



**Asia-Pacific
Economic Cooperation**

Advancing Free Trade
for Asia-Pacific **Prosperity**

Enhancing Regional Conformity Assessment to Ensure Successful ISO 50001 Standard Outcomes

APEC Energy Working Group

August 2018

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ISO 50001 Standard Outcomes**

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ISO 50001 Standard Outcomes
(EWG 04 2015A)**

ENERGY WORKING GROUP

FINAL REPORT

August 2018

This project, led by the United States Department of Energy, in collaboration with the Energy Management Working Group (EMWG) and United Nations Industrial Development Organization (UNIDO), focused on building capacity in APEC economies to promote the value of ISO 50001 and the supportive policies and infrastructure to ensure successful implementation. The ISO 50001 international energy management system (EnMS) standard offers a key energy efficiency strategy to increase the competitiveness of APEC economies, meet APEC energy intensity reduction goals, and reduce greenhouse gas (GHG) emissions in key economic sectors, including the manufacturing sector. This project facilitated technical exchange and training through three workshops and a webinar that enabled APEC economies to improve the infrastructures that support successful ISO 50001 implementation, such as efforts to train and qualify ISO 50001 personnel. The project also compiled regional feedback from APEC economies on ISO 50001 implementation experiences to inform the ISO Technical Committee (TC) 301 as it revises the ISO50001 and related standards.

Project Overview

The project completed three workshops and a webinar. The first policy-oriented workshop was held in Jakarta, Indonesia on 23-25 January 2018 to explore the role of ISO 50001 in domestic energy efficiency policies and to introduce concepts of energy performance. The second was a technical training held in Atlanta, Georgia, USA on 13-16 February 2018, which prepared practitioners with greater understanding of the tools and techniques to verify energy performance improvements from ISO 50001. The third was a technical and policy workshop held in Lima, Peru on 24-25 April 2018, which combined concepts from the first two workshops with an emphasis on technical skills and quality infrastructure needed to guarantee technically robust implementation and conformity assessment. On 9 May 2018, a webinar was held with the Energy Management Working Group (EMWG) governments and APEC members to share ISO 50001 implementation experiences. Finally, the results of the technical exchanges and feedback from each workshop and webinar on ISO 50001 implementation experiences were compiled into regional input presented to the International Organization for Standardization (ISO) Technical Committee 301 on energy management and energy savings. This ISO committee is revising ISO 50001 in 2018 and is responsible for maintaining the family of supporting standards. The goal of the input was to reflect regional perspectives and challenges to be taken into account as the standards are revised.

Outcomes

All economies share a need for building capacity of both ISO 50001 implementation professionals and auditors. Economies have varying levels of infrastructure to support both end user ISO 50001 certification and personnel credentialing programs. These workshops made progress on both fronts. Policymakers and practitioners gained a greater understanding of energy performance improvement as it relates to ISO 50001, and the value of leveraging ISO 50001's data-driven approach to demonstrate progress toward domestic energy goals. Policymakers also gained a greater understanding of the infrastructure needed to support deployment of professional credentialing programs. Participants broadened their knowledge of the specific skillsets and experience that ISO 50001 professionals should possess in order to implement or audit ISO 50001 effectively. They also discussed the value of developing the supportive infrastructure needed to deploy these types of training and professional credentialing programs.

Technical professionals also received specialized training on methods to measure and verify ISO 50001. This training deepened their understanding of energy performance as it relates to ISO 50001, along with the techniques and tools for measuring and verifying energy performance improvements. Concepts from ISO 50001 personnel credentialing programs were introduced, including the Certified Practitioner in EnMS (CP EnMS) and Energy Professionals International (EPI) ISO 50001 Lead Auditor. The training provided a foundation for these individuals to pursue steps to achieve credentialing as an ISO 50001 implementation specialist or as an auditor.

Accreditation refers to the international recognition that conformity assessment bodies (also called "certification bodies" or "normalization bodies" depending on location) seek to demonstrate that they conduct audits in accordance with international auditing standards. The complexity of the accreditation process is a barrier for many individual economies, as economies have varying levels of infrastructure in place. Individually, economies may lack the number of persons to support training on accreditation procedures, but they could combine across the region to receive joint trainings. This type of regional approach could be one very useful next step for APEC.

Regional Input to the ISO Technical Committee (TC) 301

During the workshops and webinar, participants discussed domestic experiences, challenges, capacity needs, and best practices on ISO 50001 and related energy management standards implementation, as well as how the advanced auditing techniques could be used in their current domestic ISO programs, and their transition to the updated 2018 version of ISO 50001. The feedback from the workshops and webinar were compiled to formulate regional input to the March 2018 Working Group 1 meeting of ISO/TC 301 (the ISO committee charged with energy management and energy savings), which is focused on the 2018 revision of the standard. ISO/TC 301 also maintains the ISO 50001 family of supporting standards and guidance documents, so the input will also be provided during the next revisions of ISO 50004 (on implementation) and ISO 50003 (on auditing). General feedback about the supporting standards and implementation experiences will continue to be shared with ISO TC 301 and its working groups. The regional input is included in the appendix and a summary can be found in the box below.

Regional Input for ISO TC 301 on Energy Management and Energy Savings

(See Appendix for greater detail)

Factors promoting successful ISO 50001 implementation

- Mandatory or voluntary programs are both effective
- Technical assistance and programs:
 - Learning networks
 - Multilateral collaboration among governments to deliver training
 - Training and qualification of ISO 50001 consultants and auditors
 - Capacity building and piloting through international programs, such as UNIDO Industrial Energy Efficiency Programme
- Tax/financial incentives: strong drivers
- Recognition of achievements

ISO 50001 End User Implementation Challenges

- High cost, specifically staff time
- Energy not a priority at some companies
- Uncertainty on measuring and monitoring energy performance at company level
- Lack of resources for implementation
- Lack of institutional ISO 50001 expertise; external assistance may be needed
- Lack of awareness at top management level
- Lack of understanding of non-energy benefits from ISO 50001

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Additional Feedback on the ISO 50001 and Family of Standards

- Energy review – administrative aspects not necessarily reflected
- User map of the ISO 50001 family of standards would improve navigability and clarify when to use which standard
- Common vocabulary and understanding on EnMS is needed (flow chart or diagram)
- Guidance needed on social aspects: engaging top management, establishing working groups, communicating with employees, etc.
- Section 6.2 on risk management needs clarification
- Energy Performance Diagram from Annex A – missing, but discussion is needed on defining energy performance. Insert as diagram into ISO 50004

ISO 50006

- Helpful for establishing baselines and EnPIs
- Fills gap on measuring energy performance in the EnMS
- Enables data-based decision making at organizations
- May be too advanced for companies new to ISO 50001
- Useful for connecting energy performance to sustainability claims

Regional Input for ISO TC 301 (Cont.)

ISO 50004

- Some economies provide additional guidelines for specific sectors
- Accepted calculations needed to connect ISO 50001 energy performance to CO₂ and GHG reductions.
 - Companies want to claim credits based on contributions to CO₂ reductions.
 - Energy ministries need mechanism to link energy savings to Nationally Determined Contributions (NDC) in climate agreements.
 - GHG policymakers need assurance that energy savings under ISO 50001 properly contributes toward GHG reduction goals
- Suggestions:
 - Develop Technical Specifications to link energy-related calculations to ISO 14060 series.
 - Form joint working group between TC 301 WG1 and the ISO TC 207/SC7 Committee for greenhouse gas management and related activities.

Next Steps

Participants showed interest in building capacity through the CP EnMS and EPI ISO 50001 Lead Auditor personnel certification programs. Participants were also highly interested in using the software tools demonstrated at the workshops. These high interest levels suggest that additional technical trainings for practitioners would be valuable follow-on activities.

Economies varied in their application of ISO 50001 in domestic programs and policies, though all participants gained a greater understanding of different policy mechanisms. Economies without specific ISO 50001 programs indicated an interest in considering a regulatory approach to ISO 50001 as potential next steps, though certification would not be initially required due to the high cost. Participants expressed a greater desire to continue interacting with other APEC economies to facilitate information sharing on each other's programs.

This APEC project was developed in collaboration with the Clean Energy Ministerial (CEM) Energy Management Working Group (EMWG). The EMWG is well-positioned to consider follow-on activities given its ongoing international dialogue among governments on ISO 50001. Future activities are subject to resource availability and the EMWG's formal activity review and selection process. U.S. DOE's role as an active EMWG government and UNIDO's new role as EMWG Operating Agent could offer continuity and promote further knowledge sharing. In addition, UNIDO has ongoing engagements with Peru, Indonesia, and other APEC economies through its Industrial Energy Efficiency (IEE) Programme. We can encourage them could reinforce workshop concepts into ongoing projects.

Continuing information sharing, including implementation experiences, from APEC economies with the ISO Technical Committee 301 would help address some regional capacity needs. Several EMWG and UNIDO representatives are actively involved in ISO TC 301 and its working groups and can follow up on participants' recommendations. We recommend an ongoing relationship between APEC, EMWG and UNIDO to further enhance the effective implementation of ISO50001 and related standards around the APEC region.

Appendix. Regional Input for ISO TC 301 on Energy Management and Energy Savings

APEC Economies' Feedback on ISO 50001 Implementation Experiences Input for the International Organization for Standardization (ISO) Technical Committee 301 on Energy Management and Energy Savings

The Asia-Pacific Economic Cooperation (APEC) project, Enhancing Regional Conformity Assessment to Ensure Successful ISO 50001 Standard Outcomes (EWG 04 2015A), is conducting workshops that enable APEC economies to improve the infrastructures that support successful ISO 50001 implementation, such as efforts to train and qualify ISO 50001 personnel. The project is also compiling feedback on ISO 50001 implementation experiences for the ISO Technical Committee (TC) 301, which is revising the standard. ISO TC 301 also maintains the ISO 50001 family of supporting standards and guidance documents.

The United States is leading this project and sharing feedback on ISO 50001 implementation experiences heard during the project's first two workshops. This input does not reflect any official APEC-wide position on ISO 50001. The first workshop was held in Jakarta, Indonesia in January 2018, and the second workshop was conducted in Atlanta, Georgia, USA in February 2018. A third workshop is planned in Lima, Peru on 24-25 April 2018. Feedback relevant to the draft revision of the ISO 50001 standard will be shared at the ISO TC 301 Working Group 1 meeting in Berlin, Germany on 11 March 2018. General feedback about the supporting standards and implementation experiences will continue to be shared with ISO TC 301 and its working groups beyond the Berlin event.

Feedback on the ISO 50001 standard

- Economies that implement ISO 50001 in their domestic programs are finding value through mandatory and voluntary approaches.
 - Successful programs based on mandatory involvement, information and experience sharing and the potential provision of incentives to encourage involvement (if not mandatory) and to assist with implementation.
 - Unsuccessful approaches involved company reporting and mandatory compliance without clear knowledge about what the potential benefit would be. Also some difficulties with programs involving energy service companies (ESCOs).
- Technical assistance and programs support successful ISO 50001 implementation
 - Deployment of learning networks in economies, such as Mexico, in cooperation with other governments implemented ISO 50001 in small and medium enterprises.
 - The governments of Mexico, Canada, and the United States collaborate on ISO 50001 training and implementation in companies, and on training ISO 50001 implementers and auditors to help companies.

- Indonesia, Malaysia, and other economies cited participation in the UNIDO Industrial Energy Efficiency Programme in strengthening capacity building and piloting ISO 50001 in companies.
- Tax/financial incentives provide strong motivation for ISO 50001, but recognition also motivates organizations when financial incentives are not available.
- Implementation challenges
 - The high cost of ISO 50001, specifically the staff time required, is a barrier to implementation
 - Many companies prioritize production over energy efficiency and performance
 - Uncertainty at a company level about why there is a need to measure and monitor energy performance.
 - One remedy to these issues at a company level is to make the concepts related to energy efficiency part of the day-to-day work within the company.
 - Challenges for small and medium enterprises:
 - Energy is not always a high priority
 - Lack of resources for implementation. They often lack good metering and monitoring equipment, which makes implementation difficult. Government support with investing in more metering and monitoring can be of assistance.
 - Organizations lack institutional capability to implement ISO 50001. Specialized knowledge and skills are needed for ISO 50001, but external assistance is needed because this expertise is not always in house.
 - Improving top management awareness of energy management is a major barrier that prevents greater uptake
 - Understanding the non-energy benefits resulting from efficiency can increase its profile within companies

Users of the standard also shared suggestions for improving ISO 50001 and family of standards:

- The concept of an energy review is larger than what most anticipate / expect. There's an administrative element that is not necessarily reflected in the standard
- A user map of the ISO 50001 family of standards would help users understand the purpose of each standard, how the standards are related, and when to use each one. Some participants find it difficult to navigate the group of standards.
- A common vocabulary and understanding is needed on the mechanics of an energy management system (EnMS) and how an EnMS works. For example, the European understanding of an EnMS differs from the North American and other regional understandings of EnMS. A flow chart or diagram would help define a clear vocabulary around EnMS.
- Guidance on the social aspects of ISO 50001 would help organizations engage top management, engage other staff across their organization, establish working groups, communicate with workers, and harness expertise throughout the company. The standard

primarily focuses on the technical aspects of processes and systems, but provides little guidance on the social aspects.

- Specific feedback on the draft revision of the standard:
 - Section 6.2 on risk management.
 - Clarification is needed on how risk and opportunities are addressed as an input and the status of action plans.
 - One suggestion was to add examples on risk to ISO 50004.
 - Diagram on Energy Performance – The diagram from the 2011 version (Annex A) was removed from 2018 version, but discussion is still needed on how to define energy performance. One suggestion is to insert the diagram into ISO 50004.

Feedback on **ISO 50006:2014**--*Energy management systems -- Measuring energy performance using energy baselines (EnB) and energy performance indicators (EnPI)*

- “Very new” but helpful with establishing baselines and EnPIs, and understanding the scope of the baseline and scope of the EnPIs which may be different than the scope of the EnMS.
- Fills the gap on measurement of energy performance in the EnMS.
- Helps organizations connect to the business purpose and demonstration of the performance and use in data-based decision making
- Companies new to ISO 50001 may find ISO 50006 more advanced, but the standard will be useful as the organization’s EnMS matures.
- Useful for connecting energy performance to sustainability claims. Use of the ISO 50001 standard alone does not verify the calculated energy performance improvement
- Most economies are using ISO 50006, or domestic standards in alignment with ISO 50006 to define domestic energy performance methodologies. However, Malaysia has its own energy performance methodology.

Feedback on **ISO 50004:2014**--*Energy management systems -- Guidance for the implementation, maintenance and improvement of an energy management system*

- Some economies provide additional guidelines for specific sectors.
- Governments and companies want a stronger link from ISO 50001 energy performance improvements to CO₂ and GHG reductions.
 - Companies want to claim credits based on contributions to CO₂ reductions.
 - Energy ministries and policymakers also need a way to link energy savings to Nationally Determined Contributions (NDC) to climate agreements. Energy ministries in many economies cooperate with other ministries (e.g., environment, mining, and

others) on NDCs. GHG policymakers need assurance that the energy savings under ISO 50001 properly contributes toward GHG reduction goals.

- There is a desire to connect the energy savings calculations to CO₂ and to connect ISO 50001 energy savings as contributions to CO₂ agreements. Accepted calculations are needed. Suggestions:
 - Develop Technical Specifications (TS) or other guidance to link energy-related calculations to the ISO 14060 series on quantifying and reporting greenhouse gas emissions (e.g., ISO 14064, ISO 14065).
 - Form a joint working group between the ISO Technical Committee 301 (on energy management and energy savings) Working Group 1, and the ISO TC 207/SC7 Committee for Greenhouse gas management and related activities.