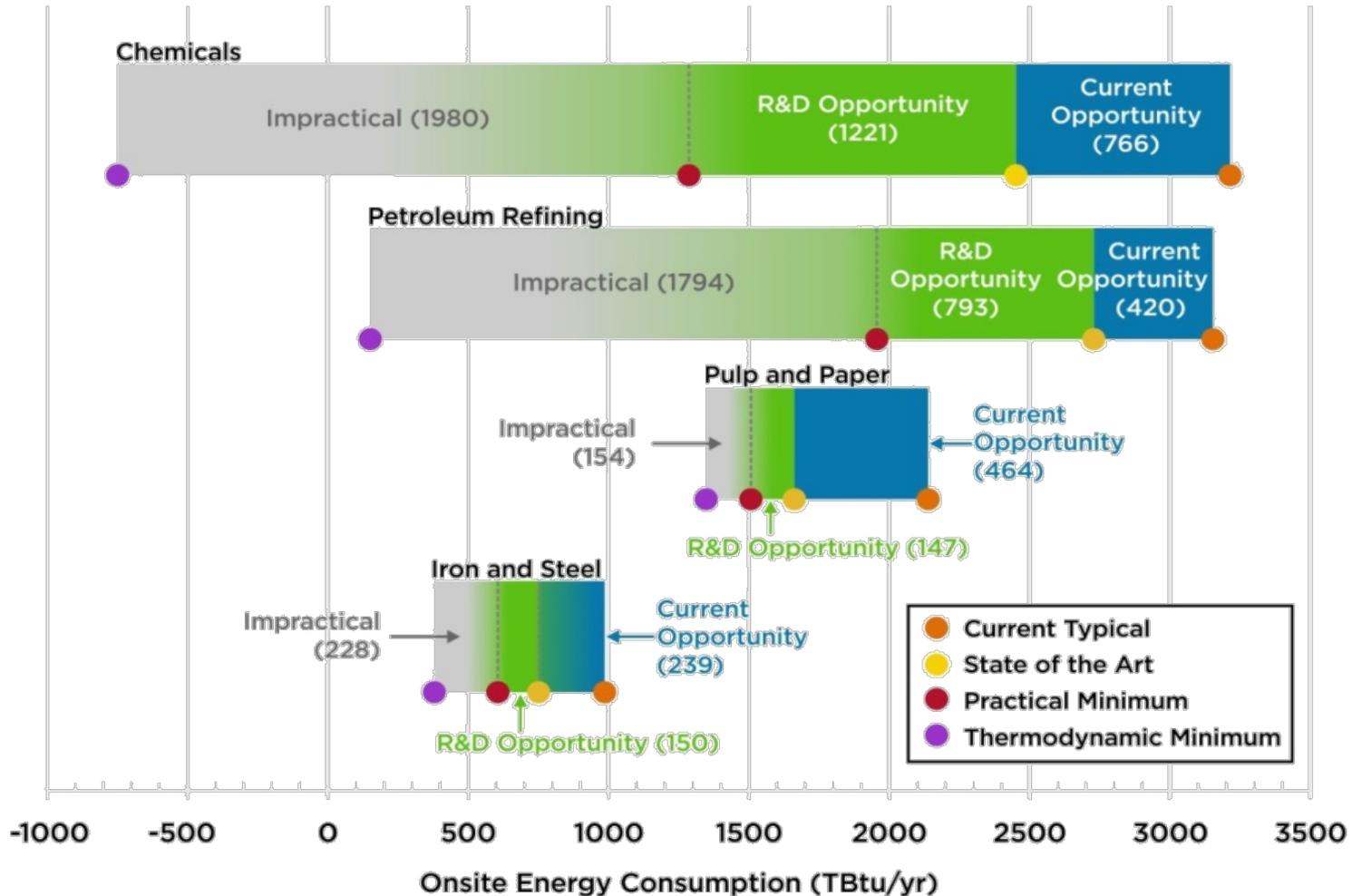


DOE's Advanced Manufacturing Office & Tech Assist Overview

Jay Wrobel
Manager
Advanced Manufacturing Office



TA: Addressing the Current Opportunity

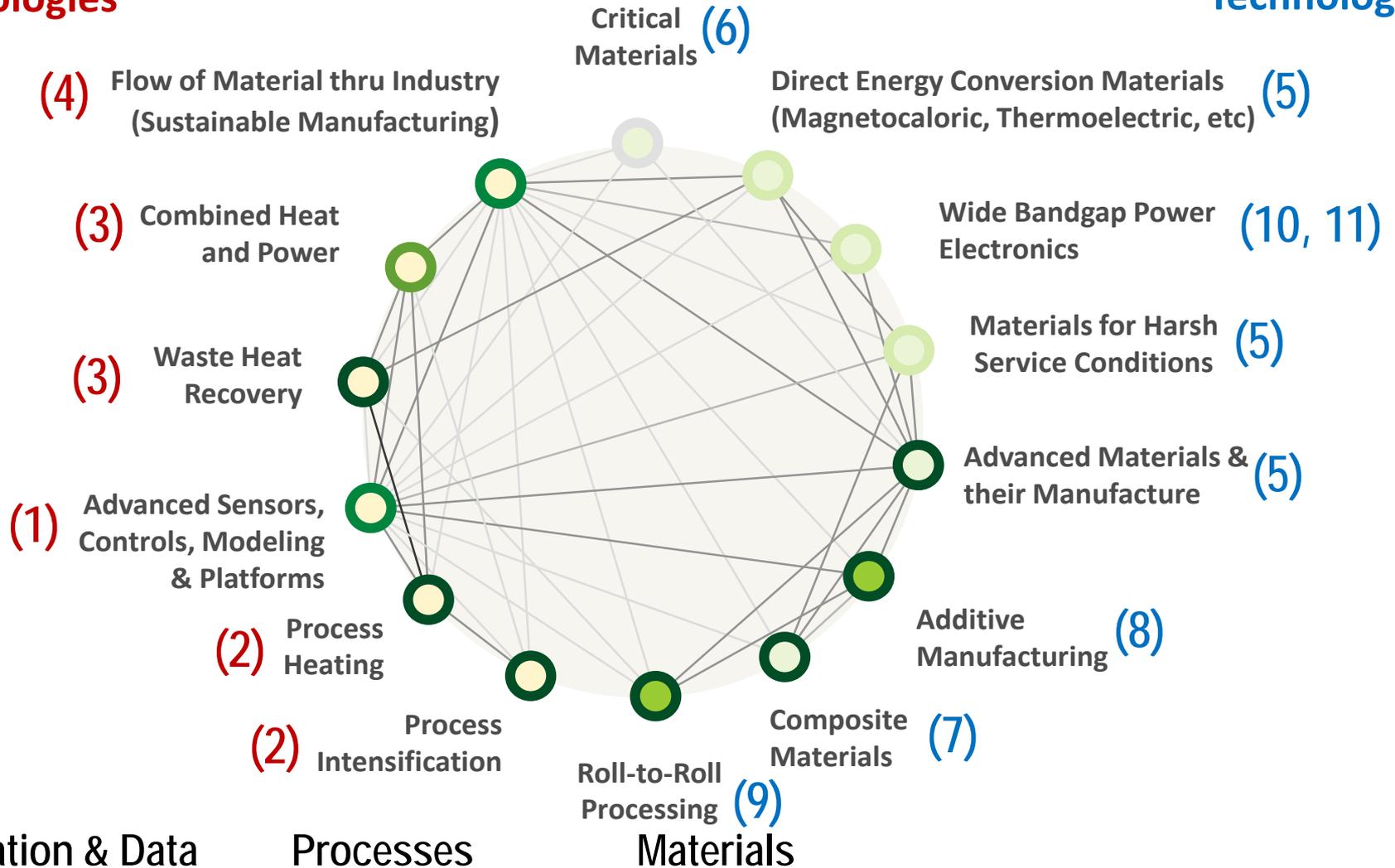


Current opportunities represent energy savings that could be achieved by deploying the most energy-efficient commercial technologies available worldwide. R&D opportunities represent potential savings that could be attained through successful deployment of applied R&D technologies under development worldwide

TA : Integrating Practice with Technology

**Efficiency
Technologies**

**Enabling Platform
Technologies**



Energy & Resource
Management

Advanced Manufacturing
Processes

Materials Development

TA: How We Do it...

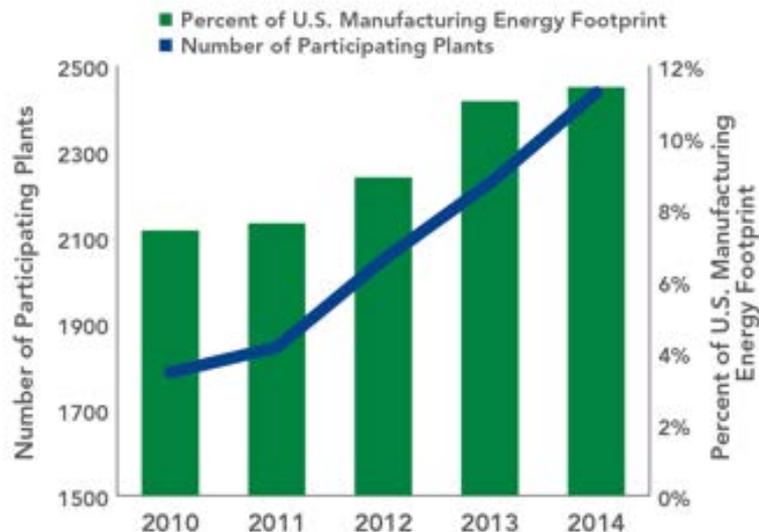
- Data.
 - ✓ Work with industry to set energy and water savings targets
 - ✓ Assist in data collection methodology and reporting
- Education.
 - ✓ Disseminate the best practices for energy and water systems
 - ✓ Provide training, tools and direct TA to all sized 'large energy users'
- Recognition
 - ✓ DOE recognition for success in energy and water excellence
 - ✓ Co-branded resources for State and utility EE programs

Better Buildings, Better Plants

- Better Plants is a key component of the President's Better Buildings Initiative, which seeks to improve the energy efficiency of commercial and industrial buildings by 20% by 2020.
- Through Better Plants:
 - Companies set long-term efficiency goals
 - DOE assists in data collection/reporting
 - Receive technical assistance and national recognition for their leadership
 - Training options
- Our Partners
 - 176 Partners, with over 2600 facilities
 - 19 water partners



Program Growth Over Time



Expanded Impact: Supply Chain



Looking across the 3 initial cohorts:

- 24 suppliers have set goals to improve energy efficiency by 25% over ten years
 - Legrand = 8 suppliers
 - UTC = 7 suppliers
 - Lockheed = 9 suppliers
- 12 have conducted IAC assessments that have uncovered significant energy savings

2015 Supply Chain Initiative IAC Assessments

Summary of Assessments	Results
Number of Assessments	12
Number of Recommendations	56
Average Percent Savings Per Plant	13%
Average Cost Savings Potential	\$119,000
Average Simple Payback	0.9 years
Total Potential Savings	\$1.1 million

Expanded Impact: Water Savings

- Last year, DOE launched a Water Savings Pilot with 23 Partners
- Based on the success working with this group, DOE is expanding its water-saving efforts
- Participation is open to all Challenge partners with complete energy data and one energy-focused solution

Water Savings Initiative Progress

Company	Baseline Year	Average Annual Improvement
Cummins	2010	9.9%
Ford	2009	7.4%
General Motors	2010	2.9%
Nissan	2013	16.1%
Saint-Gobain	2012	6.5%
UTC	2006	4%

Estimated 2014 Water Savings are Equivalent to:



540 Olympic Swimming Pools

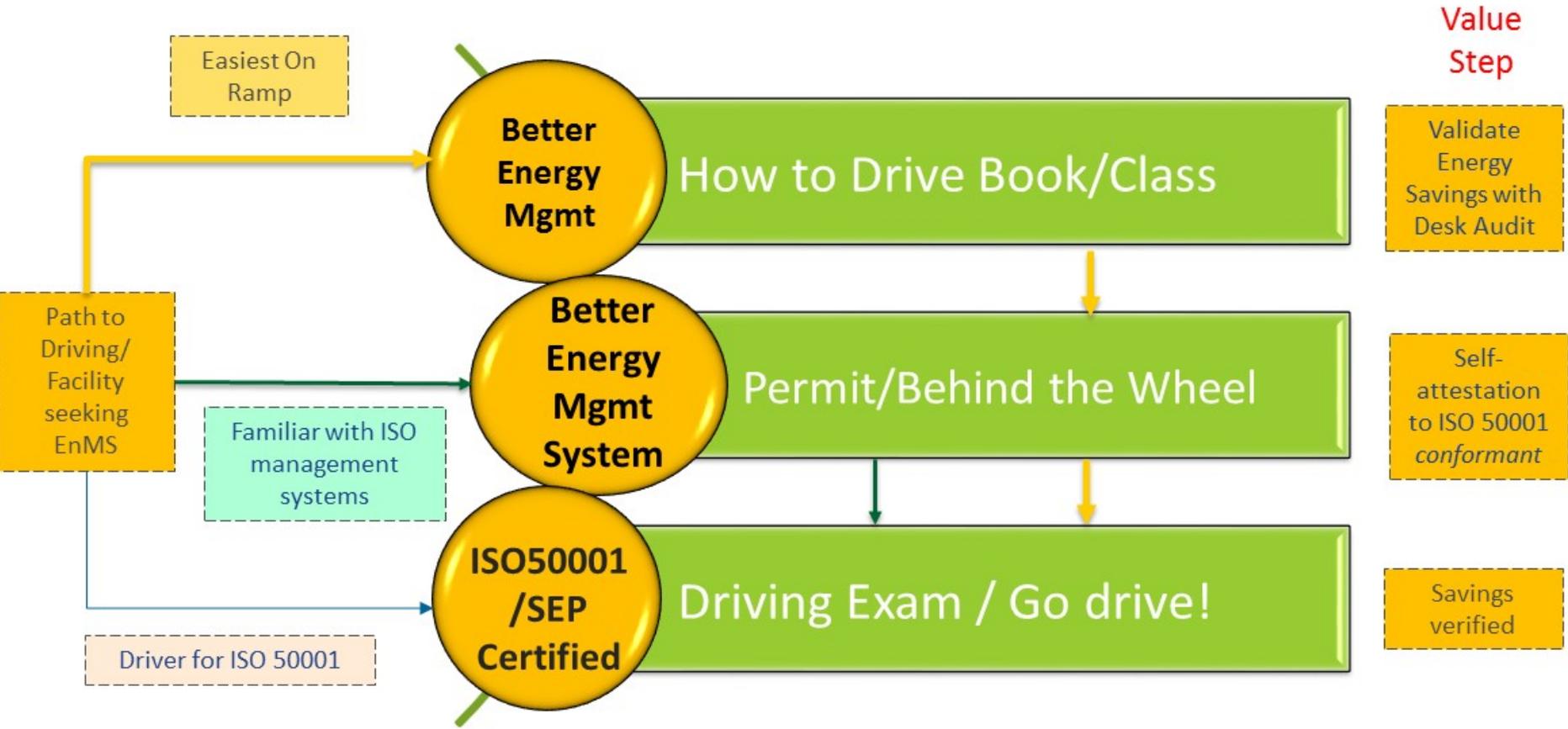


3,000 households' average annual water consumption



14 million showers

Energy Management Systems: Pathway to ISO 50001



Energy Management Systems: ISO 50001/SEP

Better Energy Management (BEM)

Better Energy Management System (BEMS)

ISO/SEP Certified



PURPOSE

- Provide a pathway for receiving recognition for energy savings through SEM
- Provide facilities, utility, and state with an enabling tool to comply with CPP or local/utility programs

- Provide a pathway for facilities receiving recognition for implementing an EnMS
- Provide facilities utilities, and states the ability to achieve ISO 50001 conformance (certified or self-declared)

- Provide pathway for rigorous, third party verified savings to facilities
- Provides transparent, credible record of performance

MARKET DRIVERS:

- Sustainability standards (e.g., IEEE, UL, etc.), supply chain preferred supplier, Clean Power Plan credits and incentives (TBD), and utility rebates and technical assistance.

Role of DOE eGuide

Better Energy Management (BEM)

- Simple guidance to implement QES Pathway
- A tool to streamline the collection of energy savings data from facilities
- Link to online application form

Better Energy Management System (BEMS)

- Streamlined step-by-step guidance to implement QEnMS and ISO 50001
- Focus on the critical outputs of implementing an ISO 50001 EnMS
- Link to online application form

ISO/SEP Certified



- Step-by-step guidance and tools to facilitate ISO 50001 and SEP implementation
- Link to online application form

EGUIDE PROVIDES...

Certified Facilities w/Energy Improvement

	Saanichton, BC Canada	30.6%
	Smyrna, TN	23.1%
	Clovis, CA	16.7%
	Seneca, SC	15.6%
	Columbia, MO	13.3% / 1 yr
	Apodaca, Mexico (Monterrey 2)	11.3%
	Hopkins, SC	10.2%
	Tijuana, Mexico	10.2%
	Peru, IN	24.9% / 10 yrs
	Cedar Rapids, IA	8.8%
	Apodaca, Mexico (Monterrey 3)	7.8%
	Lexington, KY	6.9%
	Lincoln, NE	6.5%
	Rojo Gomez, Mexico	5.9%
	Washington, DC	15.9%
	Honolulu, HI	8.4%
	San Francisco, CA	6.3%
	Brockville, Ontario Canada	21.4% / 7 yrs
	Cordova, IL	5.7%

Improvement over 3 years unless stated otherwise

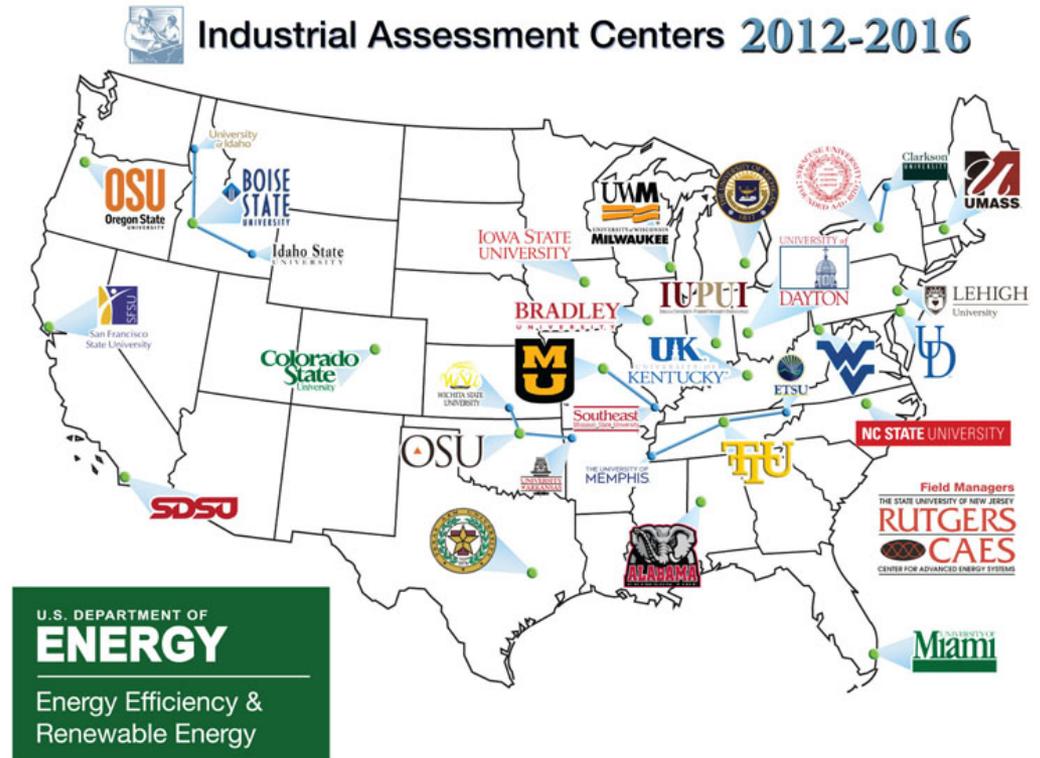
	Mack Trucks, Macungie, PA	41.9% / 10 yrs
	Dublin, VA	28.4% / 10 yrs
	Hagerstown, MD	20.9%
	Detroit, MI	32.5% / 10 yrs
	Smyrna, TN	17.7%
	Ontario, NY	16.5%
	Whitakers, NC	12.6%
	Dunedin, FL	12.2%
	Scranton, PA	11.9%
	Wilson, NC	15.1% / 10 yrs
	Gilroy, CA	9.8%
	Gaithersburg, MD	8.5%
	Cheswick, PA	7.6%
	Carlisle, PA	5.7%

Last updated: December 8, 2015

SEP Measurement & Verification Protocol provides robust methodology to track and verify energy performance improvement.

Industrial Assessment Centers (IACs)

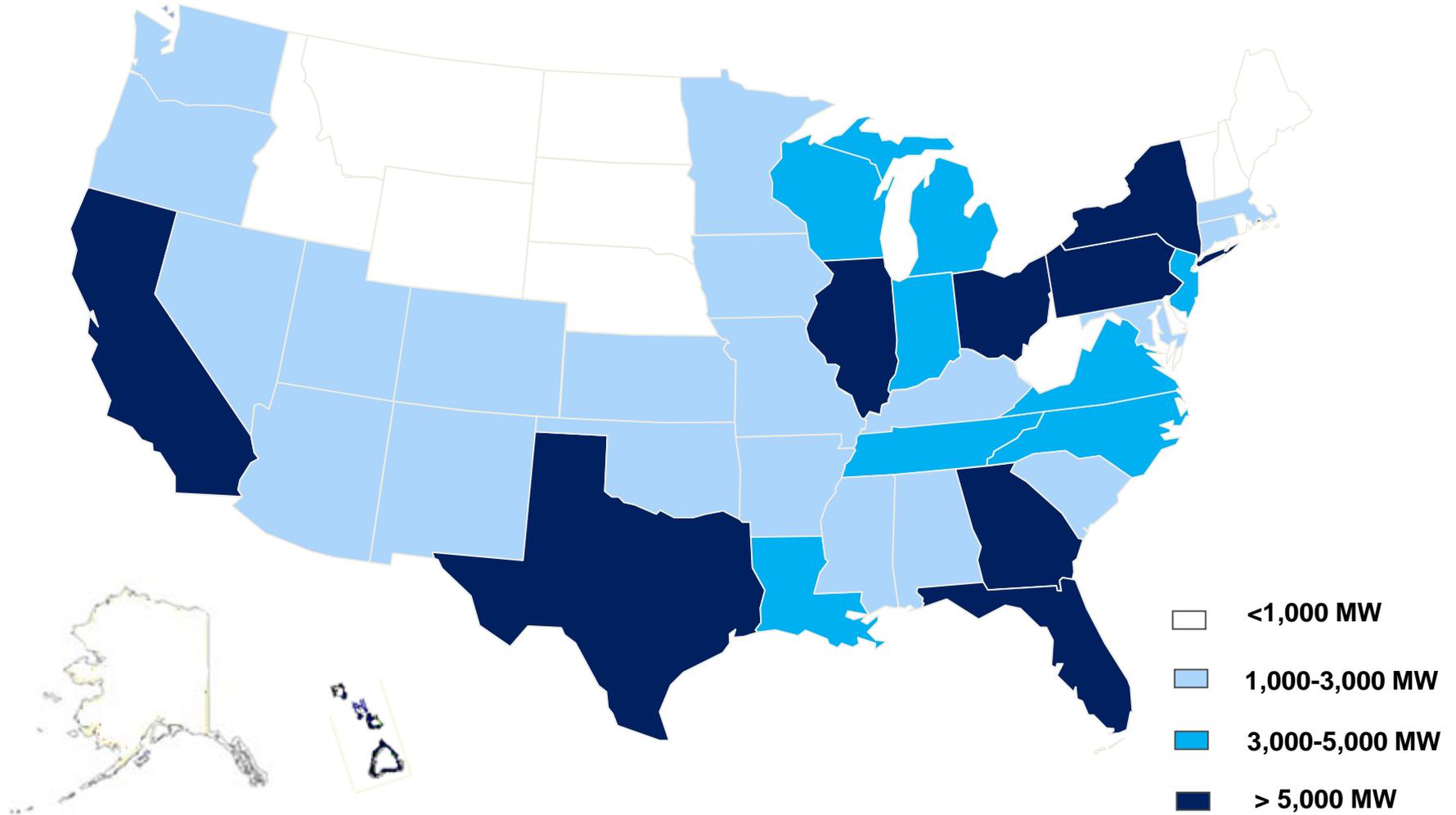
- Free assessment for small and medium sized manufacturers
- Process is assessment and 1 year follow up
 - 40% implementation rate of identified measures
- On average, IAC client will save >\$47,000 in energy/process improvements
- 60% of IAC graduates go on to careers in the energy industry
- Info: IAC.university



IAC Assessments

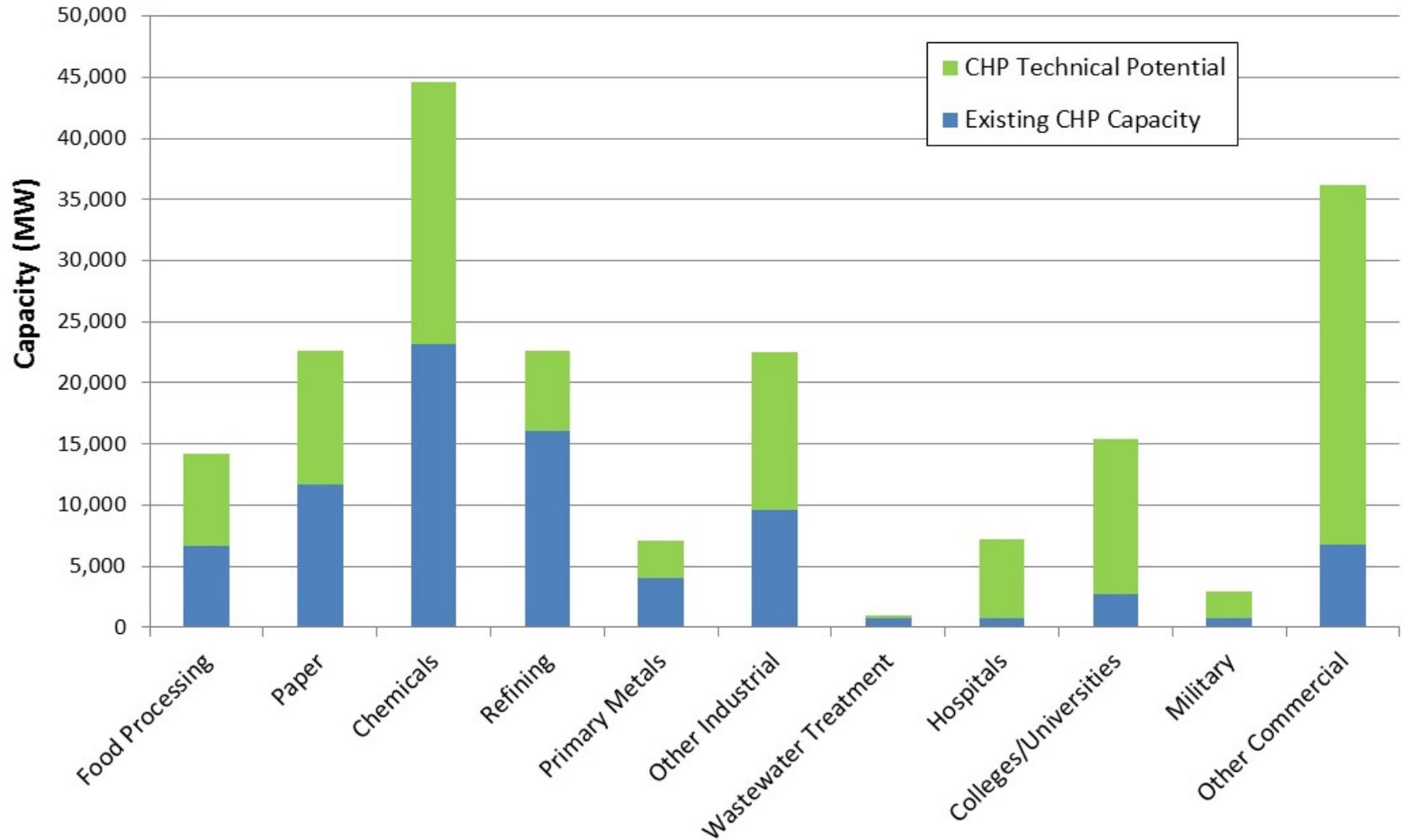
- Facility Eligibility Criteria
 - Directed at small and medium sized manufacturers – primary customer is:
 - Have gross annual sales of \leq \$100 million
 - Consume energy at a cost between \$100,000 and \$2.5 million/year
 - Employ no more than 500 people
 - No dedicated energy manager
- Company Highlights
 - On average, an IAC client will save more than \$47,000 in energy and process improvements (\$28,000 in energy, \$3000 in waste reduction, and \$16,000 in productivity improvements)
- 3rd Party Evaluation
 - For every DOE \$1, \$5 was invested in EE
 - Graduate salaries were $>$ \$6000 more than control group
 - 42% of graduates stayed in energy career, vs 28% engineering control group

CHP Deployment Program: Speeding the Rate of Installation



Where is the Remaining Potential for CHP?

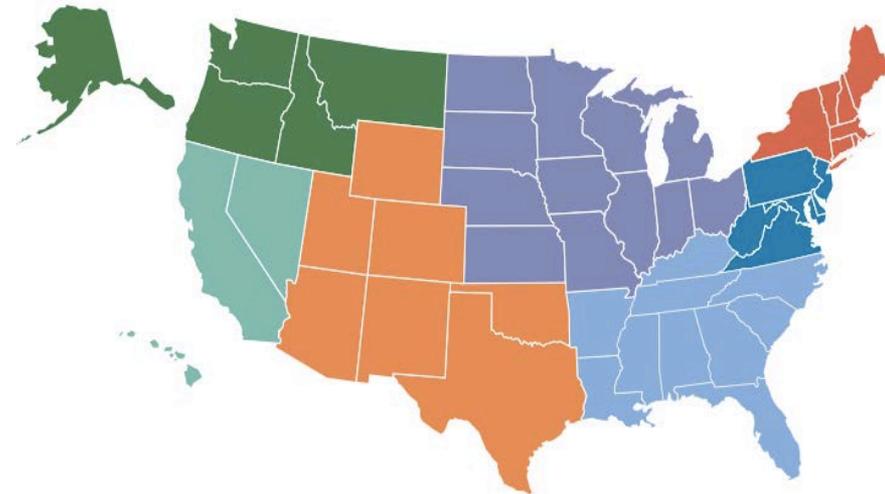
Existing CHP Capacity vs Technical Potential



DOE CHP Technical Assistance Partnerships

DOE's CHP TAPs provide local, hands on assistance for the installation of CHP, waste heat to power, and district energy or microgrid with CHP. Key services include:

- **Technical Assistance (Top priority!)**
Providing technical assistance to potential CHP host sites, from initial CHP screening to installation.
- **Market Opportunity**
Supporting key end-user stakeholders (associations, utilities, commissions, etc.) to further the installation of CHP.
- **Education and Outreach**
Providing information on the energy and non-energy benefits and applications of CHP to state and local policy makers, regulators, end users, trade associations, and others.



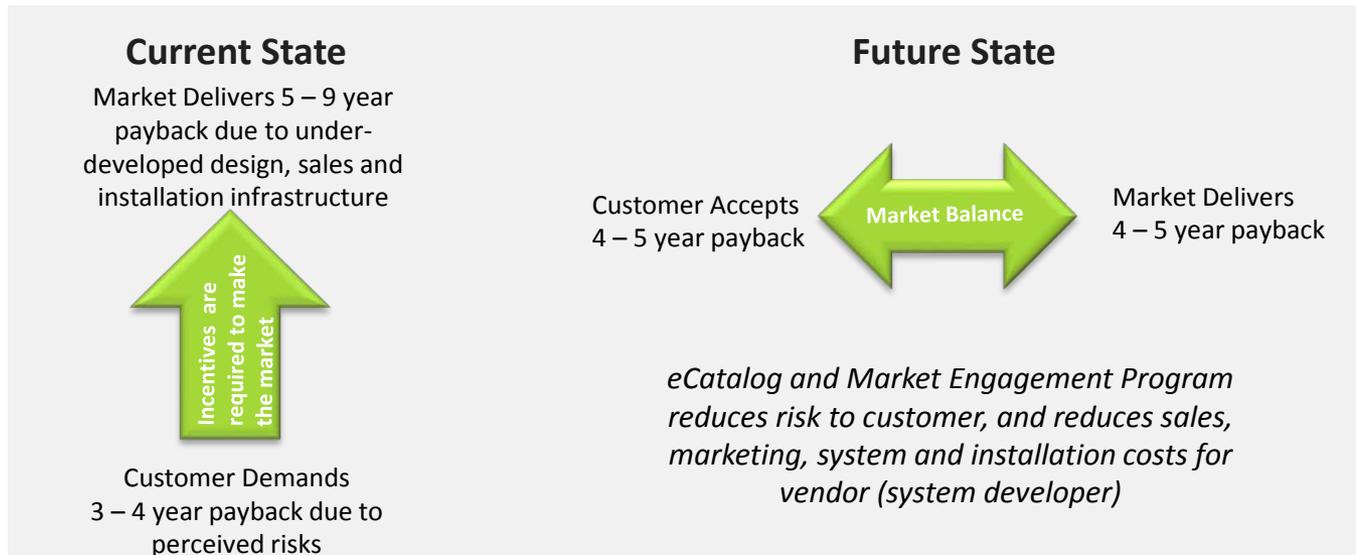
energy.gov/chp

DOE's New Packaged CHP System Challenge (AMO/BTO)

Goal: facilitate a 20% reduction in installed cost and time with packaged CHP Systems!

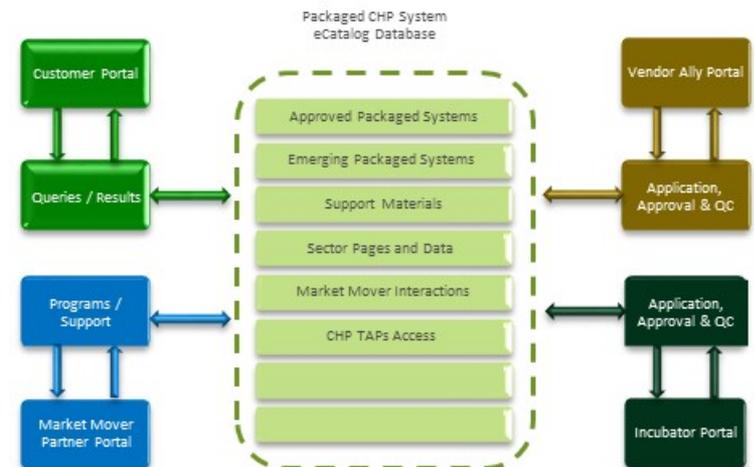
How:

- ✓ Create 'Grainger catalog' of packaged CHP
- ✓ Reduce real and perceived risks to customers
- ✓ Identifying proven packaged CHP systems
- ✓ Connecting to state, local, utility resources
- ✓ Allows for new/emerging packaged systems as well



DOE's New Packaged CHP System Challenge (AMO/BTO)

- The core of the Packaged CHP Challenge is a national electronic Catalog (eCatalog) of approved packaged CHP systems with two groups of delivery partners/allies.
 - Market Mover Partners that provide robust market engagement for CHP programs at the state, local and utility level. Engagement could range from awareness & outreach efforts to incentive programs at the discretion of each Market Mover partner.
 - Vendor Allies (system integrators) with approved packaged CHP solutions.
- Timeline
 - eCatalog Mock-up Summer 2016
 - Partner Recruitment –on-going



DOE's *New* CHP for Resiliency Accelerator

Purpose

Combined Heat and Power can play a vital role in ensuring that emergency response services are available and critical infrastructure maintains needed electric and thermal energy services to remain operational during disasters.

Offerings

- A forum for collaborating with Partners to integrate CHP and other distributed generation into resiliency action plans where appropriate
- Tools and templates to promote deployment of CHP/distributed generation in Critical Infrastructure
- Streamlined project development process with help from the Packaged CHP System Challenge
- Direct technical support through DOE's CHP Technical Assistance Partnerships (CHP TAPs)
- National recognition and visibility

Outcomes

- Integrated resiliency plans considering CHP (local, state, utility)
- Template with collective lessons learned for replicability

Timeline

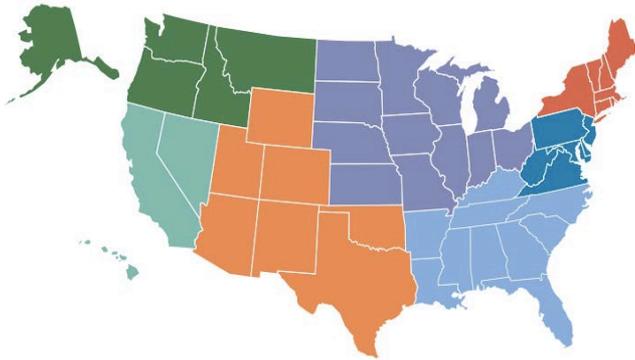
- Launch May 2016
- Two-year commitment



Efficient On-Site Energy

CHP Technical Assistance Partnerships

Energy.gov/CHP



Energy.gov/BetterPlants



Energy.gov/ISOSEP



Industrial Assessment Centers

Energy.gov/IAC

