MEKRA Lang

Metal Industries, Inc.*

Michels Corporation

Mitsubishi Electric Automotive America

Mohawk Industries

Mulgrew Aircraft Components, Inc.

Narragansett Bay Commission

Navistar International*

Neenah Foundry

NEW Water (Green Bay Metropolitan Sewerage District)

Newman Technology

Nissan North America, Inc.*

Novati Technologies

Novelis Inc.

NSK Americas

NY DEP – Bureau of Wastewater Treatment

O'Fallon Casting

OFD Foods, Inc.

OMNOVA Solutions Inc.

Orange Water and Sewer Authority

Oshkosh Corporation

OSRAM SYLVANIA*

Owens Corning

Ozinga Brothers

Pactiv

PaperWorks Industries

Parker Hannifin

Patrick Cudahy, Inc.*

Patriot Foundry & Castings*

PepsiCo

Pharmavite

Philadelphia Water Department

Pima County Wastewater Reclamation Department

Plastics Engineering Company (Plenco)

PPC Broadband

PPG Industries

Procter & Gamble*

Quad/Graphics, Inc.

Raytheon Company

Research Electro-Optics

Richmond Industries Inc.

Roche Diagnostics Operations*

Rowley Spring and Stamping

Saint-Gobain Corporation

Saputo Dairy Foods

Savage Precision Fabrication

Schneider Electric*

Selmet, Inc.

Shape Corporation

Shaw Industries Group, Inc.*

Sheboygan Regional Wastewater Treatment Facility

Sherwin-Williams*

Solberg Manufacturing, Inc.

Sony DADC

Spirax Sarco, Inc.

St. Petersburg Water Resources Department

Stanley Spring & Stamping Corporation

Steelcase, Inc.

Sugar Creek Packing Company

SunOpta, Inc.

TE Connectivity*

Tenaris

Texas Instruments*

Texas Nameplate Co.

Textron

ThyssenKrupp Elevator*

TitanX Engine Cooling, Inc.

Toyota Motor Engineering and Manufacturing North America*

TPC Group

Tri-State Plastics, Inc.

Tyson Foods

United Mechanical and Metal Fabricators

United Technologies Corporation*~

Vanguard Space Technologies

Vermeer

Verso Paper Corporation*

Victor Valley Wastewater Reclamation Authority*

Volvo Group North America*

W. L. Gore and Associates

Waupaca Foundry

Weber Metals Inc.

Western Lake Superior Sanitary District

WestRock

Weyerhaeuser*

Whirlpool Corporation

Xerox

Zimmer Biomet

KEY

Bold – Better Plants Challenge Partner

Underline – New Partner

Asterisk* – Energy Goal Achiever

Tilde~ – Water Goal Achiever

Better Plants Challenge Energy and Water Goal Achievers

3M
BENTLEY
J. Martin & Co. EST. 1833
Celanese The chemistry inside innovation™
BCWSA
Cummins
ENCINA WASTEWATER AUTHORITY
General Mills
GM
HARBEC
Holcim
ingevity
Johnson Controls
legrand®
NISSAN
Schneider Electric
Simplot
TE connectivity
TOYOTA
United Technologies
VVWRA
VOLVO

Better Plants Program Energy and Water Goal Achievers

AT&T
BPM Inc A Specialty Paper Mill
BRADKEN
CALPORTLAND
Cardington Yutaka Technologies Inc.
COMAU
COMPLETE Design & Packaging
DAIKIN
EATON
EXPERA specialty solutions™
GENERAL DYNAMICS
Graphic Packaging INTERNATIONAL
Ingersoll Rand
Johnson & Johnson
JM
Kingspan
LENNOX INTERNATIONAL
LA Sanitation
LOCKHEED MARTIN
METAL INDUSTRIES, INC.
NAVISTAR
OSRAM SYLVANIA
OWENS CORNING
PATRICK CUDAHY
PATRIOT FOUNDRY & CASTINGS
P&G
Roche
Shaw FLOORS
SHERWIN WILLIAMS
TEXAS INSTRUMENTS
thyssenkrupp
VERSO
Weyerhaeuser