

APEC-ASEAN Harmonization of Energy Efficiency Standards for Air Conditioners: Phase 1

APEC Energy Working Group The 42nd meeting of EGEE&C

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Outline of presentation

1. Project background
2. Findings and Recommendations of TWG for ASEAN
 - I. Definition of residential air-conditioners in ASEAN.
 - II. Summary of gap analysis of testing standards for air-conditioners in ASEAN
 - III. Update of testing facilities in ASEAN
4. Recommendations for APEC-wide Harmonization
5. Conclusion

Background

- Program initiated in 2010 by ICA and UNEP under the steering of the ASEAN EE&C SSN:
 - Study on estimate of EE related to increase in MEPS for AC and refrigerators in ASEAN conducted
 - Critical needs identified: harmonization of standards for testing methods and MEPS
 - Strategic framework for harmonization of EE standards for household appliances developed and approved by EE&C SSN
 - ACs selected as priority
- “APEC-ASEAN Harmonization of Energy Efficiency Standards for Air Conditioners: Phase 1” is the first step in harmonization of EE standards for ACs
- APEC economies to draw lessons on harmonization in ASEAN

Project Overview

Phase 1
(2012-2013)

Harmonize standards for testing methods for air conditioners among ASEAN members and develop a roadmap for the harmonization at APEC level based on lessons learned.

Phase 2

Harmonize EE standards in ASEAN members through MEPS and HEPS policies

Phase 3

Build capacity of testing laboratories/increase consumer awareness.

- To create an enabling regulatory and policy environment for the market transformation in favour of higher energy efficiency air conditioners in APEC through the harmonization of standards for testing methods and energy efficiency for air conditioners.

Putting into perspective



The function of the Policy Working Group (PWG) is:

- To liaise with the Technical Working Group (TWG) to ensure necessary linkages between the testing methods and the desired level of energy performance
- To **work at policy level** for the development of roadmaps for MEPS and HEPS in ASEAN.

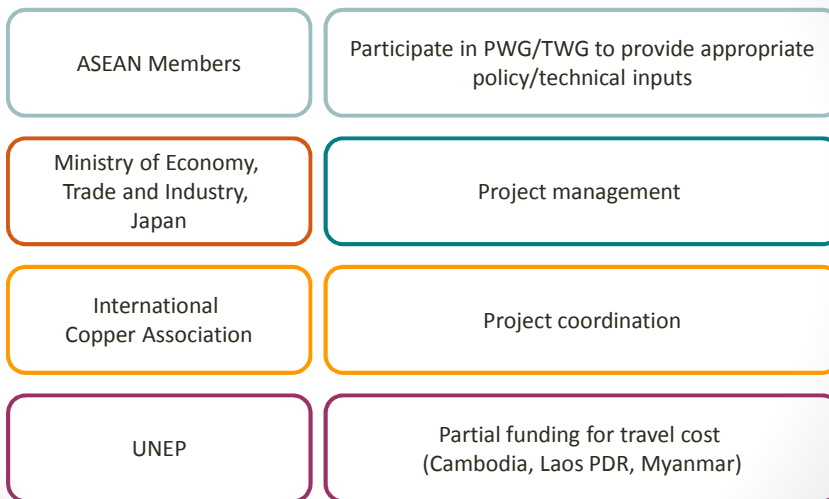
The function of the Technical Working Group (TWG) is:

- To make recommendations to the Policy Working Group (PWG) regarding a harmonized standard of testing methods for air-conditioners.
- In terms of deliverables, the TWG is tasked to:
 1. Agree on a **common definition of room air conditioners**
 2. **Develop a harmonized standard** of testing methods based on the existing sets of standards at ASEAN level.

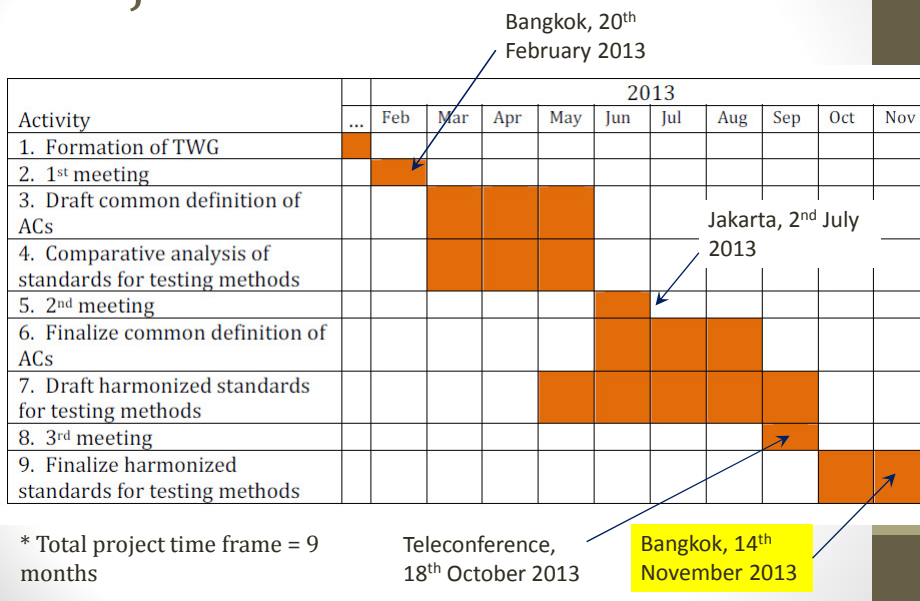
Deliverables

- Preparation of recommendations for an ASEAN harmonized standard for testing methods
- Preparation of recommendations on the way forward for an APEC-wide harmonization of standards for testing methods for air conditioners

Project Organization: Roles



Project timeline



Note

ICA managed to secure funding from the European Union (1.7 mil. EUR) to implement the complete program (upgrade and harmonization of MEPS, CB for testing labs and AC manufacturers, support to adoption of national policies to promote higher efficient ACs, consumer awareness)

➤ More experiences to share among APEC economies

Ministry of Economy, Trade and Industry, Japan is ready to continue offering technical support on the 2nd, and 3rd phases of the project with provision of necessary human resources.

Definition of RAC

Definition of room air-conditioners

- From the 1st kick-off meeting on February 2013 in Bangkok, the TWG was consulted on the scope of the definition of residential air-conditioners in ASEAN.
- The definition should benchmark that used in **ISO5151: 2010** standard.
- As a result, the proposed definition for ASEAN is given as follows:

Recommended definition

“A residential air-conditioner is defined as an encased assembly or assemblies, designed primarily to provide **non-ducted** free delivery of conditioned air to an enclosed space, room or zone.

It can be either **single-package (window or casement type)** or **single split-system** and comprises a primary source of refrigeration for **cooling and dehumidification**, that is delivered with **mechanical compression**, driven by **single-phase** electric power supply.

Such equipment can be provided in more than one assembly where the separated assemblies are intended to be used together.”

Summary of gap analysis of testing standards for air-conditioners in ASEAN

Methodology

- A comparison analysis of commonalities and differences was done between the benchmark ISO5151:2010 standard and the national test standards used in respective ASEAN countries.
- Of the 10 ASEAN countries, only 6 countries have responded to the study, i.e. **Malaysia, Singapore, Thailand, Indonesia, Viet Nam and Philippines.**

INTERNATIONAL
STANDARD

**ISO
5151**

Second edition
2010-06-15

**Non-ducted air conditioners and heat
pumps — Testing and rating for
performance**

*Climatiseurs et pompes à chaleur non raccordés — Essais et
détermination des caractéristiques de performance*

Methodology

- Comparison is done between each related clause in ISO 5151:2010 with the corresponding clauses in the national test standards used in each ASEAN country.
- Energy efficiency standards, e.g. MEPS, are not considered.
- Comparison is focused on cooling capacity testing, not covering performance testing, and heating tests.
- For this purpose, a questionnaire was sent out to the TWG members. Feedback from the members are then compiled and analyzed.

National test standards

- The following is a list of the national test standards used in the respondent countries:
 - a) Malaysia MS ISO 2010:2004
 - b) Singapore ISO 5151:1994
 - c) Thailand TIS 1155-2536, TIS 385-2524
 - d) Indonesia SNI 19-6713
 - e) Viet Nam TCVN 6576:1999
 - f) Philippines PNS 240:1998
- Malaysia, Singapore, Vietnam and Philippines are currently referencing the older version of ISO5151:1994.
- Brunei, Laos, Cambodia and Myanmar have not established any national test standards yet.

Findings

- The results of the analysis show that about **80%** of the relevant clauses in the standard are common among the respondent countries' national test standards.
- However, there are several differences among the standards which require closer scrutiny, i.e.:
 - a) Test condition T1 vs. T4
 - b) Test voltages specified in ISO5151:2010 standard (i.e. Table 2) vs. national power supply voltages
 - c) Duration of test data recording and interval of data recording
 - d) Allowable variation of entering indoor air temperature readings during steady-state cooling capacity tests
 - e) Location of test unit in the outdoor test room, and the percentage of piping length in the two room chambers
 - f) Acceptance of both calorimeter and indoor air-enthalpy test methods

Rationalization of gaps

- Through a series of discussions, the TWG has agreed, in the interest of harmonization, to change some of their existing test procedures and policies to close the gaps.

Differences	ISO5151:2010 clause	Recommendations of TWG
Gap #1 Test condition T1 vs. T4 which is used in Philippines	5.1.2.1	T1 test condition to be used for determination of cooling capacity rating.
Gap #2 Test voltage of 220V used in Thailand vs. 230V as indicated in Table 2 of ISO 5151:2010	Table 2	The test voltages for capacity testing stipulated in Table 2 of ISO 5151: 2010 to be followed. Thai Industrial Standard Institute (TISI) has agreed to amend TIS1155 standard to change the test voltage to 230V, though time is required for implementation (2-3 years).

Rationalization of gaps

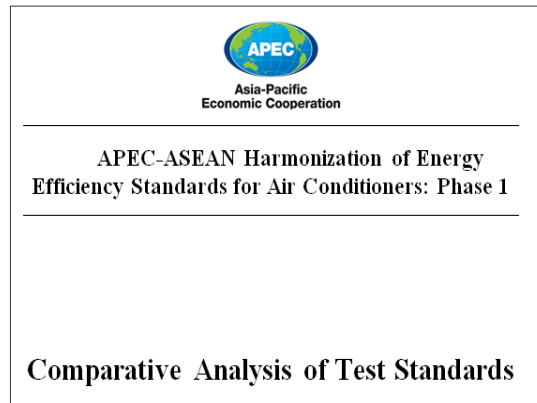
Differences	ISO5151:2010 clause	Recommendations of TWG
Gap #3 Differences in duration of test data recording and interval of data recording	5.1.4.3, 7.3.3, 7.3.5	The duration of test data recording and interval of data recording stipulated in ISO 5151: 2010 to be followed. Test data recording duration = 30 minutes (minimum), interval of data recording for air temperatures ≤ 1 min.; and others ≤ 5 min. Final reading averaged over the data recording duration.
Gap #4 Variation of entering indoor air temperature readings during steady-state cooling capacity tests	7.3.1, 7.3.2	The test tolerances of air entering temperatures stipulated in Table 11 in ISO 5151:2010 to be followed.

Rationalization of gaps

Differences	ISO5151:2010 clause	Recommendations of TWG
Gap #5 Location of test unit in outdoor room: - Distance of test unit from room wall surface - Percentage of pipe length in outdoor room	Annex A	The requirements of positioning the indoor and outdoor test units in the test chambers stipulated in Annex A of ISO 5151:2010 to be followed. Total pipe length = 7.5m with the percentage of total pipe length in the outdoor room set at 50%, which complies with the requirements in Annex A.
Gap #6 Acceptance of both calorimeter and indoor air-enthalpy test methods	7.1.1, 7.1.2, 7.1.3	With the exception of Thailand, ASEAN members accept the test results from both calorimeter and indoor air-enthalpy test methods. However, Thai Industrial Standard Institute (TISI) has agreed to amend TIS1155 standard to accept results from both methods, though time is required for implementation (2-3 years). In view of this, the TWG recommends that both methods to be accepted.

Gap analysis report

- All the findings of the gap analysis have been compiled into a technical report.



Implications

- With the closure of these gaps, and high level of compliance among the national test standards, the TWG/PWG is in agreement for ASEAN to adopt directly the international ISO 5151:2010 standard as the harmonized standard of testing method for air conditioners.
- The TWG/PWG is recommending that the evaluation method for seasonal and part-loading performances with the ISO 16358 standard to be considered in the following next stages of the harmonization exercise.
- It is also recommended that ASEAN national test laboratories should build balanced-type calorimeter rooms for the purpose of conducting cooling capacity rating tests on air-conditioners. However, barriers of insufficient funding and lack of technical expertise to build new facilities must be addressed in the next phases of this harmonization project.

Experiences from ASEAN

1. Scope of work

The harmonization exercise should start **by restricting the scope** of study to household residential air-conditioners, for both cooling & heating modes. This will allow the working group to focus on harmonizing one set of testing standards among the economies for a start.

2. Level of receptivity

The harmonization exercise should focus on **key economies** which have medium and high levels of energy efficiency receptivity to drive the programme, who would then **be role models for the less developed economies.**

Experiences from ASEAN

3. Agreement with ISO 5151

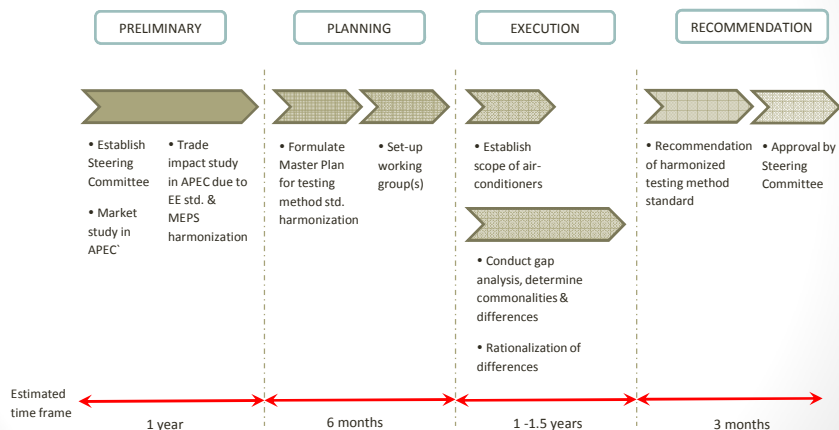
The successful harmonization of testing method in ASEAN is partly due to **the referencing of existing national test standards** to the ISO 5151:1994. Nevertheless, compromises are still needed to make changes to existing practises in the interest of harmonization.

4. Test facilities

There is a shortage of testing facilities in the ASEAN region. It is **necessary to understand the capacity building plans** of member economies and examine the difficulties and barriers to increase the testing capacity. Support should be given to less developed economies, in terms of technical expertise or providing advice in securing funding from relevant authorities.

Other possible mechanism is the establishment of Mutual Recognition Agreement (MRA) for accepting test reports from other member economies.

Proposal: APEC-wide roadmap for harmonization



Conclusion

- Phase 1 of the “APEC-ASEAN Harmonization of Energy Efficiency Standards for Air Conditioners” project has been completed with the recommendation of definition for RACs and adoption of ISO 5151:2010 as the harmonized test standard.
- The experiences gleaned from this ASEAN-wide exercise will serve as guidelines for a similar APEC-wide harmonization effort.
- A roadmap for an APEC-wide harmonization has been proposed for consideration by the EGEE&C.

Thank you for your attention