



Industrial Energy Efficiency 工业能效 Technical Assistance and Recognition 技术支持和表彰

Paul Scheihing

U.S. Department of Energy, Advanced Manufacturing Office 美国能源部先进制造办公室

Presentation to NDRC Delegation

October 18, 2016

Contents

主要内容

- Overview of DOE Industrial Energy Efficiency Programs
能源部工业能效项目概览
- Better Plants
好工厂项目
- “50001 Ready”
“50001预备”
- Superior Energy Performance
卓越能源绩效
- Industrial Assessment Centers
工业评估中心
- Combined Heat and Power (CHP) Technical Assistance Partnerships
热电联产技术支持合作伙伴

The US Context for Federal Industrial Energy Efficiency Programs 美国联邦政府工业能效项目

- No U.S. requirement/driver for ISO 50001 certification 美国没有对ISO50001认证的要求和动力
 - No strong levers (e.g. tax breaks, laws, regulation).没有强有力的杠杆（比如减税、法律和规章）
 - Residential and commercial energy efficiency primarily driven by building code and appliance standards.居住建筑和商业建筑能效提升动力主要来自建筑条例和家电标准
- US DOE offers a range of industrial energy efficiency programs 美国能源部提供一系列工业能效项目
 - Technical assistance, self reported savings, and energy management system (EnMS) 技术支持，自己汇报的节能量，能源管理系统（EnMS）
- Focus has evolved: 关注点的演变
 - Equipment → Systems → Energy management systems (EnMS) 设备->系统->能源管理系统（EnMS）
- Energy management systems are the foundation on which to drive continual energy performance improvements 能源管理系统是推动能源绩效持续提升的基础
 - Drive: technology uptake, operational control, behavior change 带动了技术应用、运行控制和行为改变

3

U.S. DOE: Voluntary Recognition Offerings for Industrial Energy Efficiency 美国能源部：工业能效的自愿表彰项目

Multi-program strategy 多项目策略:

Allows industrial organizations to engage with the U.S. DOE at their comfort level. 允许工业企业在其允许范围内多与美国能源部互动

Corporate Level 企业级别



Facility Level 工厂级别

Two market options based on ISO 50001 EnMS
依据ISO50001能源管理系统的两个市场选择

50001 Ready
(Name Not Yet Official)
名称未最终确定



CHP Technical Assistance Program
热电联产技术支持项目

Industrial Assessment Center Program
工业评估中心项目

Better Buildings, Better Plants

好建筑，好工厂

- 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. 好工厂是奥巴马总统好建筑项目的重要组成部分，旨在提高商业建筑和工业建筑的能效
- Through Better Plants: 通过好工厂项目
 - Companies set long-term efficiency goals (25% energy intensity over 10 years) 企业设定长期能效目标（10年降低能源强度25%）
 - Receive technical assistance and national recognition for their leadership 获得技术支持和国家表彰
- Manufacturers have two opportunities to engage in Better Plants: 制造商有两种途径参与好工厂项目
 1. Broader-based *Program* level 更广维度的项目层面
 2. Higher-level *Challenge* 更高层面的挑战项目



Better Plants Overview

好工厂概述

Energy savings and program footprint continue to grow

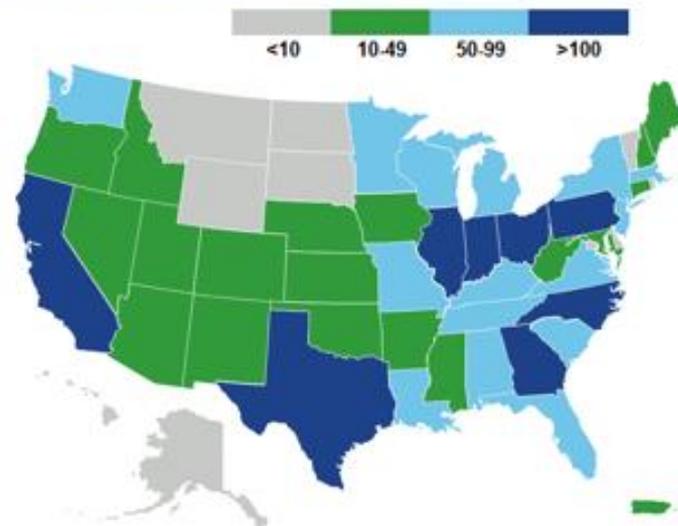
节能量不断增加，项目覆盖范围不断扩大

Better Plants Snapshot, September 2016

2016年9月，好工厂一览

Accomplishments 成果	Total 总计
Number of Partners 伙伴数量	181
Approximate Number of Plants 工厂数量	2,600
Percent of U.S. Manufacturing Energy Footprint 占美国制造业总能耗比例	11.5%
Reported Savings 报告的节能量	
Cumulative Energy Savings (TBtu) 总结能量	600
Cumulative Cost Savings (Billions) 总成本节约 (十亿)	\$3.1
Cumulative Avoided CO ₂ Emissions (Million Metric Ton) 避免的二氧化碳排放总量 (百万吨)	34.7
Average Annual Energy Intensity Improvement Rate 年均能源强度提升率	3.0%

Regional Distribution of Better Plants Facilities



Two Options for Market with ISO 50001

应用ISO50001的两个选择

Elements 要素

Program Name
项目名称

US Gov't
Supported
Approach
美国政府支持方法

Emissions
Validation Approach
排放核证方法

Market
Actors & Drivers
市场参与者和推动者

US Recognition Options for ISO 50001

美国表彰ISO50001的项目

50001 Ready
(Name Not Yet Official)
50001预备
(名称未最终确定)

US developed program for
ISO 50001 compliance
美国编制项目履行ISO50001
标准

Validation with QE²ST
Protocol
验证QE²ST协议

Market Allies recognized by
US DOE
获美国能源部表彰的市场盟

Superior Energy
Performance (SEP)
卓越能源绩效

US developed program for
ISO 50001 certification
美国制定项目认证ISO50001



Validation with SEP M&V
Protocol
验证SEP测量和验证协议

Accredited certification bodies
recognized by US DOE
美国能源部表彰授信的核证机构

DOE Better Buildings, Better Plants Partners can use 50001 Ready and SEP to achieve their voluntary pledge to reduce energy intensity.

美国能源部更好建筑、更好工厂伙伴可以通过50001预备和卓越能源绩效项目实现他们降低能源强度的自愿承诺

“50001 Ready”: Overview

50001预备：概述

- Recognition of an organization’s energy and emissions savings from a self-declared ISO 50001 energy system

表彰某企业通过自我声明的ISO50001能源体系实现的节能减排

- Audience:* industrial, commercial and institutional organizations that want to implement ISO 50001 without seeking third-party certification 受众是希望应用ISO50001但不寻求第三方认证的工业、商业和机构
- Desired outcome:* organizations implement ISO 50001 structure and quantify their energy and emissions savings 希望的成果：机构实施ISO50001框架并量化节能减排量
- Resources:* DOE developing tools to self-attest EnMS implementation in accordance with ISO structure, without requiring third-party certification 资源：DOE开发工具，帮助在ISO框架下实施EnMS，并且不需要第三方认证

Guide to Energy Management

(GEM): checks EnMS elements
能源管理指南：检查EnMS各要素



QE²ST Tool: checks for energy performance improvement over one year
QE²ST工具： 每年检查能源绩效提升



What “50001 Ready” Is...

“50001预备”是什么

1. An strategic energy management (SEM) program design able to be rebranded for utilities, cities, states, etc. 策略性能源管理项目，重塑电力、城市和州
2. Guide for Energy Management (GEM) tool; a ‘self-paced’ tool to establish an energy management system 能源管理指导工具，一个自定进程的工具帮助建立能源管理系统
 - Should not require ‘certified’ professionals to do it 不应要求“认证的”专业人员使用
 - May leverage existing program support people or CP EnMS professionals 可以利用现有项目支持人员或者认证的能源管理系统专业人员
3. Regression-based QE²ST calculator 基于回归的QE²ST计算器
 - Based on utility SEM ‘best practices’ and CPP guidance 基于电力SEM最佳实践和CPP指南
 - DOE will share tool for partner analysis and adoption 美国能源部将分享工具供分析和使用
4. Consistent energy management principles and savings numbers 一致的能源管理原则和节省量
 - Based on ISO 50001 guidance used across the globe 基于全球通用的ISO50001指南
 - Output consistent across sectors, geography, service territories 结果各部门、各区域、各领域都通用
5. Not requiring certification 不要求认证
 - Option to move to ISO 50001/SEP certification (as Tier 2 program) 可以转移到ISO50001/SEP认证（第二级别的项目）

SEP™: An Energy Performance Improvement Certification Program Based on ISO 50001

卓越能源绩效 (SEP™): 基于ISO50001的能源绩效提升认证项目

- Certification to ISO 50001 with third party verification of energy savings 节能量通过第三方认证的ISO50001认证
 - Energy management system (ISO 50001) and 能源管理系统 (ISO50001)
 - Energy performance improvement (ANSI/MSE 50021) 能源绩效提升 (ANSI/MSE 50021)

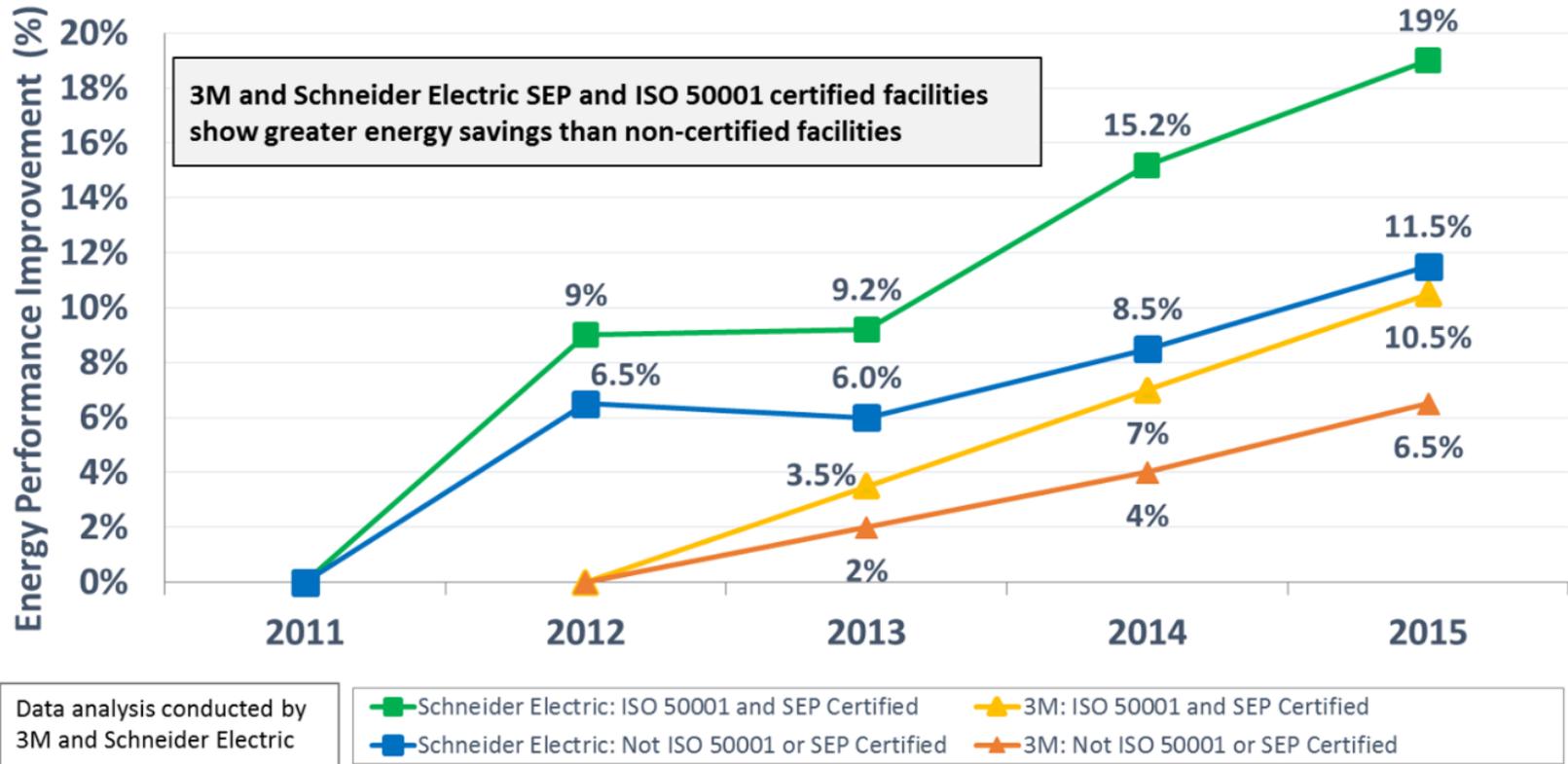


Through DOE's Superior Energy Performance... 通过DOE的卓越能源绩效项目

- Achieving up to \$1 million in annual savings 每年实现约100亿美元的节省
- Significant savings from operational improvements with no capital investment 无资本投资情况下通过运行提高带来巨大节省
- Reducing carbon emissions, with third-party verified energy performance improvement 减少碳排放, 第三方认证的能源绩效提升
- Savings found to be almost double corporate business as usual 与趋势照常相比, 节省将近一倍

ISO 50001 as Business Driver

ISO50001推动商业



Savings at certified facilities greater on average compared to non-certified facilities 平均来看，认证的设施节省量比未认证的要多：

- **3M: 62% greater over 3 years:** 18 ISO 50001 sites across 7 countries; 2 US SEP, 1 Korea SEP certified; 257 non-ISO 50001

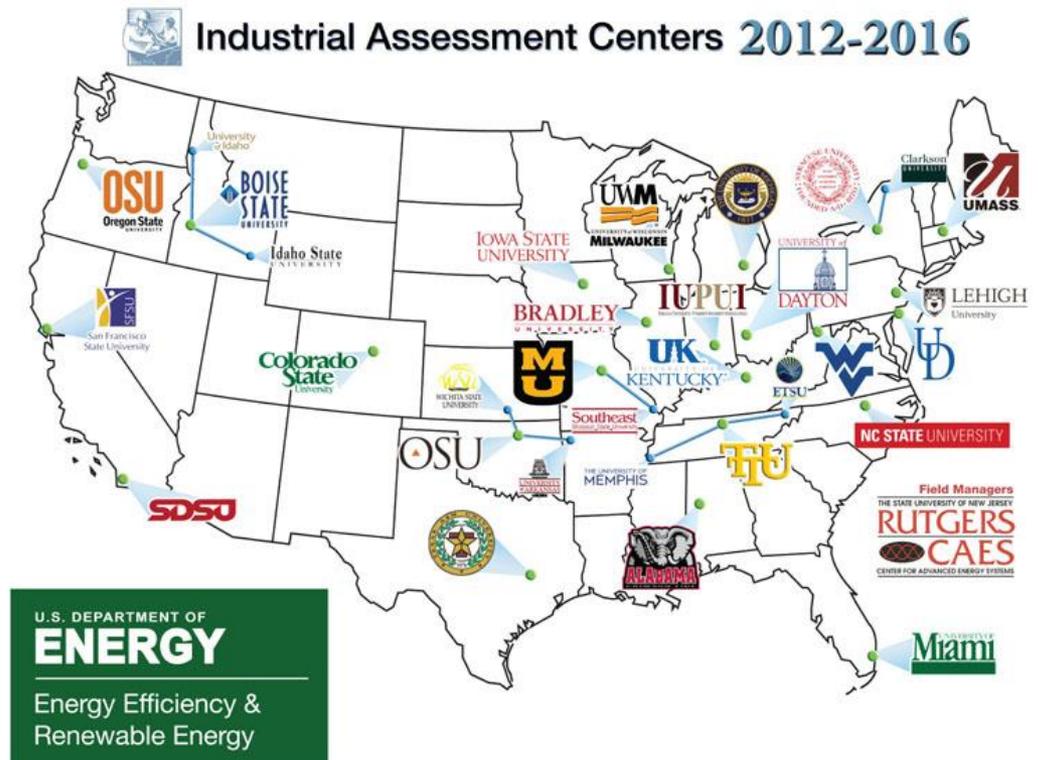
3M公司三年内提升62%：18个ISO50001设施，遍布7个国家，2个美国SEP，一个韩国SEP，257个非ISO50001

- **Schneider Electric: 65% greater over 4 years:** 20 ISO 50001 in North America; 16 US SEP certified; 30 non-ISO 50001
- 施耐德电气四年内提高65%：北美20个ISO50001，16个美国SEP认证，30个非ISO50001

Industrial Assessment Centers (IACs)

工业评估中心 (IACs)

- Free assessment for small and medium sized manufacturers为中小型制造商提供免费评估
- Process is assessment and 1 year follow up 评估以及一年跟踪
 - 40% implementation rate of identified measures 百分之40的方案被使用
- On average, IAC client will save >\$47,000 in energy/ process improvements 平均来看, IAC客户节省超过47000美元
- 60% of IAC graduates go on to careers in the energy industry 百分之60的IAC毕业生去能源部门工作
- Info: <https://iac.university/>



IAC Assessments

IAC评估

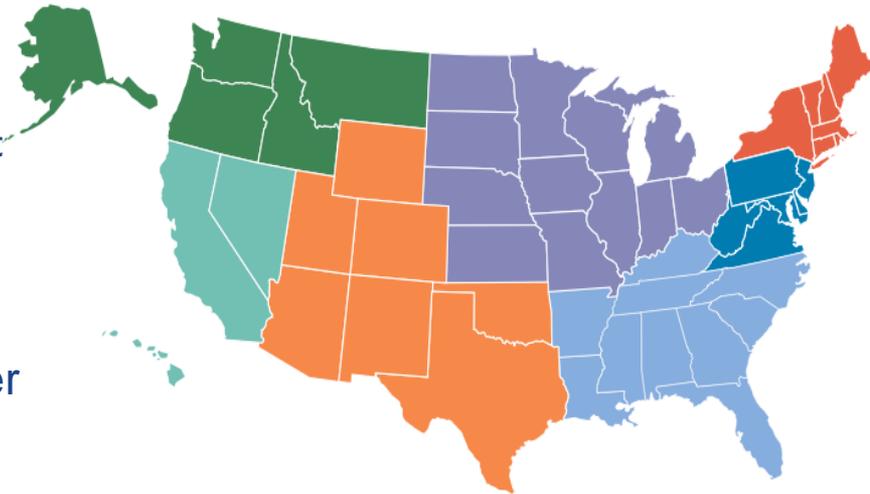
- Facility Eligibility Criteria 设施资格
 - Directed at small and medium sized manufacturers – primary customer is: 中小型制造企业，主要是
 - Have gross annual sales of \leq \$100 million 年总销售额不超过1亿美元
 - Consume energy at a cost between \$100,000 and \$2.5 million/year 每年能源成本介于10万美元到250万美元之间
 - Employ no more than 500 people 雇员不超过500人
 - No dedicated energy manager 没有专门的能源经理
- Company Highlights 亮点
 - 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) 平均来看，一个IAC客户能源和生产过程提高带来的的节省超过47000美元（能源提高节省28000美元，生产力提高节省16000美元）
- 3rd Party Evaluation 第三方评估
 - For every DOE \$1, \$5 was invested in EE 每DOE的1美元，5美元投资于能效
 - Graduate salaries were $>$ \$6000 more than control group 与控制组相比，毕业生薪水高6000多美元
 - 42% of graduates stayed in energy career, vs 28% engineering control group 42%毕业生留在能源行业工作，儿工程控制组只有28%

Combined Heat and Power (CHP) 热电联产

Technical Assistance Partnerships (TAPs) 技术支持伙伴

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: DOE的热电联厂技术支持伙伴项目提供给地方实际的帮助，包括热电联产的安装，余热发电以及分布式能源和微网，主要服务包括

- **Technical Assistance (Top priority!) 技术支持（首要服务）** Providing technical assistance to potential CHP host sites, from initial CHP screening to installation. 给潜在CHP安装地提供技术支持，包括从一开始的筛选审查到最后安装
- **Market Opportunity 市场机会** Supporting key end-user stakeholders (associations, utilities, commissions, etc.) to further the installation of CHP. 支持主要终端用户（协会、电力、委员会）继续安装CHP
- **Education and Outreach 教育与宣传** 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

给州和地方政策制定者、管理者、用户、交易机构和其他相关部门提供使用CHP的能源和非能源收益的信息

Contact info 联系信息



Paul Scheihing

Technology Manager, Technical Assistance

Advanced Manufacturing Office

US Department of Energy

paul.scheihing@ee.doe.gov

1-202-586-7234

美国能源部先进制造办公室

技术支持部门技术经理



Learn more: 更多信息

www.energy.gov/ISO50001

www.energy.gov/ISOSEP

www.energy.gov/eere/amo/better-plants

energy.gov/eere/amo

energy.gov/eere/amo/ta