WeLOCAL

BALTIMORE, MARYLAND

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Powering Change:

Advancing Sustainability with Energy Management

Kalie Miera, CEM
Oak Ridge National Lab

Nice to meet you!

Kalie Miera, CEM

Professional Experience:

- Technical Account Manager/ R&D Associate, *Oak Ridge National Lab*
- Energy Engineer, *3M*
- Project Engineer, *3M*

Education:

- ME Engineering Management
- BS Industrial & Systems Engineering
- Certified Energy Manager

SWE Leadership Coaching Committee (LCC), Coach & Counselor/ Faculty Advisor Lead

Rochester Institute of Technology

CEM® Certified Energy Manager

aee® Association of Energy Engineers

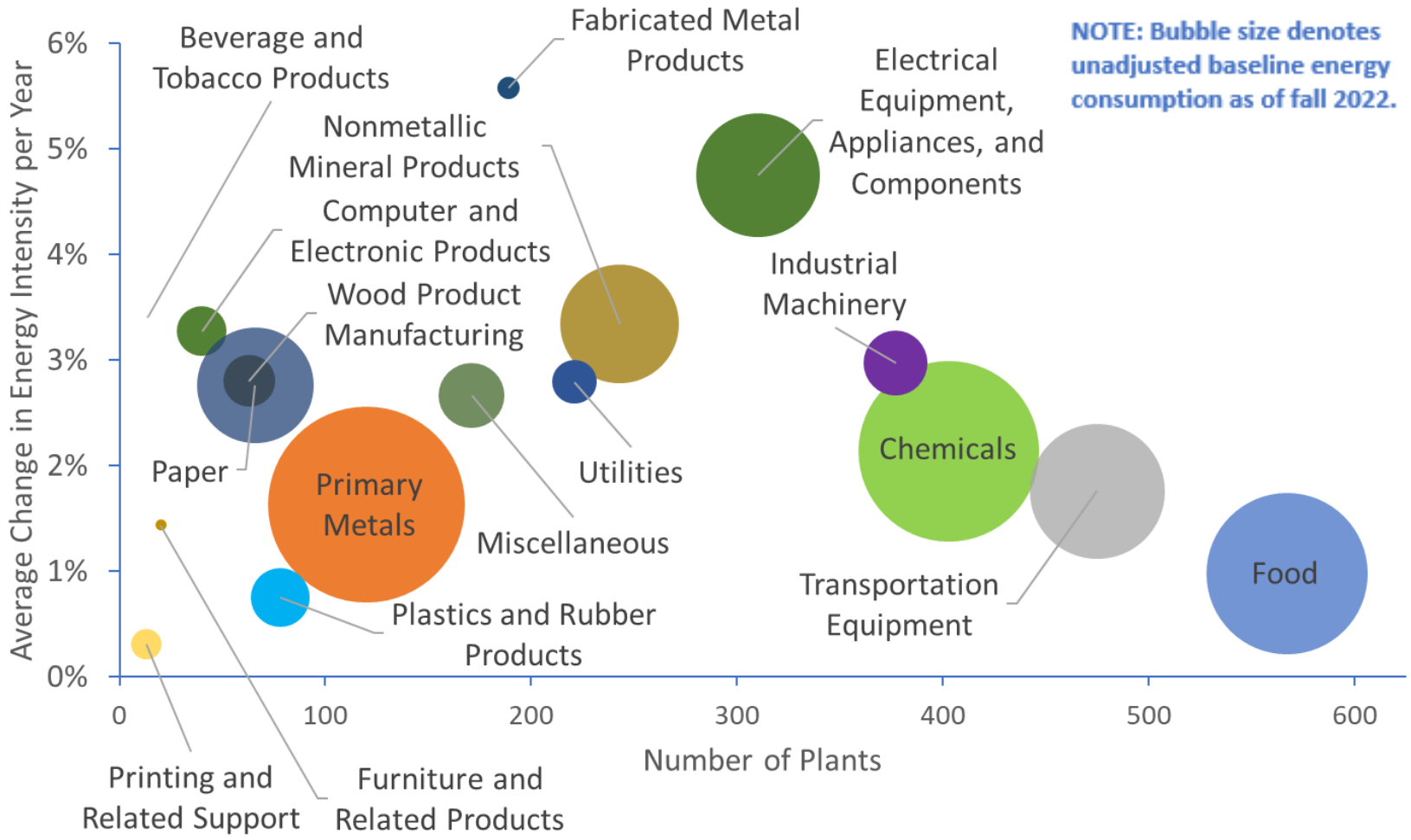
What is the first solution to decarbonize our industries?

Key Learnings

- Recognize the importance of energy efficiency and energy management as a core decarbonization strategy.
- Apply the key components of energy management systems to develop an efficient program at an industrial facility.
- Relate case studies and examples to potential decarbonization projects at their individual facility for further investigation.
- How can the US Department of Energy Help?

Average Annual Energy Performance of DOE's Better Plants Partners

Average energy intensity improvement in terms of no. of plants and program energy footprint for selected sectors[1]



2.2 QBTU
of energy saved

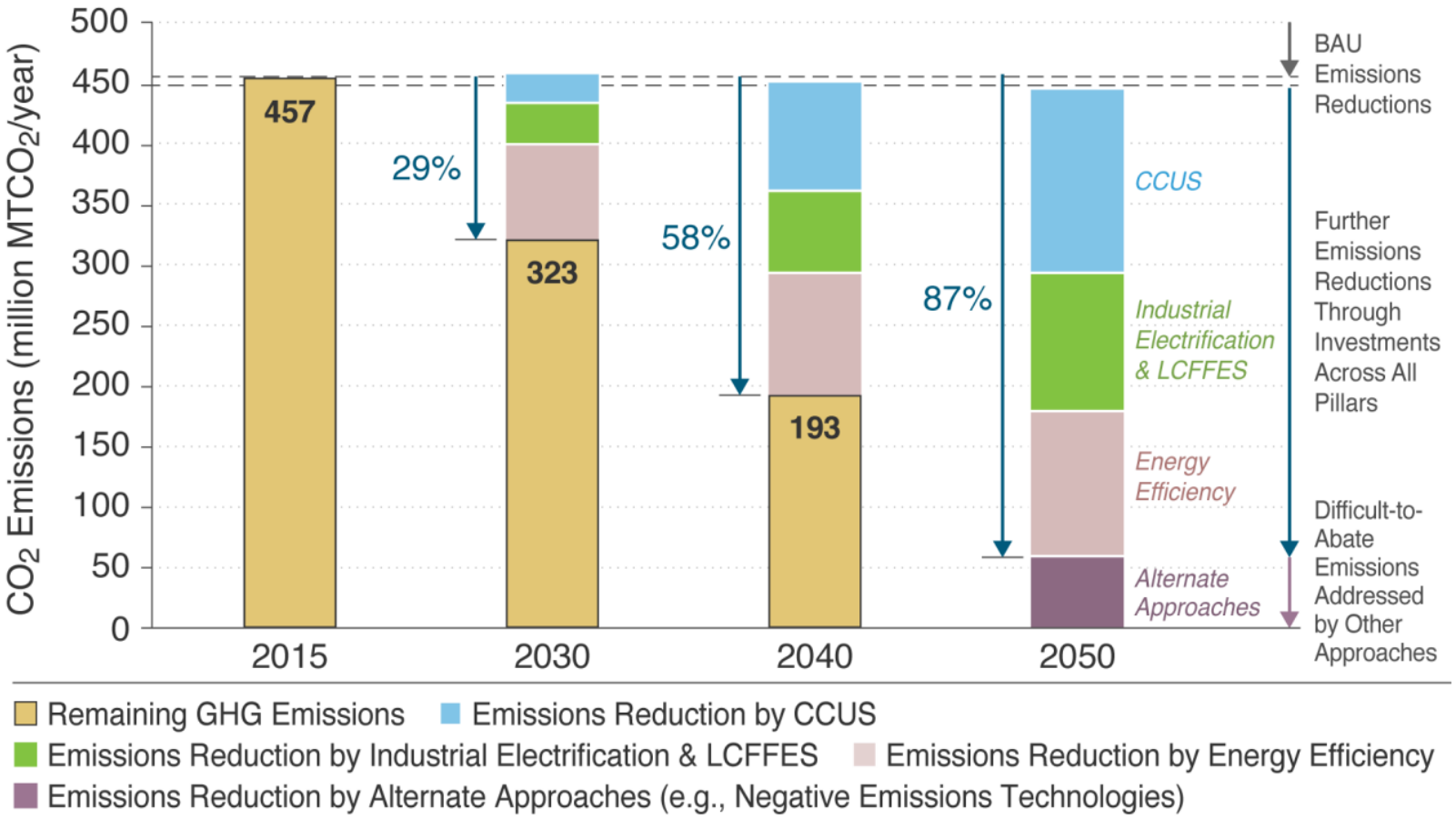
1.8%
average annual energy intensity improvement rate

$10.6 billion
saved

131 million
metric tons of CO_2 saved

Sundaramoorthy, S.; Kamath, D.; Nimbalkar, S.; Price, C.; Wenning, T.; Cresko, J. Energy Efficiency as a Foundational Technology Pillar for Industrial Decarbonization. Sustainability 2023, 15, 9487.

Projections for CO2



U.S. DOE Industrial Decarb Roadmap highlights **energy efficiency as a foundational strategy** for both near term and long-term carbon reduction

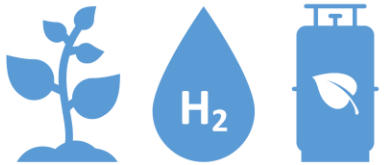
The Industrial Decarbonization Pillars

Energy Efficiency (near-term)

- Energy Management
- Adoption of Smart Manufacturing
- Improved Material and Process Efficiency
- Utilization of Combined Heat and Power

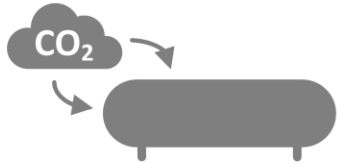
Industrial Electrification (mid- to long-term)

- Electrification of Process Heating
- Electrification of Space Heating
- Electrification of Hydrogen Production
- Development of Electrified Processes



Low-Carbon Fuels, Feedstocks, and Energy (mid- to long-term)

- Development of Carbon-Free Alternative Fuels
- Adoption of Low-Carbon Alternative Fuels
- Utilization of Low-Carbon Feedstock Materials
- Development of Biofuel Infrastructure



Carbon Capture, Utilization, and Storage (long-term)

- Direct Air Carbon Capture
- Carbon Capture, Utilization, and Storage
- CO_2 Distribution Infrastructure
- Chemical Utilization

Source: Industrial Decarbonization Roadmap; DOE/EE-2635; United States Department of Energy: Washington, DC, USA, 2022.

The Industrial Decarbonization Pillars

Energy Efficiency (near-term)

- Energy Management
- Adoption of Smart Manufacturing
- Improved Material and Process Efficiency
- Utilization of Combined Heat and Power

System Efficiency

Smart Manufacturing

Materials & Life Cycle Efficiency

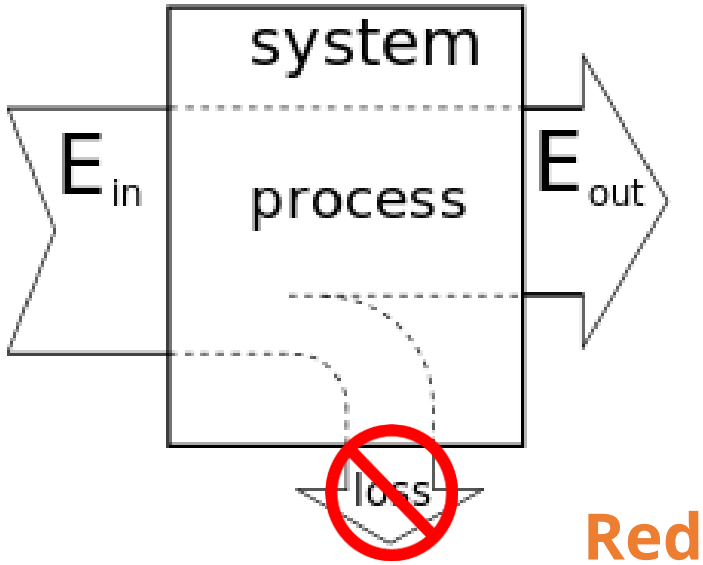
Combined Heat & Power (CHP)

Strategic Energy Management

Source: Industrial Decarbonization Roadmap; DOE/EE-2635; United States Department of Energy: Washington, DC, USA, 2022.

Why Focus on Energy Management?

This is what you pay for



This is value added

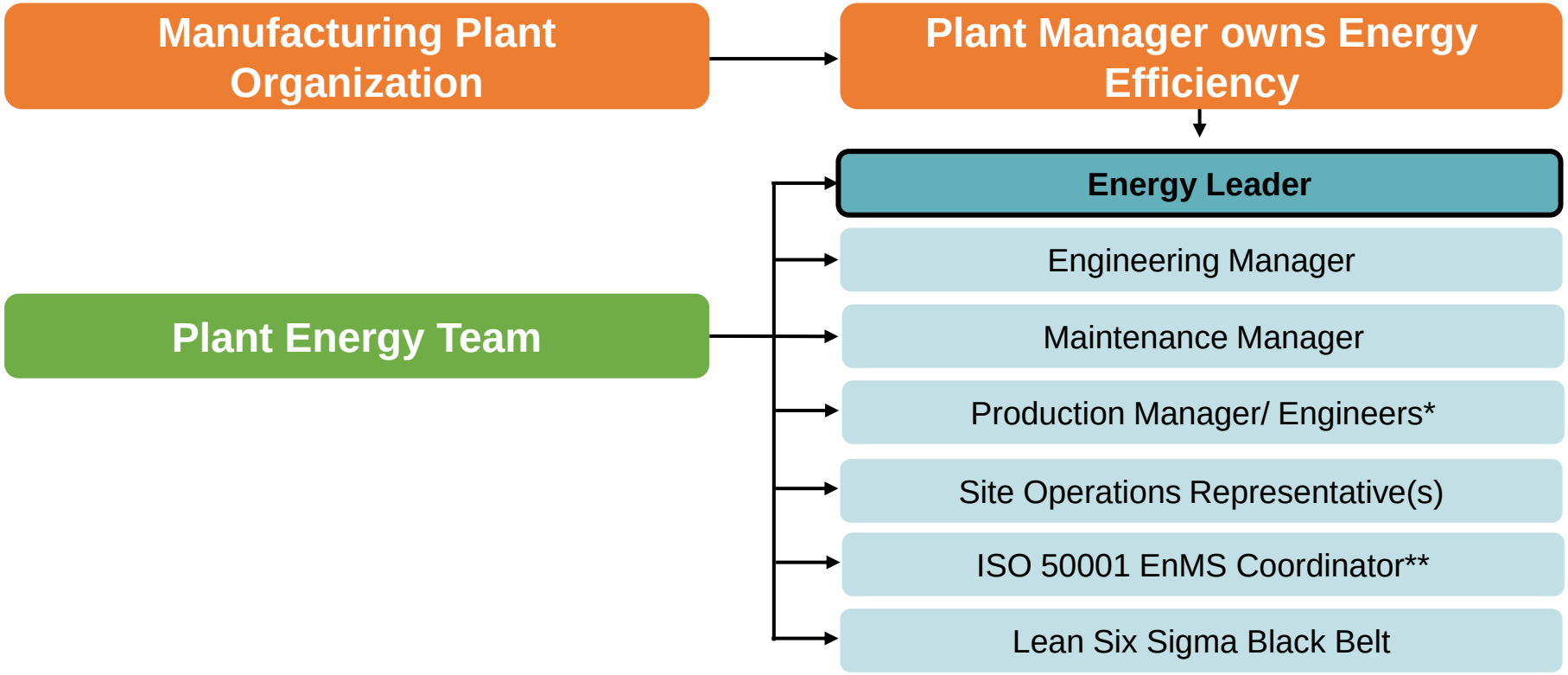
Reduce losses

Get as close to 100% as is technically and economically possible

The Role of the On-Site Energy Leader

- Accurate energy data reporting
- Maintain hopper & implementing projects
- Co-ownership of sustainability goal success
- Accountability requirement with Plant Leadership
- Lead Local Energy Team
- Coordination of ISO 50001 System

The On-Site Energy Team



* Representation from significant energy using (SEU) areas

** ISO 50001 Energy Management System Coordinator may be the Energy Leader

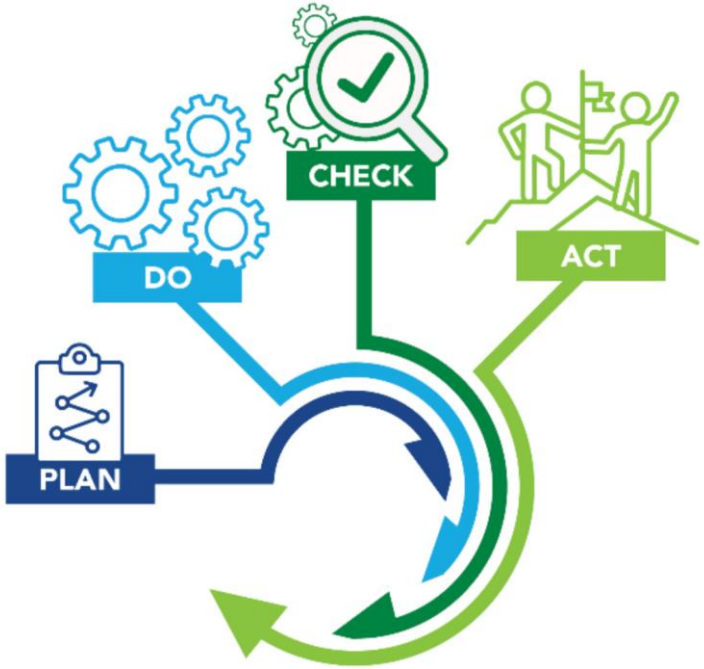
Team should utilize different functional supports as relevant:

- EHS & Sustainability Leaders
- Finance & Tax experts
- Legal representation

What is ISO50001?

International standard that draws from **best practices around the world** – data-driven, flexible design helps organizations of all kinds and sized achieve **persistent energy & cost savings** over the **long term**.

ISO 50001
ENERGY MANAGEMENT



1. Scope
2. Normative references
3. Terms & Definitions
4. Context of the Organization
5. Leadership
6. Planning
7. Support
8. Operation
9. Performance Evaluation
10. Improvement

What is ISO50001?

EnMS

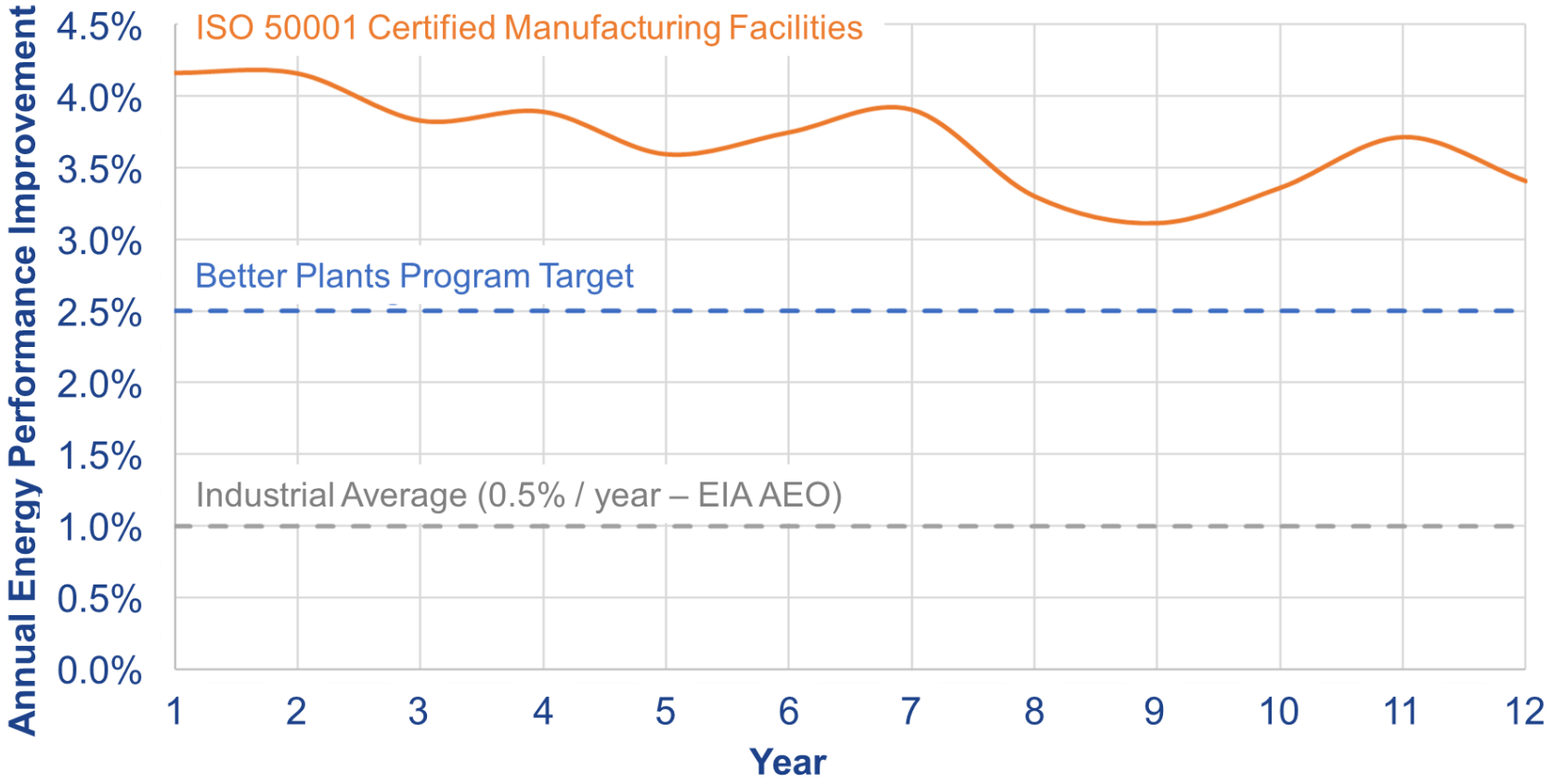
Energy Management System

"whose purpose is to enable an organization to follow a systematic approach in achieving continual improvement of energy performance, including energy efficiency, energy use, and consumption."

- Integrates energy management into everyday business practices and procedures
- Saves energy and money, and helps firms reach climate goals
- Not to be confused with building technologies used to manage energy

What is ISO50001?

4.2% Year 1 Energy Savings That Grow Year over Year



LBNL analysis

Compatibility with Other ISO Standards

Leverage Common & Similar Elements

ISO 50001

ENERGY POLICY

Energy review
Energy performance indicators
Energy baseline
Energy management

Unique Elements: data-driven approach

ISO 14001

ENVIRONMENTAL POLICY

Environmental aspects
Emergency preparedness
Environmental management program

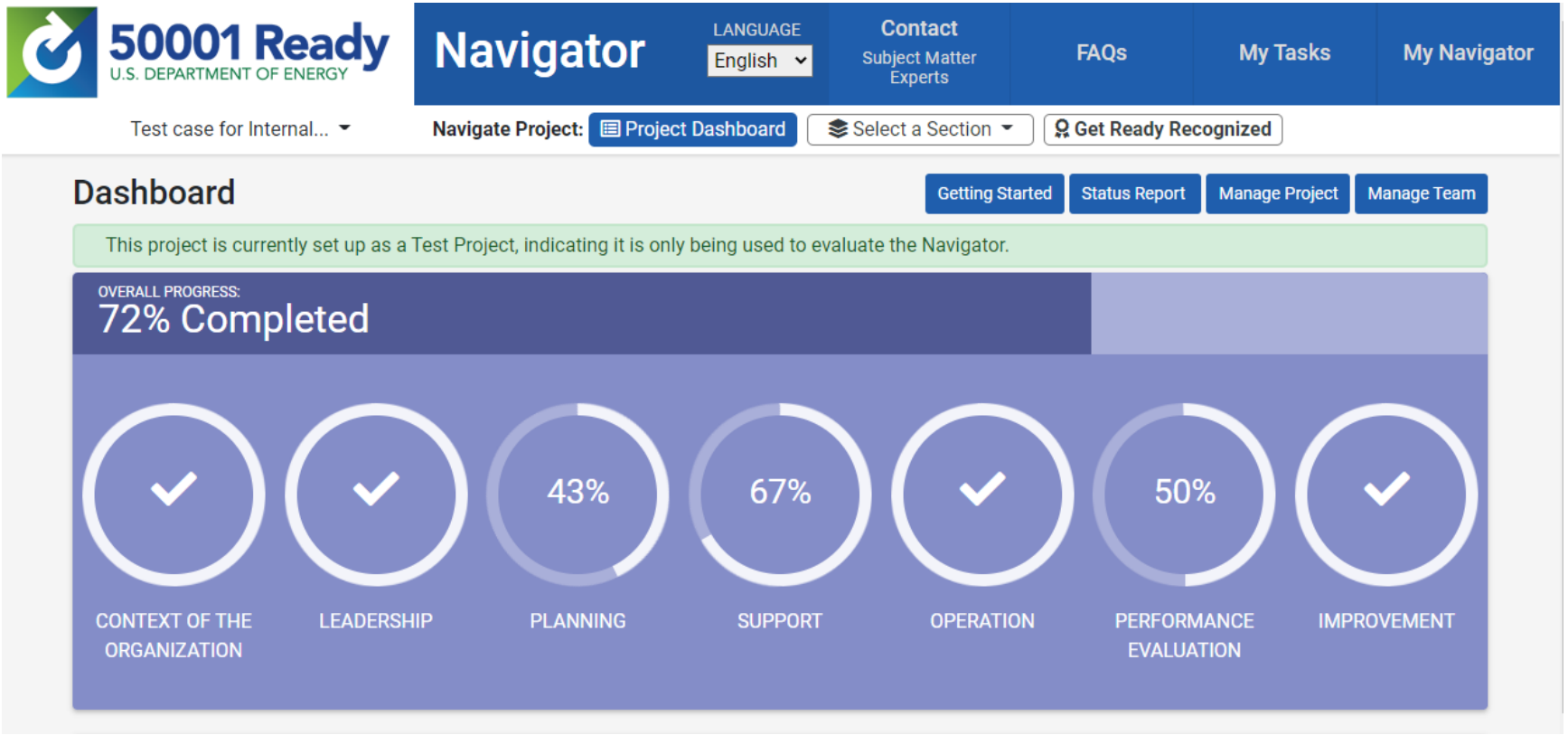
Management Commitment
Roles, responsibility & authority
Competence, training & awareness
Communication
Operational Control
Monitoring & Measurement
Documentation
Internal Audit
Corrective & preventative Action
Management review

ISO 9001

QUALITY POLICY

Customer focus
Planning of product realization
Customer-related processes
Control of nonconforming

The 50001 Ready Navigator



50001 Ready is an online, web-based 25 task process for energy management

https://navigator.lbl.gov/

Overview of 50001 Ready – Tasks

50001 Ready Coaches train participants on how to implement each of the 25 steps toward building systematic energy management approach using the 50001 Ready Navigator

Context of the organization

1. An EnMS and Your Organization
2. People and Legal Requirements
3. Scope and Boundaries

Leadership

4. Management commitment
5. Energy policy
6. Energy team and resources

Planning

7. Risk to EnMS success
8. Energy data collection and analysis
9. Significant energy uses
10. Improvement opportunities
11. Energy performance indicators and baselines (EnPIs and EnBs)
12. Objectives and targets
13. Action plans for continual improvement

Support

14. Competence and training
15. Awareness and communication
16. Documenting the EnMS

Operation

17. Operational controls
18. Energy considerations in design
19. Energy considerations in procurement

Performance Evaluation

20. Monitoring and measurement of the EnMS
21. Monitoring and measurement of energy performance improvement
22. Internal audit
23. Management review

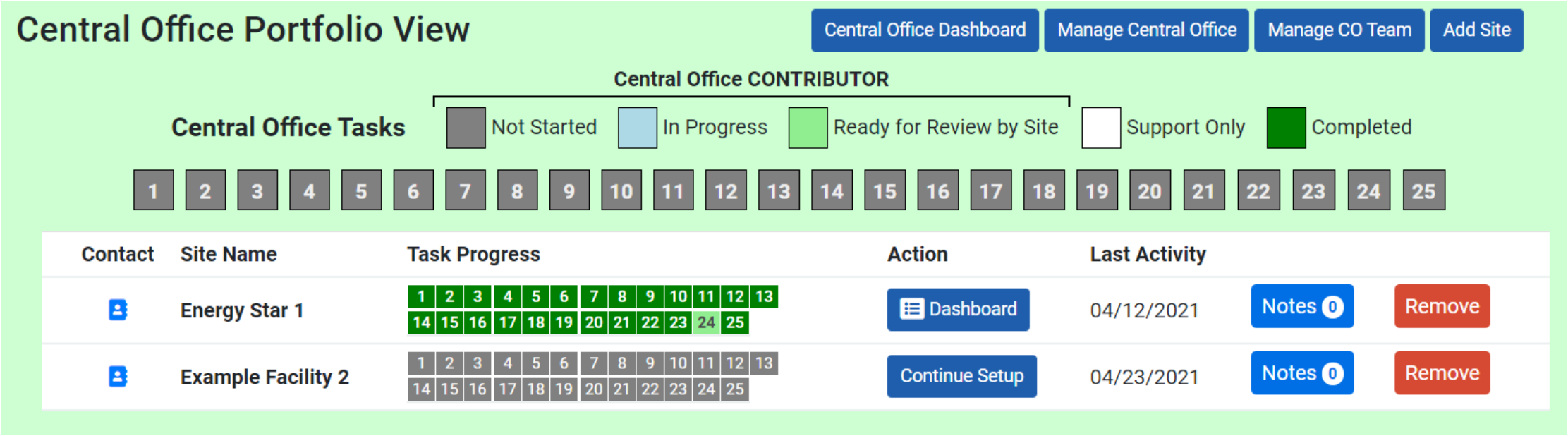
Improvement

24. Corrective action
25. Continual improvement

50001 Ready
U.S. DEPARTMENT OF ENERGY

The 50001 Ready Navigator – Multisite

There is functionality for tracking a multisite effort with a central office with many separate locations working together



Centralized repository for understanding how your facilities manage energy

A Pathway to Meet YOUR Goals

	50001 Ready (U.S. Department of Energy)	ISO	Superior Energy Performance (U.S. Department of Energy)
	SELF ATTEST	**CERTIFY**	**VERIFY**
Tasks Associated	• Complete 25 steps in Navigator • Self-attest to completion • Report energy performance	• ANAB-accredited audit • Receive certification from the certification body	• ISO 50001 certification • 3rd party SEP Performance Verification audit
Time Req.	Flexible	12-18 months	12-18 months

50001 Ready is part of a Pathway toward ISO 50001 Certification and (if desired) validated energy savings in SEP

https://navigator.lbl.gov/

A Pathway to Meet YOUR Goals

STEP 1
Complete the 25 tasks in the 50001 Ready tool

STEP 2
Prepare your signed self-attestation form

STEP 3
Determine your energy performance improvement

STEP 4
File for 50001 Ready recognition

50001 Ready
U.S. DEPARTMENT OF ENERGY

DOE Recognizes
50001 Ready Completion


50001 Ready Site 2022
U.S. DEPARTMENT OF ENERGY

Company Name

Is recognized as an Energy Management Leader for instituting DOE's 50001 Ready program across its [Facility] in [location]

UNDER THE LEADERSHIP OF

Facility Level Energy Manager — Corporate (or Agency) Energy Manager

Recognized [or if re-attested since YYYY of initial recognition] by the United States Department of Energy

[Date of certificate issuance]

Delivered by Better Plants — ENERGY

https://navigator.lbl.gov/

Proven Success: Adtran, Inc.

Went through a 50001Ready Cohort via Tennessee Valley Authority's (TVA) Save It Forward Program for HQ campus

Key Takeaways

Diversified Teams

Staff from a variety of positions in the facility allows for benefit of collective wisdom.

Empowered Employees

Energy Policy creates accountability amongst all

Taking the Leap

Short learning curve for Navigator tool

Structured System

Significant crossover between standards - less hurdle to entry

"One of the things that attracted me to 50001 Ready is the low-cost support it provides to formalizing your energy management system. Even without certification, it's really helpful and can help organizations make significant improvements."

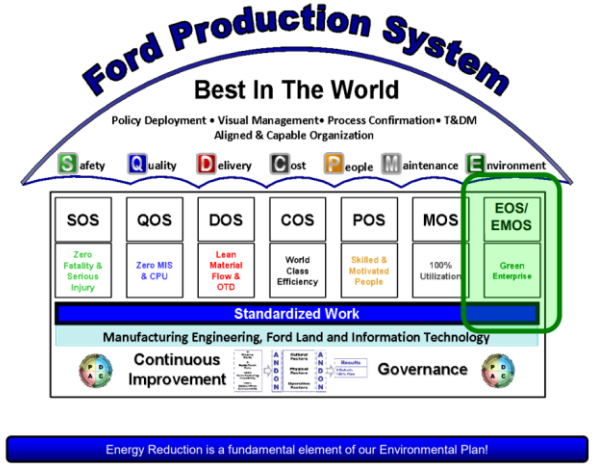
– Jeff Whitmire, Senior Manager of Quality Management Systems, Adtran

https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Case_Study_Adtran_DOE_50001_Ready.pdf

Proven Success: Ford Motor Company

50001 Ready
U.S. DEPARTMENT OF ENERGY

Used 50001Ready to update their Energy Management Operating System (EMOS) in 30+ facilities globally



Key Takeaways

Standardized Approach

Enterprise driven implementation, building into business processes

A Bird's Eye View

Progress across all facilities tracked in Navigator

Strengthening Strategic Partnerships

Advantageous involvement of local utilities helped

Assessing Opportunities

Significant crossover between standards - less hurdle to entry

"Our participation in 50001 Ready allowed us to refresh and simplify our EMOS programs and reinforce energy management as an important tool to reach cost savings and emissions reductions goals."

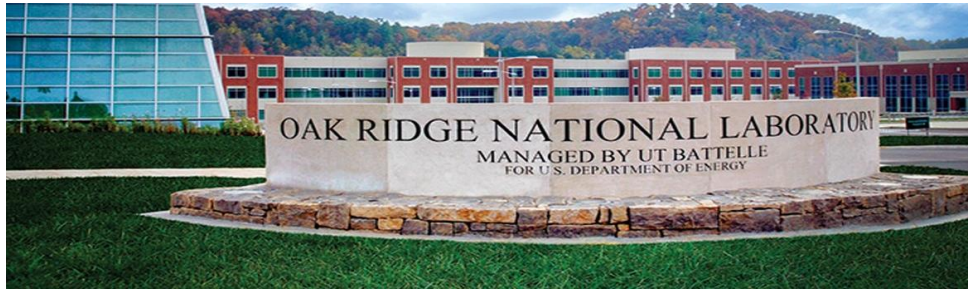
– Michelle Croal, Energy Manager, Ford Motor Company

https://betterbuildingssolutioncenter.energy.gov/sites/default/files/attachments/Case_Study_Ford_DOE_50001_Ready.pdf

How can the Department of Energy Help?

Better Plants Program

- Technical Account Managers (TAMs) help partners develop a roadmap to achieve their energy, waste, and water goals.
- TAMs help partners set energy baselines, track data, and identify energy savings opportunities.
- They also help inform partners about DOE and external resources.



"Like having a free consultant on retainer"

--Andy Terrey, City of Phoenix Water Services

https://betterbuildingssolutioncenter.energy.gov/better-plants/technology-focus-areas

Free Tools

- The Diagnostic Equipment Loan Program
- Industrial Assessment Centers
- MEASUR & VERIFI software tools
- Plant Water Profiler Tool
- Financing Navigator
- And MORE!

MEASUR

https://measur.ornl.gov/

VERIFI

https://verify.ornl.gov/

Industrial Assessment Center
U.S. DEPARTMENT OF ENERGY





Trainings

- In-Plant Trainings (INPLTs) teach plant workers how to conduct assessments, use DOE tools, and implement projects.
- **140+** In-Plants, **2400** participants since 2011
- Partners have identified more than **$53M** in energy savings opportunities, to date

Training Topics:

- Pumping Systems
- Fans
- Compressed Air
- Motors
- Processed Heat
- Steam Systems
- 50001 Ready
- Industrial Refrigeration
- Water/Wastewater Treatment
- Water Efficiency
- Energy Treasure Hunt

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Better Plants

ABOUT | BETTER PLANTS CHALLENGE | JOIN | MEET PARTNERS

The Better Plants program works with leading U.S. manufacturers and wastewater treatment agencies to set ambitious energy, water, waste, and carbon reduction goals. By partnering with industry, the Better Plants program aims to help leading manufacturers boost efficiency, increase resilience, strengthen economic competitiveness, and reduce their carbon footprint.

Subscribe to Better Plants email notifications **here** - we'll share regular bulletins, new resources and program updates, and partner achievements.

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https://betterbuildingssolutioncenter.energy.gov/better-plants/about

Questions?

Thank you!

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Links to everything shared can be found here!