



Refrigerators/Freezers Design and Implementation under Energy Efficiency Regulation (EWG 07 2017A)

EWG 07 2017A project updates

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Outline

- Project information
- Objectives of the project
- Work plan and timeline
- The energy saving technology seminar and the 1st technical expert group meeting
- Future work



Project Information

- Proposing economy: Chinese Taipei
 - Co-sponsors: China, Korea
 - Project overseer: Mr. Shiao-Jiun Bor, senior specialist at BOE
 - Project time period: July 1st, 2017 to Dec. 31st, 2018
 - Budget: APEC funding \$80,000 + Self-funding \$40,000
- ❑ This project aims to **widespread high efficient refrigerator technologies and energy efficiency (EE) management experience.**
 - ❑ This project works on **experience review and information exchange for EE management to accelerate the development, promotion, and application of energy saving technologies for refrigerators.**

Objectives of the project

1

Evaluate energy efficiency management system and policies for refrigerators, provide policy suggestions for the APEC economies

2

Evaluate and identify feasible refrigerator energy saving technologies under EE regulation

3

Study practical method of the selected case to improve market share of high efficient refrigerators

4

Establish a refrigerator energy-saving knowledge-sharing platform and integrate EGEE&C network to share knowledge of refrigerator energy saving design

5

Spread project experience, share the best practice and collect comments from the APEC economies



Preparation work

Time	Work plan	Outputs
July- Oct. 2017	<ul style="list-style-type: none"> Set up a work plan Design questionnaire and distribute the questionnaire to the APEC economies in mid-October Survey for publications about energy saving technologies in refrigerator EE improvement On behalf of the BOE, prepare to hold an energy saving technology seminar in Chinese Taipei 	Work plan and questionnaire design
Nov. 2017	<p>An Energy Saving Technology Seminar for Refrigerator/Freezer Energy Efficiency Improvements in the APEC Region</p> <ul style="list-style-type: none"> Establish a technical background for international experts of seminar and summarize the presentations to conduct research of the latest refrigerator energy saving technologies. Establish a technical background for representatives from developing economies in the seminar and summarize the experience sharing on refrigerator EE improvement for each economy The 1st technical expert group meeting will be held the second day of seminar. Summarize the outcomes and suggestions of the seminar and the 1st technical expert group meeting 	Self-funds an Energy Saving Technology Seminar for Refrigerator/Freezer Energy Efficiency Improvements in the APEC Region

Work plan and timeline (1/2)

Time	Work plan	Outputs
Jan. - Feb. 2018	<p>Technical Review and survey regarding energy efficiency improvements of refrigerators/freezers</p> <ul style="list-style-type: none">❑ Review the results of previous relevant APEC projects, including 'Harmonization of Energy Efficiency Test Methods of Refrigerators' (EWG 04 2014A).❑ Analysis of questionnaire responds from APEC economies about refrigerator/freezer EE management	<p>Two written reports</p> <ul style="list-style-type: none">① research of EWG 04 2014A project, initial findings of questionnaire survey② Minutes of the technology seminar and the 1st technical expert group meeting in Nov 2017
Feb. - April 2018	<p>Case Studies of Refrigerators/Freezers Design and Implementation under Energy Efficiency Regulation</p> <ul style="list-style-type: none">❑ Workshop I will be held during the 51st APEC EGEE&C meeting and experts from different economies can share experiences at the workshop.❑ The contractor should present the research results at the workshop.❑ After workshop I, gather representatives from each economy to the 2nd technical expert group meeting to discuss the resolution on the case studies.❑ Start writing the investigation report: the result of case studies of refrigerators/freezers design and implementation under energy efficiency regulation	<p>A one-day workshop and the 2nd technical expert group meeting</p> <p>Investigation report</p>

Work plan and timeline (2/2)

Time	Content	Outputs
May - Oct. 2018	<p>Refrigerator/Freezer Energy Efficiency Improvement in APEC Region: Review of Experience and Best Practices</p> <ul style="list-style-type: none">❑ Conduct a study of successful EE management programs and identify the best practice.❑ Draft a report of successful methodologies and outcomes for developing economies.❑ Hold workshop II during the 52nd APEC EGEE&C meeting.❑ The contractor should present the research results in the workshop.❑ After workshop II, gather representatives from each economy to the 3rd technical expert group meeting to discuss the resolution on the case studies.	<p>A one-day workshop</p> <p>The 3rd technical expert group meeting</p>
Nov. - Dec. 2018	<p>Integrating workshop result into final report</p> <ul style="list-style-type: none">❑ Submit draft report❑ Revise the draft report based on comments from the PO, EWG members and the APEC Secretariat.❑ All reports will be published on the APEC websites for public access. <p><i>Completion of the project</i></p>	<p>Final report</p>



Energy Saving Technology Seminar for Refrigerator/Freezer Energy Efficiency Improvement in APEC Region (Self-funding)

DATE: November 16, 2017

VENUE: Howard Plaza Hotel Taipei, Taipei City, Chinese Taipei

PURPOSE: Gather international experts to discuss the latest energy-saving technology development of refrigerators/freezers

No.	Topic	Presenter	Organization
1	Integration of Appliance for Smart Home	Dr. Morris Pei-Fang Liang	Industrial Technology Research Institute(ITRI)
2	Technical Reference on Harmonization of Energy Efficiency Test Methods of Refrigerators towards the NEW IEC 62552 among APEC Region	Mr. Andy Li Tie	Vkan Certification & Testing Co., Ltd (CVC), China
3	Next Possible Refrigerant for Environmental Consideration	Dr. Yongming Niu	Honeywell International (China) Co. Ltd
4	State-of-the-art Refrigerator Compressor Design	Mr. Alejandro Vázquez Escámez	Cubigel Compressors, Huayi Bcelona, Electrolux Group
5	System Design for Energy Efficiency Improvement of Household Refrigerators/Freezers	Mr. Tony Wen-Ruey Chang	Industrial Technology Research Institute(ITRI)

Energy Saving Technology Seminar on Nov 16, 2017



- ✓ Six APEC economies participated this seminar, namely China, Indonesia, Malaysia, Chinese Taipei, Thailand, and Viet Nam.
- ✓ 40 attendants from domestic manufacturers and lab representatives



Technical Expert Group Meeting

Refrigerator/Freezer Energy Efficiency Improvement in APEC Region: Review of Experience and Best Practices

DATE: November 17, 2017

VENUE: Howard Plaza Hotel Taipei, Taipei City, Chinese Taipei

- ✓ 4 economies share experience on refrigerator energy efficiency management
- ✓ Six APEC economies including China, Indonesia, Malaysia, Chinese Taipei, Thailand, and Vietnam participated in the technical expert group meeting.
- ✓ Total 20 participants from different organizations joined the meeting.
- ✓ Present the initial findings of questionnaire results of refrigerator EE management in the APEC region

No.	Presenter	Organization	Representing Economy	Topic
1	Mr. Hermanu	PT TUV Nord Indonesia	Indonesia	Review of Experience and Best Practices
2	Mr. Chok Ser Gan	Malaysian Air-Conditioning & Refrigeration Association (MACRA)	Malaysia	Minimum Energy Performance Standards (MEPS) for Refrigerator in Malaysia
3	Mr. Pawatt Suwannakut	Electrical and Electronics Institute (EEI)	Thailand	Experience sharing on refrigerator energy efficiency promotion
4	Ms Doan Thi Thanh Van	Vietnam Standards and Quality Institute (VSQI)	Vietnam	Energy efficiency program for refrigerator/freezer in Viet Nam

Technical expert group meeting on Nov 17, 2017



Site visit to Taipei Public Library Bei-tou Branch (Bei-tou Library)

- ✓ Taiwan's first green library opened in November 2006
- ✓ A wooden building with large windows which allows natural light for internal lighting, and provides better ventilation that reduces the use of fans and AC.
- ✓ Partially PV-covered roof to convert sunlight to electricity
- ✓ Collect rainfall for toilet use



Technical Review

- ◆ Energy saving technology review - international research and development trend survey from open literature and technical reports by many international institutions
 - ✓ Over 40 technical publications in open literature were surveyed.
 - ✓ Main topics for refrigerator EE improvement:
 - cabinets improvement
 - refrigeration system improvement
 - inverter control
 - system design.

- ◆ Review of relevant APEC project, i.e. 'Harmonization of Energy Efficiency Test Methods of Refrigerators' (EWG 04 2014A)



Workshop I

DATE: April 9, 2018

VENUE: Embassy suites by Hilton Washington DC conventional center, USA

- ✓ Representatives from US, New Zealand, Japan, and Chinese Taipei share experience of refrigerator EE management
- ✓ 10 economies, 18 attendants

09:30 - 10:00	Introduction to the EWG 07 2017A Project and its Implementation Status -By Yun-Tzu Guo, Industrial Technology and Research Institute(ITRI), Chinese Taipei
10:00 - 10:30	Experience sharing of USA on EE promotion of refrigerator/freezer under energy efficiency regulation (Pt.1) -Ms. Stephanie Johnson, Department of Energy, USA
10:30 - 11:00	Group photo and Coffee Break
11:00 - 11:45	Experience sharing of Chinese Taipei on EE promotion of refrigerator/freezer under energy efficiency regulation -Mr. Tony Wen-Ruey Chang, Industrial Technology and Research Institute (ITRI), Chinese Taipei
11:45 - 14:00	Lunch
14:00 - 14:30	Experience sharing of Japan on EE promotion of refrigerator/freezer under energy efficiency regulation -Mr. Hiroki Yoshida, Ministry of Economy, Trade and Industry, Japan
14:30 - 15:00	Experience sharing of New Zealand on EE promotion of refrigerator/freezer under energy efficiency regulation -Mr. Eddie Thompson, Energy Efficiency & Conservation Authority, New Zealand
15:00 - 15:30	Coffee Break
15:30 - 16:00	Conclusion for Case Studies of Refrigerators/Freezers Design and Implementation under Energy Efficiency Regulation -By Project Manager and Technical Working Group Member Closing of the Workshop
16:00 - 17:00	Technical Expert Group Meeting



Future work

- Hold workshop II during the 52nd APEC EGEE&C meeting
- Invite international refrigerator manufacturers to share practical implementation experience of EE improvement
 - Expecting manufacturers:
Hitachi & Panasonic (Japan), LG (Korea), Whirlpool (USA), Haier (China), Sampo (Chinese Taipei)
- Complete final report in Dec 2018.