

US DOE Two-Step Approach for ISO 50001 Market Adoption

Elements

Program Name

US Govt Supported Approach

Emissions Validation Approach

Market Actors & Drivers

US Recognition Options for ISO 50001

50001 Ready

US developed program for ISO 50001 compliance

Validation with QE²ST Protocol

Market Allies recognized by US DOE

Superior Energy Performance (SEP)

US developed program for ISO 50001 certification



The logo for Superior Energy Performance, U.S. Department of Energy, featuring a stylized green and blue square icon.

Validation with SEP M&V Protocol

Accredited certification bodies recognized by US DOE

United States Strategy for ISO 50001

Response to US Climate Commitments

"50001 Ready"

Resources to increase adoption of ISO 50001 structure within all sectors of US economy

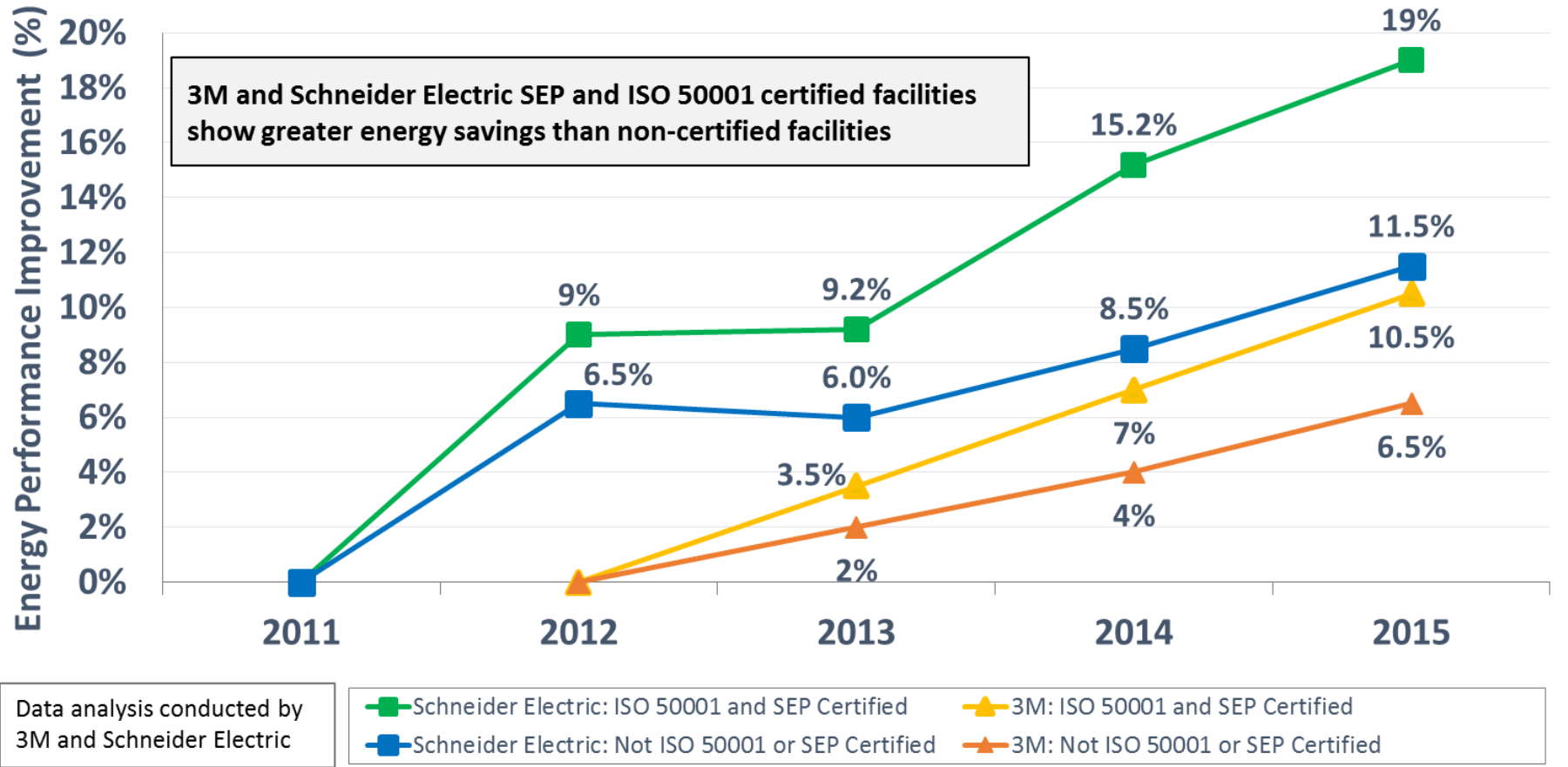
**Step 1:
Self-declared Implementation
of
ISO 50001**

**Step 2:
Validation of energy and
emissions reductions**

US Technical Approach

- Step by step guide to self-directed ISO 50001 implementation using Guide for Energy Management (GEM) tool
- Calculator to determine energy and emissions savings through top-down regression analysis using Qualified Energy and Emissions Savings Tool (QE²ST)
- QE²ST Protocol for validation and consistency of results

ISO 50001 Conformant Plants Outperforms Peers



Savings at certified facilities greater on average compared to non-ISO facilities:

- **3M: 62% greater over 3 years:** 18 ISO 50001 certified sites across 7 countries; 2 US SEP, 1 Korea SEP certified; 257 non-ISO5001
- **Schneider Electric: 65% greater over 4 years:** 20 ISO 50001 certified in North America; 16 US SEP certified; 30 non ISO50001

Certification for SEP Professionals Ensures High Quality

The professional credentialing programs for SEP are ANSI ISO/IEC 17024 accredited: Scientifically developed exam and strict controls on conflict of interest provides greater assurance that individuals will have the necessary knowledge and skills to be competent

Elements:

- Certification Scheme
- Scope and Job Task Analysis (Blueprint)
- Both training and professional exam are based on the Scope and Blueprint
- ANSI requires a firewall between training and professional qualification exams

Professional Certification Body:
Institute for Energy Management Professionals

(Accredited by ANSI in accord with ANSI/ISO/IEC 17024)

Deliver exams and certify personnel

Professional Training Organization:
Georgia Tech and UL DQS

(Use training license from U.S. DOE)

Deliver training courses in preparation for exam

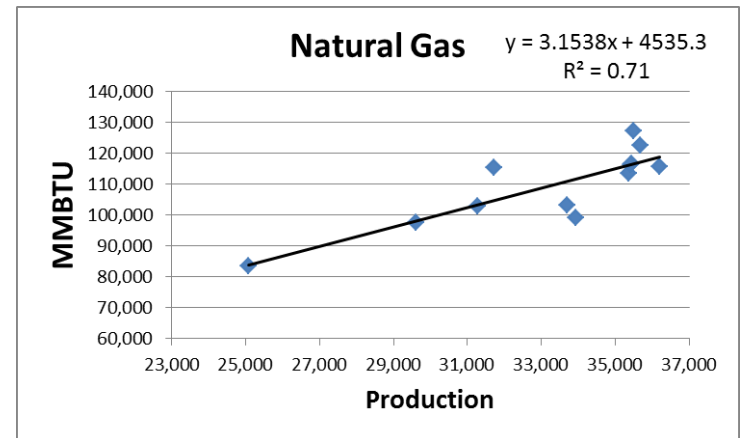
SEP Measurement & Verification

SEP energy performance is demonstrated by:

1. Top-down, whole facility SEP EnPI (“SEnPI”)

$$SEnPI = \frac{BTU_{Tot\ actual}}{BTU_{Tot\ expected}}$$

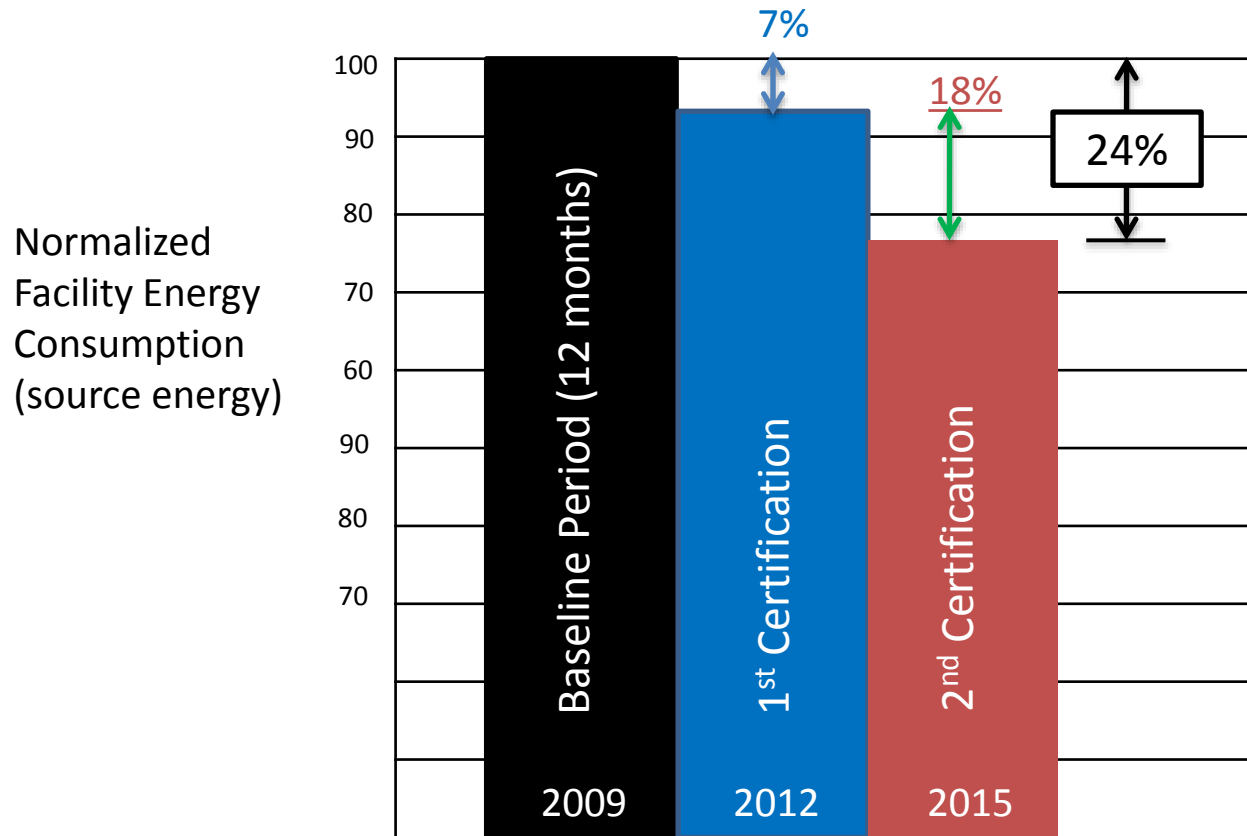
Where $BTU_{Tot\ expected} = f(X1, X2, \dots Xn)$



2. Bottom-up sanity check

Project-specific energy saving estimates based on engineering calculations give confidence in top-down result

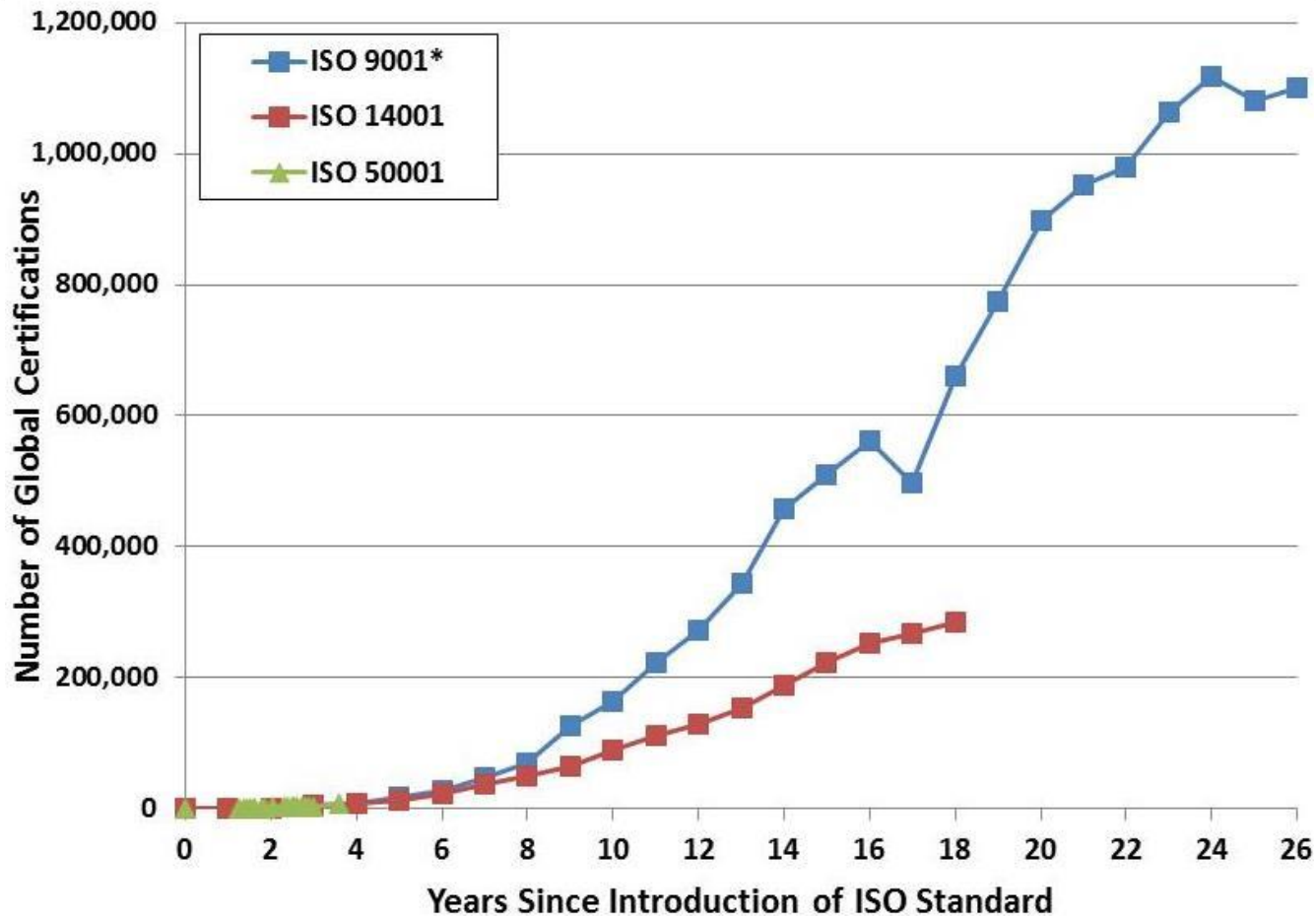
Recertified Facilities Show Continual Energy Performance Improvement



Nissan – Smyrna, TN facility

Initial Growth of ISO 9001, 14001, & 50001

Global - Initial 26 Years



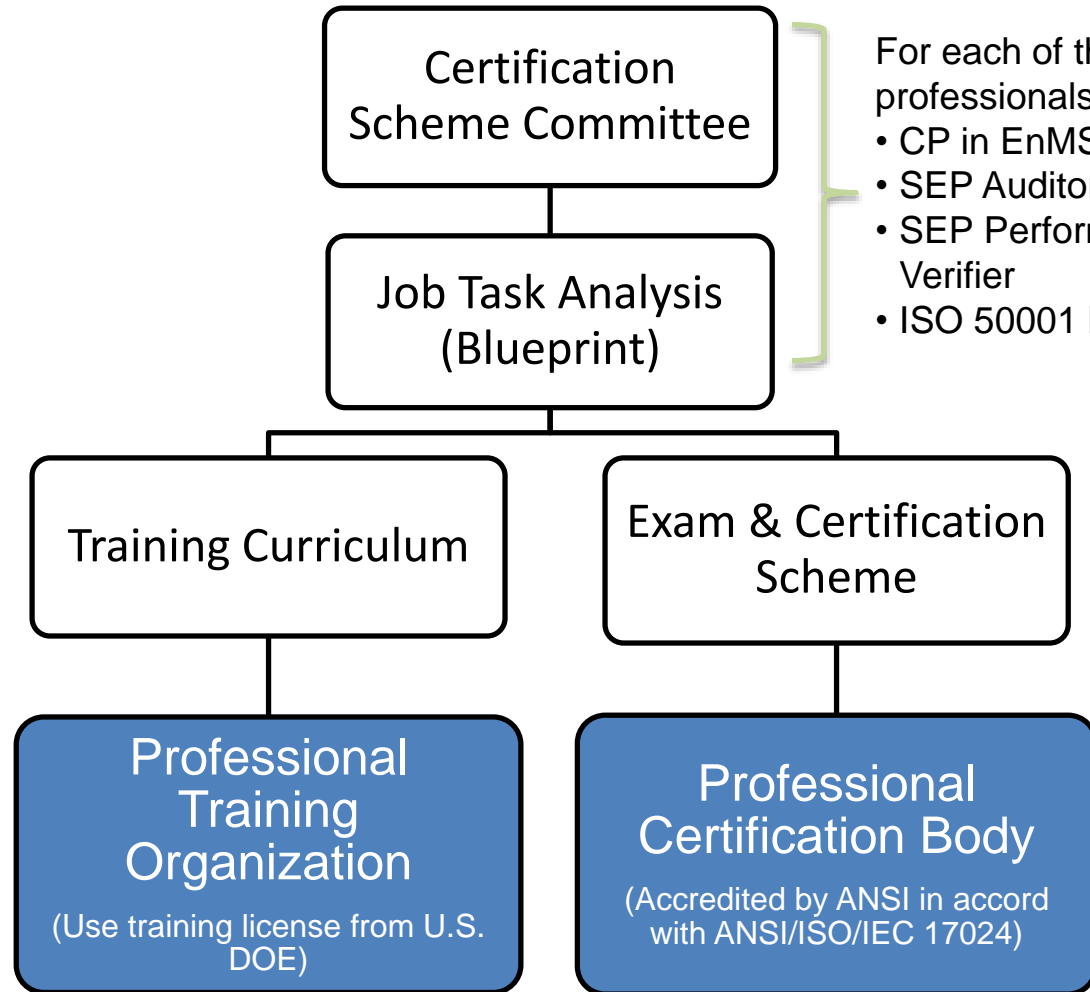
Professional Certification Framework

Committees of experts were developed for each type of professional

List of required knowledge and performance topics (skill set) were defined and reviewed by a separate expert group

Training and exam based on Job Task Analysis (JTA) Blueprint

Training and exams administered through selected organizations



- For each of the following professionals:
- CP in EnMS
 - SEP Auditor
 - SEP Performance Verifier
 - ISO 50001 Lead Auditor

SEP Program Update - Refinement

DOE is refining SEP to improve and simplify the program based on experiences and feedback to date. Improvements include:

- **Single, unified scoring system and qualification pathway** combines best features of the Energy Performance and Mature Energy Pathways
- Provide **flexibility in setting facility baseline year to align with corporate or enterprise**; enable companies to more easily expand SEP participation across facilities
- **Motivate plants to enhance energy management programs** through use of the Scorecard at Gold and Platinum levels
- **For recertification, provide practical and flexible energy performance improvement requirement** that is sustainable over multiple certification cycles

Certification to updated program design anticipated by Fall 2016

- SEP standards and protocols to be updated and peer reviewed
- Current program will continue to be available during a transition period

SEP Program Update – Preview Initial Certification

SEP - Initial Certification

Performance Levels



Achievement period	Performance Levels		
	Bronze	Silver	Gold
12-36 months (1-3 yrs)	1%		5%
37-48 months (~3-4 yrs)	N/A		7%
49-60 months (~4-5 yrs)	N/A		8%
61-72 months (~5-6 yrs)	N/A		10%
73-84 months (~6-7 yrs)	N/A		12%
85-96 months (~7-8 yrs)	N/A		13%
97-108 months (~8-9 yrs)	N/A		15%
109-120 months (~9-10 yrs)	N/A		16%

Recertification: Same requirements except energy performance improvement is:
Bronze: 1% over most recent 3 years
Silver, Gold, Platinum: 3% over most recent 3 years
 for all achievement periods

Platinum
<p>+ 60 SEP Scorecard credits, including:</p> <p>35 points for Energy Management System - and - 10 points for Advanced Practices and Additional Energy Performance</p>

<p>+ 40 SEP Scorecard credits, including:</p> <p>20 points for Energy Management System</p>

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SEP Verification Bodies & Certified Personnel

ANSI/MSE 50028
(Requirements for Verification Bodies)

Verification Bodies will be accredited by ANSI and ANAB, based on requirements of the MSE 50028 standard.

ANSI-ANAB Accreditation includes:

- Off-site review of the VB candidate's documented management system
- Observations of the candidate's audit team
- Assessment of the recordkeeping and competence of candidate's office personnel
- Annual verification of continued conformance

All Certified Personnel must meet ANSI/ISO/IEC 17024 accredited certification requirements, including education, experience, and standardized exam

Verification Bodies
(governed by ANSI/MSE 50028 requirements)

Accredited Verification Bodies conduct SEP audits using certified SEP Lead Auditors and SEP Performance Verifiers.

Certified SEP Audit Team Members

SEP Performance Verifier

SEP Lead Auditor

Can be one cross-qualified person

CP EnMS + additional SEP Performance Verifier Exam required

CP EnMS & ISO 50001 Lead Auditor + additional SEP Lead Auditor Exam required

Certified Practitioner in Energy Management Systems (CP EnMS)

Certified ISO 50001 Auditor
(U.S. National Exam)

Note: CP EnMS requires sector-specific certification

IEEE 1680.1 standard for Electronic Computer Desktops: Energy Management Suppliers criterion Parts A, B and C

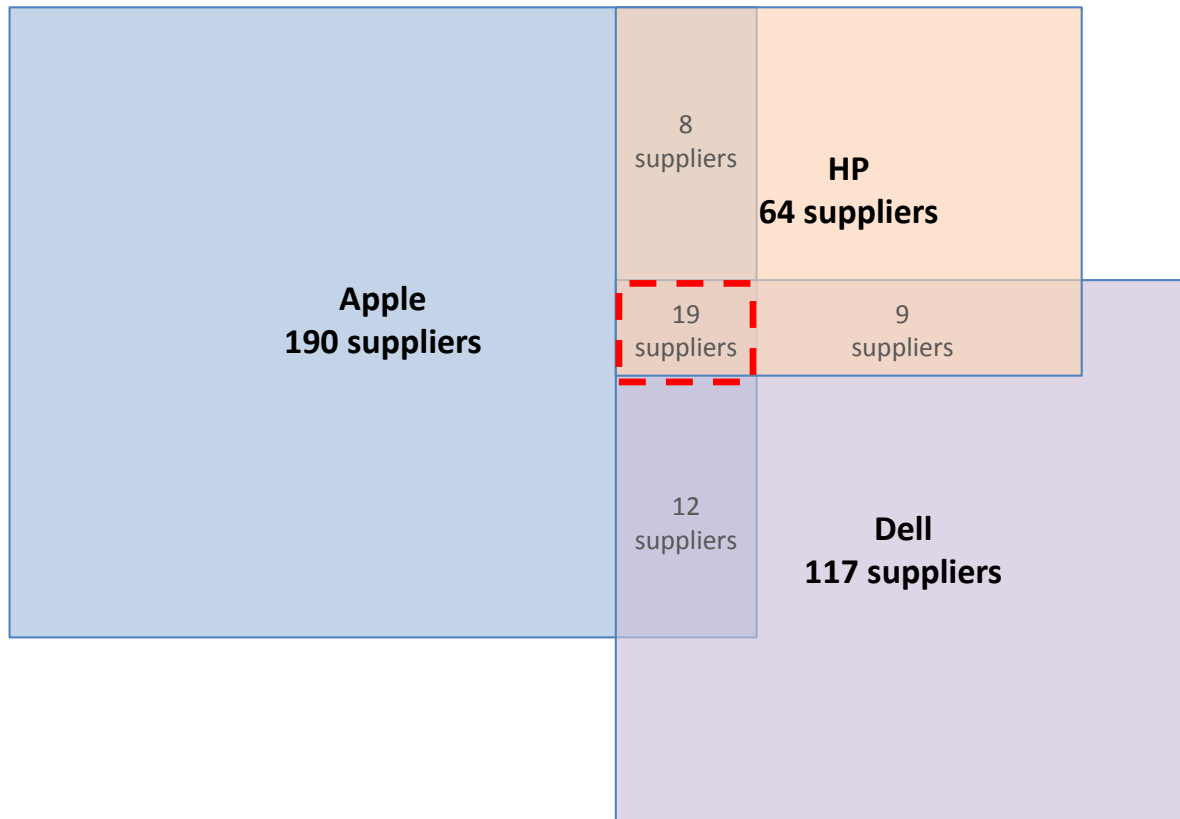
The Manufacturer shall demonstrate that its supplier facilities or enterprises have each individually achieved any one or a combination of the following:

Part A. Third party certification to ISO 50001 or a nationally adopted version of ISO 50001

Part B. Improved energy performance by at least 5% in the most recent 3 years (calendar or fiscal) or that it has improved energy performance by at least 1.67% in the most recent year. The energy performance improvement shall be verified through a third party, accredited, verification body or qualified auditor. The energy performance shall be normalized using key relevant variables within the scope of the program (e.g., production volume, building occupancy, and weather)

Part C. Third party certification to an energy performance program e.g. US DOE Superior Energy Performance (SEP) program at the Silver achievement level or greater, Korea SEP program, or a nationally adopted version that meets the requirements of the SEP program

Venn Diagram of Crossover of Apple, Dell and HP suppliers



Breakdown of suppliers

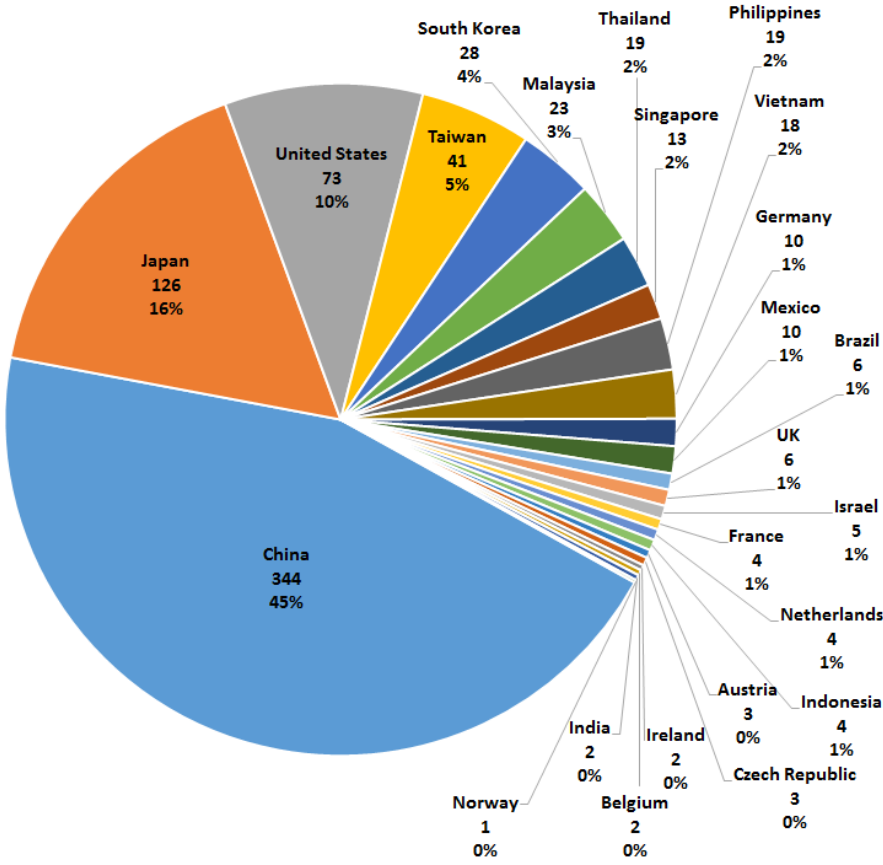
- 84% unique
- 10% shared by two of the three Manufacturers
- 6% shared by all three Manufacturers

Supply Chain: Apple

Number of Facilities per Country
766 Facilities

Top countries in Apple's supply chain:

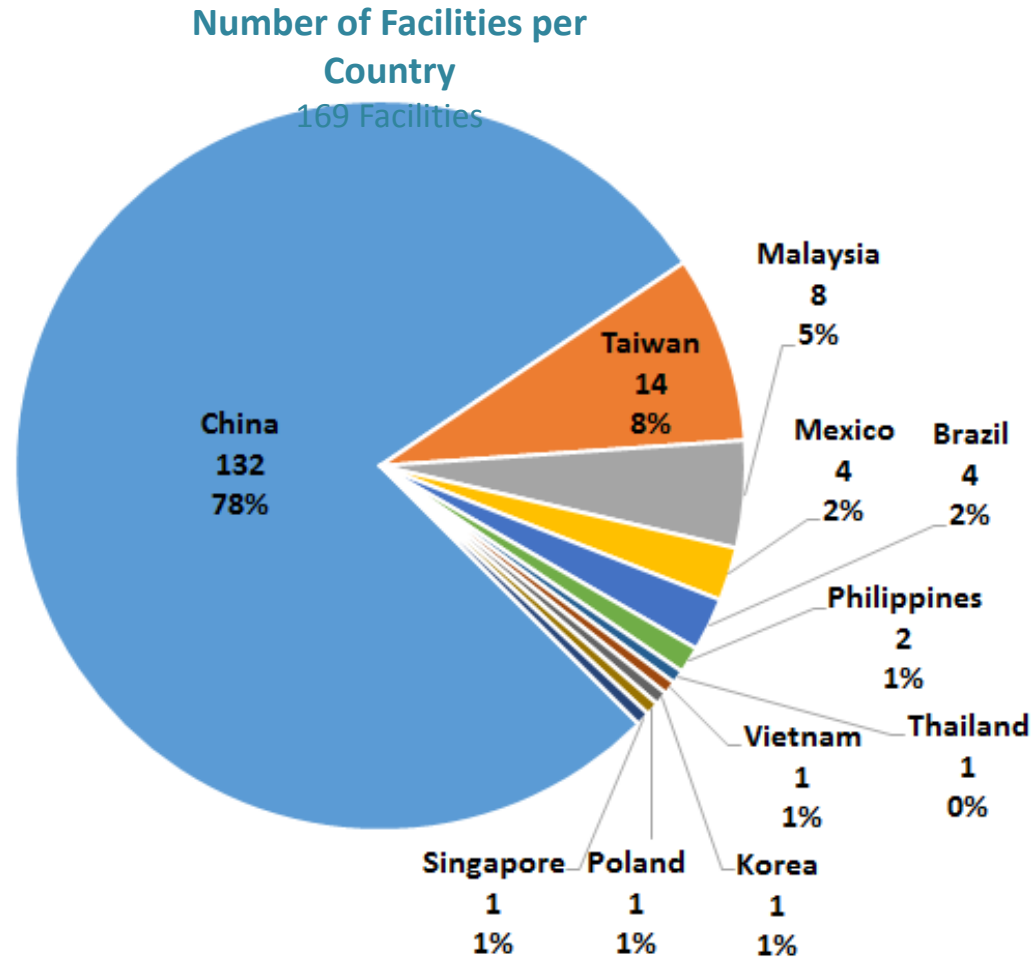
- 1. China: 45%
- 2. Japan: 16%
- 3. USA: 10%
- 4. Taiwan: 5%



Supply Chain: Dell

Top countries in Dell's supply chain:

1. China: 78%
2. Taiwan: 8%
3. Malaysia: 5%



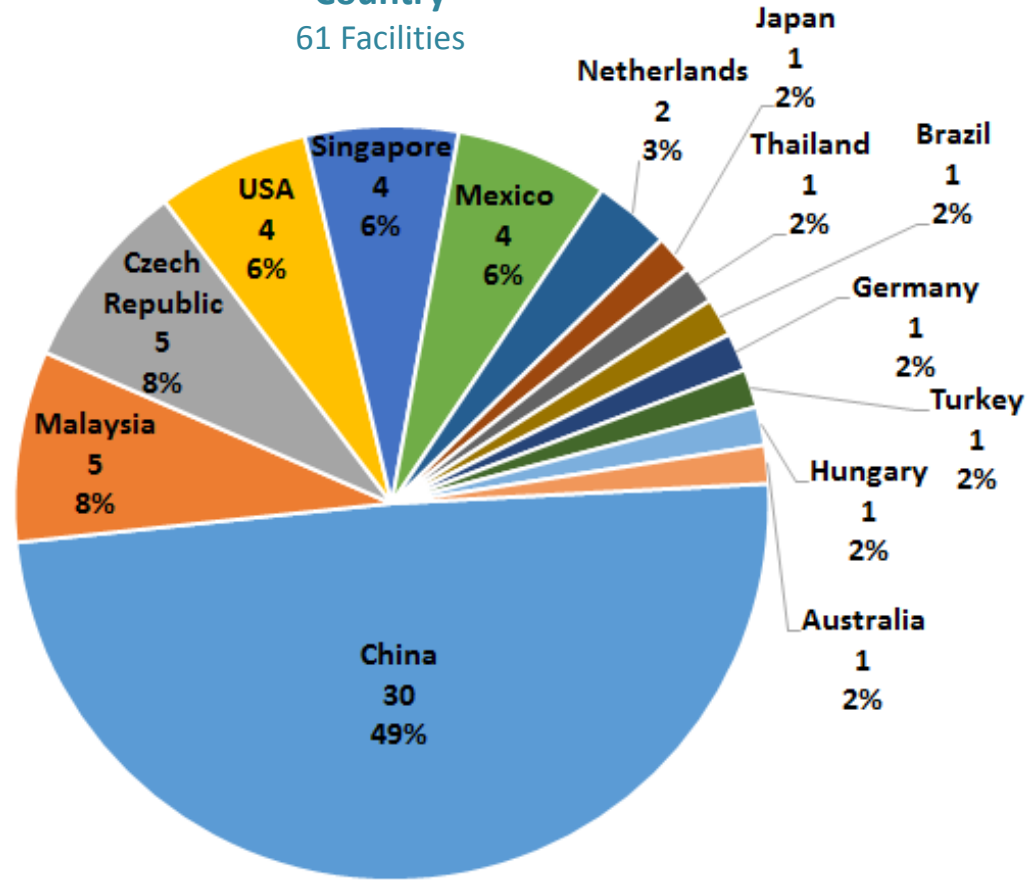
Supply Chain: HP

Top countries in HP's supply chain:

1. China: 49%
2. Malaysia: 8%
3. Czech Republic: 8%
4. USA: 6%
5. Singapore: 6%
6. Mexico: 6%

*The population of facilities does not include HP's commodity and component suppliers (38 companies). The country of origin is not provided for this subset of HP's suppliers.

Number of Final Assembly* Facilities per Country
61 Facilities



Supply Chain: Apple, Dell and HP Consolidated

