



**Asia-Pacific
Economic Cooperation**

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

Current Energy Efficiency Requirements for Electric Motors in the APEC and ASEAN Regions

APEC Energy Working Group

December 2019

APEC Project: EWG 04 2019S

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APEC#219-RE-04.6

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I. BACKGROUND

Electric motor systems consume about 70% of industrial electricity and 40% of total electricity worldwide. Furthermore, electric motor-driven systems account for almost half of global electricity consumption costing more than \$565 billion (USD) per year. A modest efficiency gain of 1.5% would significantly contribute to meeting APEC's energy intensity reduction goal of 45% by 2035. Currently, the Super-Efficient Equipment and Appliance Deployment (SEAD) standards and labels (S&L) database contains 44 different standards and labeling efforts for motors in the APEC region alone. The fragmentation of requirements around the globe places a large burden on the motor industry, as diverging specifications have emerged in multiple markets, threatening to create non-tariff barriers and undermine deployment through the rest of the region. In light of this trend, economies benefit by striving to align requirements globally and implement programs that promote innovation and ensure access to these technologies, which, in turn, can bring energy savings across sectors.

Over the past several years, APEC leaders have repeatedly acknowledged the importance of working to achieve trade facilitation to advance sustainable economic growth. The project on *Aligning Conformity Assessment Efforts for Energy Efficiency Regulations of Motors in the APEC and ASEAN Regions (EWG 05 2018A)* has been developed as a direct response to this growing concern. In order to reinforce the bases for the project implementation, a preparatory self-funded workshop was organized on 19 March 2019 at the Regal Kowloon Hotel in Hongkong China, in parallel to the APEC Expert Group on Energy Efficiency and Conservation (EGEEC) meetings.



The workshop organized in Hong Kong China brought together policy makers, industry representatives, and key experts on higher efficiency motors.

The preparatory workshop was organized under the coordination of Pacific Northwest National Laboratory, USA (EWG 05 2018A project overseer) and with the support of UL LLC (UL), wholly owned by Underwriters Laboratories Inc., and International Copper Association (ICA), the project implementers. The workshop was further supported by United for Efficiency (U4E), a global public-private partnership under Sustainable Energy for All (SEforAll) dedicated to energy efficiency market transformation.

II. OBJECTIVES

The project aimed to identify existing energy efficiency standards and labeling requirements for high efficiency motors in the APEC + ASEAN region and opportunities for new efforts in economies without programs. By allowing an early consultation with motor stakeholders, the project aimed to provide a better preparation, and enhance the potential impact of the APEC EWG 05 2018A project. The key objective of the project was therefore, through the organization of a preparatory workshop, to disseminate commonalities and gaps in motor energy efficiency standards and labelling efforts in APEC and ASEAN.

III. WORKSHOP PARTICIPANTS

Private sector participation almost doubled Economy representatives at the workshop. Industry Associations such as International Copper Alliance (ICA), the North American Electrical Manufacturers Association (NEMA) joined individual business representatives from UL (testing laboratory), Regal Beloit (motor manufacturer), the Hong Kong and China Gas Company Limited (utility), CLP Power Hong Kong Limited (utility), the Hong Kong Electric Company (utility), and the International Energy Efficiency and Conservation (consulting firm) at the workshop.

The APEC contingent was led by the Chair of the Experts Group on Energy Efficiency and Conservation (People's Republic of China), Chinese Taipei, Hong Kong China, Thailand, the USA, and the Asia Pacific Research Centre (APEREC).

IV. WORKSHOP SUMMARY

The one-day workshop took place on 19 March 2019 in Hong Kong, China, in conjunction with the Joint Meeting of the Expert Group on New and Renewable Energy Technologies (EGNRET) and Expert Group on Energy Efficiency and Conservation (EGEE&C).

In addition to meeting the stated workshop objective of helping policy makers better understand the benefits of standards and labeling requirements, the workshop explored their critical role in contributing to market transformation, and international best practices. While not a stated objective of the Workshop, what became abundantly clear throughout the day was the value of bringing together private sector organizations with APEC Economy Representatives to share perspectives, offer new ideas, and engage in discussions that will lead to more collaboration and ultimately, more effective energy efficiency policies.

The workshop was called to order by the APEC EGEE&C Chair, Mr Li Pengcheng closely followed by opening remarks from Mr VY Ek-Chin, from the Electrical and Mechanical Services Department, Hong Kong China who offered remarks on the important role that high efficiency motors must play in meeting the APEC energy efficiency goals. The Project Overseer, Mr Cary Bloyd (USA) introduced both the goals of the self-funded Workshop as well as how this workshop was designed to support the objectives of the broader APEC-funded project on Aligning Conformity Assessment Efforts for Energy Efficiency Regulations of Motors in the APEC and ASEAN Regions.

Mr Mayur Karmakar (ICA) presented an overview of the United For Energy (U4E) Program's work on promoting policies to encourage the adoption of more energy efficient motors by looking at the current efficiency levels of installed motors and how efficiency have improved in motor designs from 1960 through 2013 by 68%.

Mr Nick Lee (UL) followed by presenting the results of UL's examination of the current energy efficiency standards and labeling requirements that are in existence in the APEC and ASEAN regions (see Table 1 for details). The results of the investigation show that there are many

differences in how the APEC and ASEAN economies address the energy efficiency of electric motors. UL found that there are mandatory requirements for motor efficiency in 11 economies (Australia, Canada, Chile, People’s Republic of China, Republic of Korea, Mexico, New Zealand, Peru, Chinese Taipei, the United States, and Viet Nam) with four economies (Indonesia, Japan, Malaysia, and Thailand) having either voluntary requirements or are in the process of finalizing requirements. Across the economies, different policies exist concerning the scope (classes of motors covered), test standards referenced, and conformity assessment procedures for energy efficient motors. Some economies have developed their own test standards and efficiency classes (e.g. U.S., Canada and China) while others have adopted IEC test standards as part of their regulation, but created their own rules for registration or labeling (e.g. Australia – GEMS 2018, Korea and Viet Nam). These differences complicate conformity assessment procedures around the APEC and ASEAN regions and represent significant barriers to market access for manufacturers of energy efficient motors.

Table 1
Standards and Labeling of APEC and ASEAN Regions

	Regulation	Test Standard	MEPS	Labeling
Australia	GEMS 2012 GEMS 2018	AS/NZS 1359.5 IEC 60034-2-1	MEPS (similar to IE2) GEMS level (IE2)	Marking
Canada	Energy Efficiency Regulations with Amendments	CSA C390 CSA C747	Energy-efficient Premium efficiency (similar to IE2/IE3)	Energy Verification Mark
Chile	NCh 3086	IEC 60034-2-1	MEPS	Energy Label
People’s Republic of China	CEL 007 GB 18613	GB/T 1032	Grade 2 (similar to IE3)	Energy Label
Indonesia	None	SNI IEC 60034-2-2	None	Under development
Japan	Top Runner - Motor	JIS C 4034-2-1	Voluntary (similar to IE3)	None
Republic of Korea	Energy Use Rationalization Act - Motor	KS C IEC 60034-2-1	MEPS (similar to IE3)	Energy Label
Malaysia	None	IEC 60034-2	Voluntary	None
Mexico	NOM-016-ENER- 2016 NOM-014-ENER- 2004	NOM-016-ENER- 2016 NOM-014-ENER- 2004	Premium efficiency (similar to IE3)	Marking
New Zealand	Energy Efficiency Regulations 2002 - Motor	AS/NZS 1359.5	MEPS (similar to IE2)	Marking
Peru	NTP 399.450	NTP IEC 60034-2-1	MEPS	Under development
Chinese Taipei	Energy Management Act - Motor	CNS 14400	IE3 (same as Premium)	Marking
Thailand	TIS 867-2550	TIS 867-2550	Voluntary	Under development
United States	10 CFR Part 431 Subpart B & X	IEEE 112 IEEE 114	Energy-efficient Premium efficiency (similar to IE2/IE3)	CC number
Viet Nam	TCVN 7540-1 TCVN 7540-2	TCVN 6627-2-1	MEPS	Energy Label

The morning session concluded with a presentation on the perspective of the US electric motor industry on standards and labeling efforts citing the importance of compliance and enforcement of such efforts if calculated energy savings are to become realized energy savings.

Following lunch, Dan Delainey (Regal Beloit) gave an overview of the Global Motor Energy Efficiency (GMEE) program that's run by the IEC and IECEE that could be leveraged by economies throughout the region as an example of a harmonized approach to motor standards. The ultimate aim of the program is to have manufacturers test their products to one standard and have that test report recognized throughout the globe to gain market access.

Mr Larence Loh (Hong Kong China) and Mr Watcharin Boonyarit (Thailand) delivered in-depth case studies on their economy's efforts to improve motor efficiency. Finally, Pierre Cazelles (ICA) offered some final observations and gathered individual participant takeaways before closing the workshop.

Each presentation can be found [here](#).

V. CONCLUSION

The self-funded workshop was conducted to disseminate the findings of UL's evaluation of the current requirements for energy efficient motors in the APEC and ASEAN regions, identify known gaps in information, and gather feedback from economy and industry stakeholders. The results of this workshop will be used to complete the APEC-funded project "Aligning Conformity Assessment Efforts for Energy Efficiency Regulations of Motors in the APEC and ASEAN Regions" (EWG 05 2018A) by December 2019.

VI. APPENDIX I: WORKSHOP AGENDA

APEC Workshop on Aligning Conformity Assessment Efforts for Energy Efficiency Regulations of Motors in the APEC and ASEAN Regions

19 March 2019

Regal Kowloon Hotel, Hong Kong, China

Agenda			
8:30 AM - 9:00 AM	Arrival & Registration		
9:00 AM - 9:15 AM	Opening Remarks		Mr VY Ek Chin, Assistant Director for Electricity and Energy Efficiency, Hong Kong, China
9:15 AM - 9:25 AM	Welcome		Li Pengcheng, APEC EGEE&C Chair
9:25 AM - 9:35 AM	Introduction to the Workshop Objectives and Agenda		Cary Bloyd, PNNL
9:35 AM - 9:45 AM	Participant Introductions		All
9:45 AM - 10:25 AM	Overview of U4E – Motor Replacement Program		Mayur Karmakar (ICA – U4E)
10:25 AM - 10:45 AM	Coffee Break		
10:45 AM - 11:15 AM	Overview of Existing Motor Efficiency Standards & Labeling Efforts		Nick Lee, Principal Engineer, UL
11:15 AM - 12:30 PM	Industry Perspectives: Why is harmonizing standards and Conformity Assessment important		Industry Panel: Kirk Anderson, NEMA
12:30 PM - 1:30 PM	Lunch		
1:30 PM - 2:30 PM	Industry Perspectives: Why is harmonizing standards and Conformity Assessment important - Continued		Dan Delaney, Regal Beloit
2:30 PM - 3:30 PM	Economy Case Studies: Economy Representatives will share details of their Standards & Labeling Programs		Mr Lawrence LOH, Hong Kong China
3:30 PM - 3:45 PM	Coffee Break		
3:45 PM - 4:45 PM	Economy Case Studies: Economy Representatives will share details of their Standards & Labeling Programs		Mr Watcharin Boonyarit, Thailand
4:45 PM - 5:00 PM	Summary Observations & Takeaways		Pierre Cazelles, ICA