Better Plants
U.S. DEPARTMENT OF ENERGY

Better Plants Program Overview

U.S. DEPARTMENT OF ENERGY

Better Buildings, Better Plants

- **Better Plants** is a **voluntary**, public-private partnership program for **manufacturers** and industrial organizations
- Through Better Plants:
  - Partners set **long-term efficiency goals**
  - Receive **technical assistance, networking platforms** and **national recognitions**
- Manufacturers have two opportunities to engage in Better Plants:
  1. Broader-based ***Program*** level
  2. Higher-level ***Challenge***

Productivity. Cost Savings. Competitiveness.

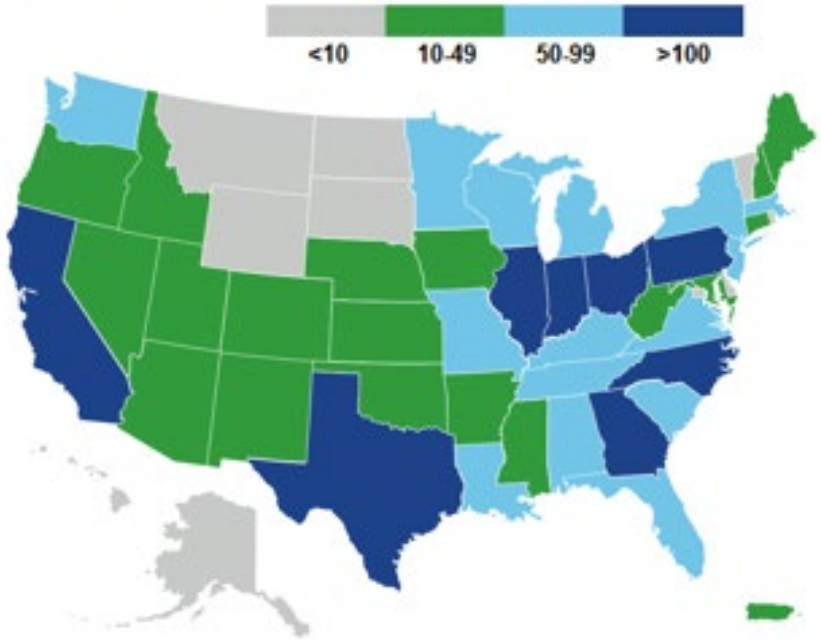
Better Plants Overview

Energy savings and program footprint continue to grow

Better Plants Snapshot

Accomplishments	Total
Number of Partners	204
Approximate Number of Plants	3,000
Percent of U.S. Manufacturing Energy Footprint	12%
Reported Savings	
Cumulative Energy Savings (TBtu)	1,059
Cumulative Cost Savings (Billions)	$5.3
Cumulative Avoided CO_2 Emissions (Million Metric Ton)	61.5
Average Annual Energy Intensity Improvement Rate	2.8%

Regional Distribution of Better Plants Facilities



53 goal achievers total, 10 in 2018!

Better Plants Challenge Partners

Simplot — Bringing Earth's Resources to Life
3M
J.M. Martin & Co. — EST. 1833
United Technologies
Schneider Electric
PHARMAVITE
LA DWP
BRIGGS & STRATTON
Cummins
VOLVO
NEW Water — The brand of the Green Bay Metropolitan Sewerage District
SOLBERG
GM
Johnson Controls
Ford
NISSAN
VVWRA
Ingersoll Rand
Electrolux
GENERAL MILLS
LENNOX INTERNATIONAL
EASTMAN
HARBEC
BD
OWASA
GE
BENTLEY
BCWSA
Holcim
CITY OF ITHACA, NY — INCORPORATED 1888
TE connectivity
DARIGOLD — SINCE 1918
Des Moines Water Works — Water You Can Trust for Life
TOYOTA
L'ORÉAL USA
legrand®
SAINT-GOBAIN
ENCINA WASTEWATER AUTHORITY
ENVIRONMENTAL SERVICES
ALCOA
Celanese — The chemistry inside innovation™

Supply Chain Initiative

- **4 Better Plants partners** are working with suppliers to set energy-savings goals and track progress
- Suppliers receive DOE **technical support, including priority access to no cost energy audits**

Legrand	UTC	Lockheed Martin	Honda NA
Chapco	GKN Aerospace	Cascade Engineering Technologies, Inc.	KYB Americas
Coilplus	Hitchiner	Clearwater Engineering, Inc.	Newman Technologies
Complete Design & Packaging	MB Aerospace	Cooperative Industries Aerospace & Defense	Asama Coldwater Manufacturing
Durex	RTI International Metals, Inc.	The Harva Company, Inc.	American Mitsuba
Lynam	Selmet, Inc.	Research Electro-Optics	MAHLE
Magnetic Metals	Weber Metals, Inc.	Savage Precision Fabrication	NSK
Rowley Spring & Stamping	Jedco, Inc.	Vanguard Space Technologies	Cardington Yutaka
Stanley Spring & Stamping		Tri-State Plastics, Inc.	Cooper Standard

Technical Account Manager

Goal

Help partner companies **achieve their energy performance goal**

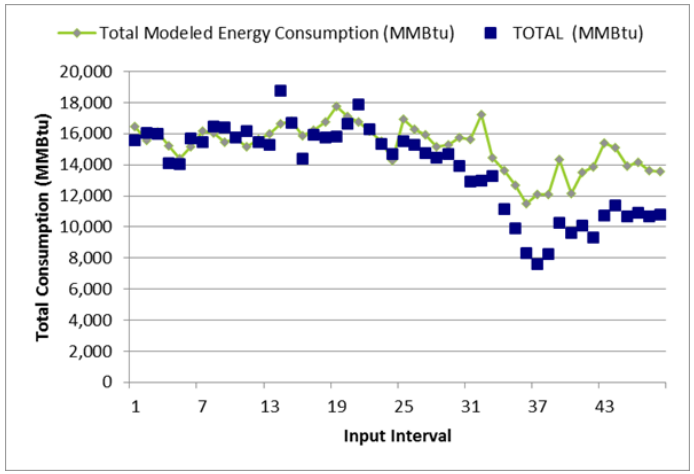
Primary Role

- Help **establish or improve data collection and analysis methods**; assist in annual reporting
- Provide **assistance on software tools**
- Help leverage to **additional resources** (INPLT, IAC, CHP, etc.)
- Relay information regarding **program developments**, **upcoming events, new resources, and other announcements**
- Connect partners to one another for **peer-to-peer learning**
- **Other technical assistance**

TAM Support for Baseline/Data Analysis

- Help with energy baselines and data tracking/reporting
  - **Regression-Based** Approach
  - **Facility-Level** Approach
  - **Corporate-Level** Approach
- DOE's EnPI tool includes GHG and cost savings calculations
- Free guidance document available

	2014	2015	2016	2017
Actual Source Electricity	128,757	134,034	104,649	72,694
Actual Natural Gas	58,373	59,387	52,471	47,597
TOTAL (MMBtu)	187,130	193,421	157,119	120,291
Adjustment Method	Model Year	Forecast	Forecast	Forecast
Modeled Source Electricity	128,757	138,873	124,419	108,220
Source Electricity Annual Savings	0	4,839	19,771	35,526
Modeled Natural Gas	58,373	56,934	55,981	55,596
Natural Gas Annual Savings	0	-2,453	3,511	7,999
Total Modeled Energy Consumption (MMBtu)	187,130	195,808	180,401	163,817
Total Improvement in Energy Intensity (%)	0.00%	1.22%	12.91%	26.57%
Annual Improvement in Energy Intensity (%)	0.00%	1.22%	11.69%	13.66%
Total Energy Savings since Baseline Year (MMBtu/Year)	0	2,387	23,281	43,526
New Energy Savings for Current Year (MMBtu/year)	0	2,387	20,895	20,244
Adjustment for Baseline Primary Energy Use (MMBtu/year)	0	8,678	-6,729	-23,313



Technical Assistance: Tools

AMO suite of industrial system software platforms:

- Measure energy losses
- Quantify savings opportunities
- Developed by national experts
- NEW: MEASUR Tool

Steam System Modeler

Pump System Assessment Tool (PSAT)

Fan System Assessment Tool (FSAT)

MotorMaster+

AIRMaster+

Process Heating Assessment & Survey Tool (PHAST)

In-Plant Trainings

Purpose: *Learn how to conduct assessments, use DOE tools, and implement projects*

Existing Training Topics

- Compressed Air
- Pumping
- Steam
- Process heating
- Fans
- Energy Treasure Hunt Exchanges
- Water/Wastewater Treatment
- Industrial Refrigeration
- 50001 Ready

- ❑ Open to employees from host plant, peer companies, suppliers
- ❑ ~85 INPLTs, 1500 participants since 2011
- ❑ Identified > 5 TBTU and $34 million in energy savings between 2011 and 2017
- ❑ Pre-INPLT webinars available on program website

In-Plant Trainings – 1st Half of 2019

Host Plant Name	Location	Energy System Type	Dates
Leggett & Platt, Carthage wire mill, Carthage MO & Hanes Dye & Finishing	Winston-Salem, NC	Treasure Hunt Exchange	Mar 17 - 19
Raytheon, Dallas Defense Products	Dallas, TX	Treasure Hunt Exchange	Mar 31, May 26
FCA, Sterling Heights	Auburn Hills, MI	Compressed Air	Jun 25 - 27
Eastman Chemical Company	Kingsport, TN	Pumping	TBD
Celanese	Narrows, VA	Compressed Air	TBD
AztraZenica, Medimmune	Gaithersburg, MD	Treasure Hunt Exchange	Late Sep
Electrolux	Springfield, TN	Compressed Air	Apr 23 - 25
CMC Steel Arizona	Mesa, AZ	Compressed Air	Mar 5 - 7
Carryovers from Previous Round			
Cooper Standard	Bowling Green, OH	Compressed Air	Jan 22 - 24
Saint-Gobain	Norwood, MA / Hagerstown, MD	Treasure Hunt Exchange	Nov 11 - 13 / Feb 18-20
City of Grand Rapids	Grand Rapids, MI	Pumps	Jan 15 - 17
3M Corporation	Maplewood, MN	50001 Ready	Jan 22 - 23
Ingevity Corporation	DeRidder, LA	Multi-system	January 8 - 11

https://betterbuildingssolutioncenter.energy.gov/better-plants/plant-trainings-calendar

Diagnostic Equipment Program

"You can't manage what you can't measure."

- Free of charge, including shipping
- Use equipment for one day, or up to four weeks
- Some technical assistance with selection and usage
- First come, first serve application

Access to DOE National Labs R&D

Better Plants hosts Technology Days at National Laboratories to:

Tour World-Class Facilities

View Demonstrations of innovative technologies

Hear from experts and Industry peers

Learn about research partnerships

Network with BP partners and researchers

NREL in 2018

LLNL and LBNL in 2019

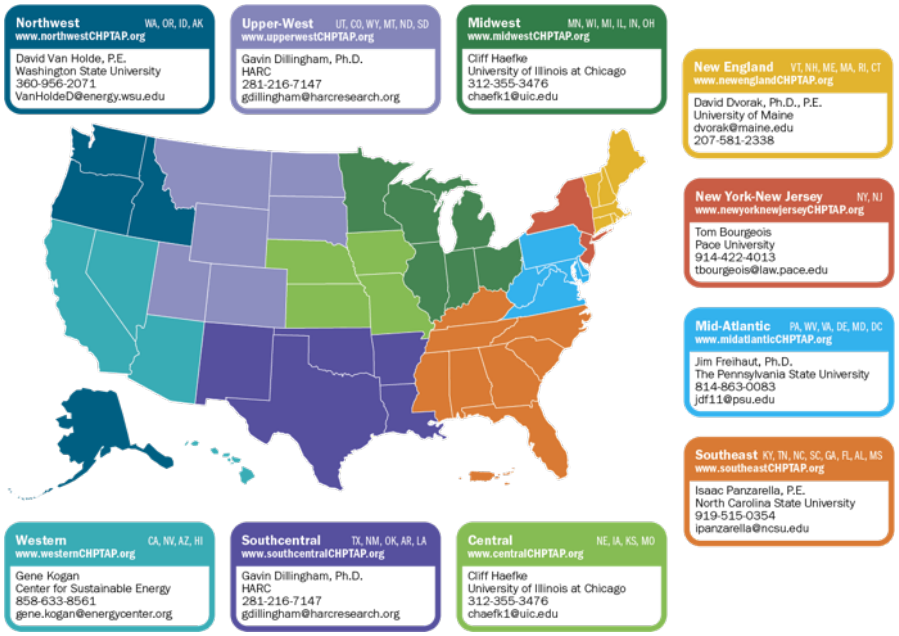
Lawrence Livermore National Laboratory

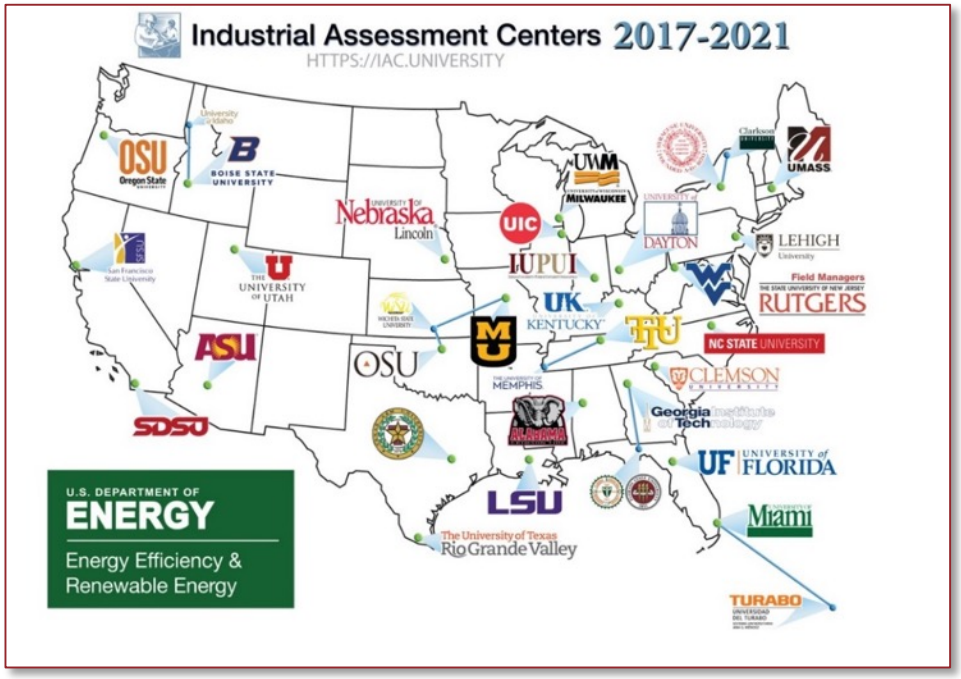
BERKELEY LAB

IAC Energy Assessments and CHP Technical Support

Industrial Assessment Centers:

- No-cost energy assessments
- IACs have provided more than 134,000 recommendations for ~18,000 manufacturers.
- Average IAC assessment yields 5-7% implemented energy savings.





Combined Heat and Power Technical Assistance Partnerships

- Identify CHP opportunities
- Vendor, fuel, and technology neutral assessments.
- Additional technical assistance for end-users considering CHP

50001 Ready

DOE's Energy Management Program

Step One: Self-declared implementation of ISO 50001

Step Two: Analysis of energy and emissions reductions

Step Three: Submit to DOE for 50001 Ready recognition

50001 Ready
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DOE or Utility recognized success for implementing 25 steps

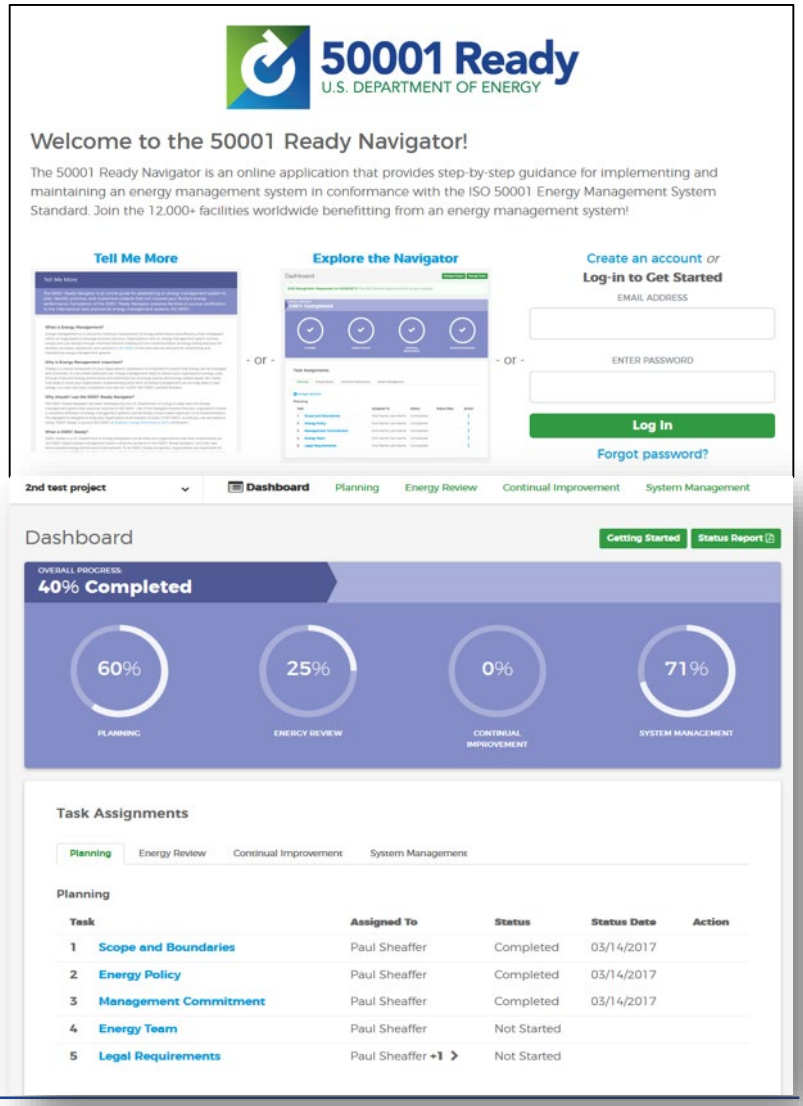
OPTIONAL:

- ***Pursue an ISO 50001 Certification***
- ***Achieve Superior Energy Performance Certification***

50001 Ready Navigator Online Tool

- ✓ Self-paced "Turbo Tax" approach to 50001
- ✓ Developed & Maintained by DOE
- ✓ Guidance: "Getting it done" "Transition tips"
- ✓ Track Progress
- ✓ Collaborate with Team Members

www.navigator.industrialenergytools.com



50001 Ready and Better Plants

ISO 50001 Pathway toward Better Plants

Program Name	**50001 Ready**	**Better Plants**
Energy Management Support	Establish Energy Management System (EnMS) using structure of ISO 50001	TAM support amplify EnMS & develop roadmap to achieve 25% in 10 years
Energy Savings Validation	EnPI Lite – preliminary energy baseline	EnPI Tool – robust energy model, validation of energy savings & GHG reductions
Recognition	Plant-level performance recognized by DOE	Annual and program goal recognition by DOE

Better Buildings Solution Center

Manufacturers and water and wastewater treatment agencies face many obstacles as they strive to improve energy efficiency in their facilities. The following individual technology focus area-webpages are meant to be one-stop shops for those seeking actionable solutions for energy efficiency challenges involving specific systems. Each page contains links to helpful resources, such as relevant Better Plants showcase projects and implementation models, DOE tipsheets and publications, software tools, webinars, and contact information for a subject matter expert:

- BUILDING ENVELOPE AND MODELING
- COMBINED HEAT AND POWER (CHP)
- COMPRESSED AIR
- FANS
- LIGHTING
- MOTORS
- PROCESS COOLING AND HVAC
- PROCESS HEATING
- PUMPS
- REFRIGERATION
- RENEWABLES, DISTRIBUTED GENERATION, AND MICROGRIDS
- STEAM
- WATER

energy.gov/bbsc

- More than 200 industrial solutions tested and proven by Partners
- Find solutions by topic, building type, solution type, building size, sector, technology, location, and more.
- Technology Focus area: https://betterbuildingssolutioncenter.energy.gov/better-plants/technology-focus-areas

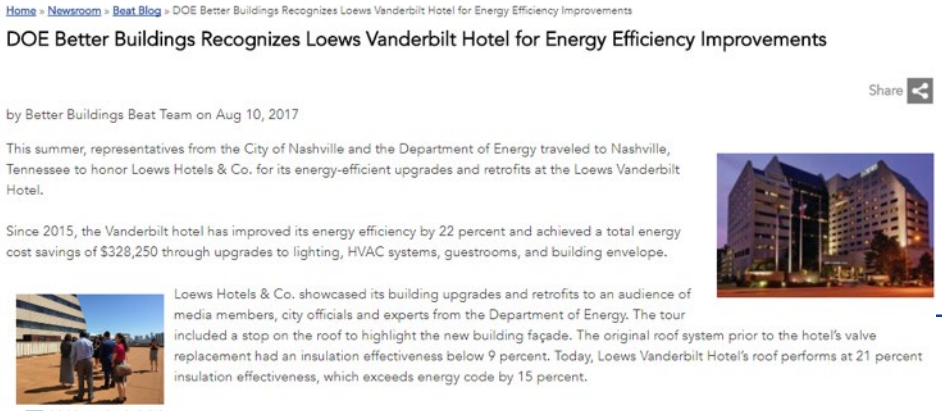
National Recognition: Examples

Better Project/Practice Awards

Social Media

Goal Achievers

Blog Articles



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Share

by Better Buildings Beat Team on Aug 10, 2017

This summer, representatives from the City of Nashville and the Department of Energy traveled to Nashville, Tennessee to honor Loews Hotels & Co. for its energy-efficient upgrades and retrofits at the Loews Vanderbilt Hotel.

Since 2015, the Vanderbilt hotel has improved its energy efficiency by 22 percent and achieved a total energy cost savings of $328,250 through upgrades to lighting, HVAC systems, guestrooms, and building envelope.

Loews Hotels & Co. showcased its building upgrades and retrofits to an audience of media members, city officials and experts from the Department of Energy. The tour included a stop on the roof to highlight the new building façade. The original roof system prior to the hotel's valve replacement had an insulation effectiveness below 9 percent. Today, Loews Vanderbilt Hotel's roof performs at 21 percent insulation effectiveness, which exceeds energy code by 15 percent.

Events & Networking Opportunities

- Annual Events
  - Better Buildings Summit
  - Industrial Energy Technologies Conference
  - World Energy Engineering Congress
  - Regional Events & Focused Workshops
- Networking
  - Forums where partners learn from each other
  - Regional events
  - Technology-based working groups

IETC 2019

2019 WEEC World Energy Engineering Congress

Partner Road Map – What is Next?

- Add partner profile to Better Plants web page
- Set up Regular Standing Conference Calls
- Establish **Energy Baseline**
- Select **Energy Tracking Methodology**
- **Identify/Access Resources,** e.g., In-Plant Trainings, IACs, CHP TAPs, Tools, etc.
- Generate **Annual Report**
- Identify **Recognition Opportunities**

For More Information

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Better Buildings, Better Plants:
http://betterbuildingssolutionscenter.energy.gov/better-plants

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Questions?

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