

## The 57<sup>th</sup> Meeting of APEC Expert Group on New and Renewable Energy Technologies (EGNRET 57)

### EGNRET 57 Meeting Summary

Virtual Meeting hosted by Thailand

October 5-7, 2022

(Thailand Time, UCT+7)

### 1. Introduction

The Joint Meeting of 57<sup>th</sup> APEC Expert Group on New and Renewable Energy Technologies (EGNRET 57) and 59<sup>th</sup> Meeting of the APEC Expert Group on Energy Efficiency & Conservation (EGEEC 59) was hosted by Thailand in virtual style from October 5 to 7, 2022.

The Joint Meeting of EGNRET 57 and EGEEC 59 was held at 08:30 am – 11:00 am on 5 October and 10:00 am-11:00 am on 7 October 2022.

As for the joint meeting, delegates from 13 APEC member economies (Canada; China; Hong Kong, China; Indonesia; Japan; Malaysia; Peru; The Philippines; Singapore; Chinese Taipei; Thailand, the United States and Viet Nam, and representatives from 5 APEC fora, including APEC Secretariat, Expert Group on Energy Data and Analysis (EGEDA), Asia Pacific Energy Research Centre (APEREC), APEC Sustainable Energy Center (APSEC), and APEC Automotive Dialogue (AD) attended. In addition, representatives from 3 international organizations, the International Energy Agency (IEA) and the World Green Building Council (WGBC), Collaborative Labelling and Appliance Standards Program (CLASP) and Energy Efficiency Hub (EE Hub), participated in the Joint Meeting as observers and guest speakers.

The list of EGNRET 57 and Joint Meeting participants was attached in Annex A

of the meeting summary.

## **2. Joint Meeting of EGNRET 57 and EGEEC 59 (08:30 AM-11:00 AM on October 5, 2022)**

The Joint Meeting was co-chaired by Dr. Tom H.T. Lee, Chair of EGNRET, and Mr. Vy Ek-chin, Chair of EGEEC.

### **2.1 Official Welcome**

On behalf of the host economy, Dr. Prasert Sinsukprasert, Director-General of the Department of Alternative Energy Development and Efficiency (DEDE), Thailand made the opening remarks. He welcomed all APEC members, speakers, and participants who attended the meeting. He introduced the current energy situation and highlighted the importance of developing renewable energy, enhancing energy conservation, and improving energy efficiency. In addition, he also introduced Thailand's energy plan, which accelerates clean energy use and increases energy efficiency to achieve carbon neutrality by 2050 and net zero emissions by 2065. Thailand also proposed "Carbon Neutrality" to be the meeting theme and would like to take this opportunity to exchange technology development, policy making, and experience with APEC members.

### **2.2 Opening Addresses and Adoption of Joint Meeting Agenda**

Mr. Vy Ek-chin, Chair of EGEEC, thanked Thailand for hosting the joint meeting and welcomed the delegates from APEC member economies, APEC Fora, and invited speakers. The joint meeting agenda was adopted by participating member economies.

### **2.3 Energy Development in Thailand**

Ms. Sutthasini Glawgitigul, Policy and Plan Analyst, Senior Professional Level, Department of Alternative Energy Development and Efficiency, Ministry of Energy, presented the Energy Development in Thailand, including the current

energy situation and the target of achieving carbon neutrality and net zero emission. Thailand also presented a variety of policy directions in the energy plan.

## **2.4 Updates of APEC/ APEC Fora**

### **(1) APEC Secretariat Update by Mr. Takuo Miyazaki, Program Director, APEC Secretariat**

APEC Secretariat presented the overall outcomes of APEC projects for 2022. The approval rate of APEC-funded projects in Session 2, 2022 was 86%. In 2022 Session 1 and 2, the approval rate of APEC-funded projects was 92%.

The APEC project cycle for 2022 Session 2 including important dates and updated information and advice for improving project quality and implementation were reported. APEC Secretariat introduced the “PO Toolkit” and “Project Quality”: Training and Guidance,” and also reminded that the Guidebook on APEC Projects (Edition 16) was updated in September 2021 and could be downloaded on the website.

### **(2) APERC Update by Mr. Glen Sweetnam, Senior Vice President, APERC**

APERC presented the historical energy intensity results for the APEC region. Similar to the financial crisis in 2009, the final energy intensity declined significantly in 2020 due to the pandemic and fell 26.4% between 2005 and 2020. In terms of energy supply intensity, year-over-year changes were similar to final energy demand intensity changes.

APERC also shared progress towards the APEC renewable energy goal. From 2010 to 2020, renewable energy share in the final energy consumption market and primary energy supply market increased by 3.5

percentage points and 2.53 percentage points, representing 58% and 52.7% of the way to the goal, respectively, which showed that they were on track to meet the doubling goal.

APEREC then shared the projections from the 8th Edition of APEC Energy Demand and Supply Outlook. The publication was primarily completed in March 2022, which did not include the effects of the energy crisis due to the situation in Ukraine. Based on the analysis, APEC would achieve its 45% energy intensity reduction goal by 2034 and 2031 in the Reference and Carbon Neutrality (CN) scenarios, respectively. Modern renewable energy share would be doubled by 2026 in REF and 2025 in CN. APEC-wide CO<sub>2</sub> emissions would decline by 14% in REF and 67% in CN by 2050.

### **(3) APSEC Update by Dr. Jinlong Ma, Vice President, APSEC**

APSEC reported its activities and project updates. APSEC also shared their institutional building effort, such as “Defining a Local Vision for CNSC Members”, the upgrade of the APEC Clean Coal Technology Transfer (CCT) Program to Future Clean Energy Technology (CET) Pillar Program and information platforms. The framework of the recently proposed research program 2023-2025, APEC Urban Energy Report, was also presented.

## **2.5 Invited Presentation**

### **(1) APEC Automotive Dialogue Presentation by Mr. Dusit Anantarak, Co-chair of AD**

APEC Automotive presented the plans for the 2022-2025 and deliverables on the Putrajaya Vision 2040 and the Aotearoa Plan of Action. The AD-35 & AD-36 key outcomes and policy recommendations for policymakers to prepare for the transition to EVs and decarbonization of transportation were also introduced.

**(2) World Green Building Council Presentation by Ms Joy Gai,  
Programmes Head of the World Green Building Council (WGBC)  
Asia Pacific Region**

WGBC shared the “Advancing net-zero” status report and the progress of World’s GBC’s advancing net zero campaign through its three strategy areas: Climate Action, Health & Wellbeing, and Resources & Circularity.

**(3) Promoting Net Zero or Carbon Neutral Commitments in APEC (EWG  
07 2021S) by Dr. Adam Borison, Senior Technical Advisor, United  
States Agency for International Development (USAID)**

This project aimed to promote information sharing and capacity building to increase members’ understanding of the different pathways that exist to reach net zero GHG emissions or carbon neutrality.

Project deliverables include 1) Compendium of Best Practice Examples that contribute to APEC economies’ efforts towards achieving low carbon goals; 2) Voluntary Peer Reviews (VPR) that support APEC Leaders’ instructions to guide implementation to achieve net zero or carbon neutrality commitments and 3) Workshops to share best practices and lessons learned.

**(4) Thailand’s BCG Model for Green Energy towards Carbon Neutrality  
by Mr. Watcharin Boonyarit, Director of Strategy and Planning  
Division, Department of Alternative Energy Development (DEDE),  
Ministry of Energy, Thailand**

Thailand introduced the energy situation, renewable energy status, CO<sub>2</sub> emission from energy consumption, and the measures to achieve carbon neutrality and net zero GHG emission. Thailand’s Energy Plan 2022 and its strategic direction. The related policies and directions were presented. In addition, Thailand also shared the driven mechanisms of the Bio-Circular-

Green (BCG) Model on Energy.

### **3. EGNRET 57 Meeting (08:30 AM-11:00 AM on October 6, 2022)**

#### **3.1 Opening Address and Adoption of EGNRET 55 Agenda**

Dr. Tom H.T. Lee, Chair of EGNRET, chaired the EGNRET 57 meeting and welcomed the delegates from APEC member economies, APEC Sub Fora and a guest speaker from Climate Investment Funds. The EGNRET 57 meeting was adopted by the participating member economies.

#### **3.2 EGNRET Update by Dr. Tarcy Sih-Ting Jhou, EGNRET Secretariat**

EGNRET Secretariat reported the meeting summary of the 56<sup>th</sup> meeting of APEC EGNRET hosted by the United States on 6-7 April, 2022. The EGNRET Secretariat also presented the EGNRET project updates and the EWG small group meeting updates.

#### **3.3 Progress/Status of Current EGNRET Projects & Project Submission Process by Dr. Tarcy Sih-Ting Jhou, EGNRET Secretariat**

EGNRET Secretariat reported the project submission process including the concept note stage and the proposal stage for Session 2, 2022, and updated the status of EGNRET projects. As of September 2022, EGNRET had 2 project proposals and 12 projects under implementation. The list of EGNRET project updates (as of September 2022) was attached in Annex B of the meeting summary.

#### **3.4 EGNRET Projects Report**

15 projects were presented by five (5) member economies, namely Chinese Taipei, Thailand, the United States and Viet Nam as listed in the table below.

<b>Proposed Economy</b>	<b>Project Number</b>	<b>Project Title</b>
<b>China</b>	EWG 01 2022S	Demonstration and Promotion of Energy Resilience tool based on Solar-Powered Emergency Shelter Solutions (SPESS) for Natural Disaster in APEC
	EWG 04 2021S	Research on means to overcome the shortage of basic urban energy-climate data
	EWG 04 2022A	Data driven carbon neutral disaster resilient cities
	EWG 06 2021A	Support Offshore Wind Deployment and Grid Connection in APEC Region
	EWG 07 2021A	Impacts of COVID-19 on Renewable Energy Development in APEC Economies
	EWG 04 2022S	Innovative Approaches for Scaling-Up Renewable Energy Deployment in APEC Region
<b>Chinese Taipei</b>	EWG 14 2021A	Empowering Indigenous Social Awareness on Renewable Energy and Increasing Inclusion Sustainability for Green Recovery in APEC Regions
	EWG 15 2021A	Best Practices on the Energy Storage System in E-scooters Developments and Applications in the APEC Region
	EWG 14 2020A	The Promotion of Community Waste-to-energy System
<b>Thailand</b>	EWG 10 2021A	Achieving Carbon Neutrality through Bio-Circular-Green Economy Principle
<b>The United States</b>	EWG 03 2021S	APEC Clean Energy Purchasing and Decarbonization Workshop
	EWG 04 2021A	Lessons learned on resiliency and uptake of variable energy resources from islanded grids that support APEC clean energy goals
	EWG 12 2021A	APEC Workshop Furthering University Collaboration to Support Data Gathering and Analysis in Energy Efficiency, Renewable Energy, and Energy Resiliency

<b>Proposed Economy</b>	<b>Project Number</b>	<b>Project Title</b>
<b>Viet Nam</b>	EWG 08 2020A	APEC Workshop on Promoting Renewable Energy for Rural and Remote Area Development
	EWG 10 2019A	APEC Workshop on Strategies and Successful Case Studies on Solar Energy

### **3.4.1 Demonstration and Promotion of Energy Resilience tool based on Solar-Powered Emergency Shelter Solutions (SPES) for Natural Disaster in APEC (EWG 01 2022S / China)**

The project aimed to provide information on the potential applications and technologies related to solar powered emergency shelters (SPES) in APEC region including understanding needs, selecting related technologies, analysis, and balance of the plant. The draft report of “Technical Review of Examples of Emergency Shelters in the APEC region” was completed.

### **3.4.2 Research on means to overcome the shortage of basic urban energy-climate data (EWG 04 2021S / China)**

The project aimed to establish a database for cities with SDGs and disaster resilience data. The purpose of the database was to fill the data shortage of SDG-relevant urban data to deal with three commitment levels.

### **3.4.3 Research on means to diminish the financing gap for sustainable urban energy (EWG 09 2021S / China)**

The project aimed to explore means for APEC cities and local communities to diminish the gap for financing local sustainable energy investments and accelerate the move towards carbon neutrality. The project addressed several ways to diminish the local financing gap, namely how cities and towns can enhance the mobilization of local green finance, catalyse green finance with other financing tools and channel it in appropriate ways to local sustainable

energy projects, and how cities can better accede to economy-wide and global green finance.

#### **3.4.4 Data Driven Carbon Neutral Disaster Resilient Cities (EWG 04 2022A / China)**

The project aimed to accelerate the development towards carbon neutrality by increasing the number of APEC cities and municipalities having the capacity to collect relevant data and use a multi-stakeholder dialogue to become carbon-neutral and energy inclusive. A multi-stakeholder dialogue would be used to elaborate 2050/2060 visions and provide reference for setting 2030 targets. The group of key stakeholders would include the energy poor populations of the lowest income quintile. The project progress was setting the criteria and selecting the target cities.

#### **3.4.5 Support Offshore Wind Deployment and Grid Connection in APEC Region (EWG 06 2021A)**

The project aimed to review the relevant policies and development plans, and planning mechanisms and analyze the challenges, barriers, and opportunities for offshore wind energy project investment. The recommendations on policies and technical solutions to promoting offshore wind energy in the APEC region would be provided as well as building relevant capacity.

#### **3.4.6 Innovative Approaches for Scaling-Up Renewable Energy Deployment in APEC Region (EWG 04 2022S / China)**

The project was to gather, analyze, and assess the key issues and recovery strategies, the priority and approach addressing sustainability and supporting renewable energy sector development. The relevant experience and knowledge were to be shared toward sustainable and green economic recoveries, enhancing the resilience of the energy systems, sustaining and accelerating renewable energy development, and facilitating to achieve the

renewable energy doubling goal of the APEC region. The related survey was conducted and the draft report was expected to complete in November 2022.

#### **3.4.7 Best Practices on the Energy Storage System in E-scooters Developments and Applications in the APEC Region (EWG 15 2021A / Chinese Taipei)**

This project aimed to share the innovation techniques of energy storage system in e-scooters among the APEC economies and build the relevant capacity. The expected outcomes included benefit e-scooter users in the APEC region, raising awareness and expanding the understanding of EVs and improving the circularity of green energy.

#### **3.4.8 Empowering Indigenous Social Awareness on Renewable Energy and Increasing Inclusion Sustainability for Green Recovery in APEC Regions (EWG 14 2021A / Chinese Taipei)**

The objectives of this project were to empower the indigenous on social awareness of renewable energy technologies by developing the knowledge, ability, skill and technical know-how to accelerate the development of green energy technologies and synergy community. The 3-day events would be held on March 22-24, 2023 and invited indigenous experts and participants for policy dialogue, training course, workshop and green farm on-site learning.

#### **3.4.9 The Promotion of Community Waste-to-energy System (EWG 14 2021A / Chinese Taipei)**

This project was aimed toward demonstrating a best practice model for developing a community waste-to-energy system and effective handling of household plastics waste. Inter-collaboration between local communities, the government, and private business sectors was targeted for the purpose of improving the circular economy by taking advantage of the proposed waste-to-energy system and waste management scheme. The workshop was held on October 14, 2022 virtually and the project overseer invited EGNRET members

to participate.

#### **3.4.10 Achieving Carbon Neutrality through Bio-Circular-Green Economy Principle (EWG 10 2021A / Thailand)**

The project aimed to review methodology and framework of carbon neutral plan from all around the world especially APEC economies on power, transport, and building sectors. The workshop was planned to organize in Japan and to share best practices on policy formation and build capacity and promote policy dialogues among APEC economies.

#### **3.4.11 APEC Clean Energy Purchasing and Decarbonization Workshop (EWG 03 2021S / USA)**

The objective of this project was to hold two workshops held on August 6, 2021 and September 1, 2021 to develop a toolkit that policies governments could use to drive the decarbonization of electricity systems while simultaneously expanding the electricity infrastructure in an affordable and sustainable way. The key recommendations from the workshops were included in the project report.

#### **3.4.12 Lessons Learned on Resiliency and Uptake of Variable Energy Resources from Islanded Grids that Support APEC Clean Energy Goals (EWG 04 2021A / USA)**

The project aimed to provide a summary of the costs and operational experiences of providing reliable electricity while utilizing maximum variable energy resources from islanded grids in the APEC region, and hosted a one-day virtual workshop. The project was expected to be completed by May 2023.

#### **3.4.13 APEC Workshop Furthering University Collaboration to Support Data Gathering and Analysis in Energy Efficiency, Renewable Energy, and Energy Resiliency (EWG 12 2021A / USA)**

The project aimed to promote information sharing and capacity building across APEC universities with three key objectives as follows.

- (1) Building the capacity of workshop participants by continuing to develop collaborations between the EWG, APERC, and university faculty in APEC economies.
- (2) Continuing discussion of data gaps and needs in Energy Efficiency, Renewable Energy, and Energy Resiliency and developing policy recommendations for the EWG in these areas
- (3) Sharing examples of collaborative projects beginning at the online workshop held in June 2021 by policymakers and universities in APEC economies that address APEC energy efficiency, renewable energy, and energy resiliency goals.
- (4) Identifying other methods of analysis to be included in projects, such as economic analysis
- (5) Discussing potential ideas for new collaborative projects

The project was expected to be completed by June 2023.

#### **3.4.14 APEC Workshop on Promoting Renewable Energy for Rural and Remote Area Development (EWG 08 2020A / Viet Nam)**

The project aimed to gather stakeholders to share information and experiences on applying renewable energy in order to utilize renewable energy to facilitate rural and remote area development as well as develop a set of recommendation on renewable energy policies while developing economy. The workshop was held on August 16-17, 2022 as hybrid format, and this project was completed.

#### **3.4.15 APEC Workshop on Strategies and Successful Case Studies on Solar Energy (EWG 10 2019A / Viet Nam)**

The objective of this project was to bring together officials, representatives from the private and academic sectors and other stakeholders solar energy to share

respective case studies and strategies in solar energy, learn from experiences to support all member economies of APEC to develop and implement policies on solar energy to provide energy needs in the midst of economic development and increasing consumption, draw more investments and address environmental issues. The workshop was held in hybrid format in March 2023, and the recommendations collected from the workshop were included in the final report of this project.

### **3.5 Member Economy Presentation: BCG Model towards Carbon Neutrality**

The meeting theme of EGNRET 57 meeting was “BCG Model towards Carbon Neutrality”, which was presented by five (5) member economies (Hong Kong, China; Japan; Chinese Taipei; Thailand; the United States). In addition to member economies’ presentations, APERC presented “The implication of the Renewable Energy Certificate (REC) in six APEC Southeast Asia Economies” as well.

- (1) **Hong Kong, China** reported its energy end-use data, the measures for achieving carbon neutrality and the latest renewable energy target which was going to increase the share of renewable energy to 7.5%-10% by 2035 with main focuses on the development of solar PV, offshore wind energy, and waste-to-energy. The targets for energy saving, green buildings, and green transport were also introduced.
- (2) **Japan** shared the information that Japan announced the 2050 carbon neutral declaration which aims to reduce its GHG emission by 46% by 2030 compared to the level of 2013. In addition, Japan reported its renewable energy development progress and current target of renewables by 2030. The waste-to-energy generation, sewage sludge to gas power, biomass to hydrogen, and carbon recycling projects were also presented.
- (3) **Chinese Taipei** reported its potential for circularity and reuse of biomass and waste, model, and related mechanisms. The target of biomass was to

install 778 MW by 2025 and facilitation strategies include providing subsidies to accelerate the formation of BCG model, promoting bio-fuels from agro-cultural and forestry-wastes, applying biomass energy in base-load power plants and co-generation systems, and producing biogas from the application of wastewater and animal manure.

- (4) **Thailand** reported its renewable energy status in 2021, current renewable energy projects and policy directions to increase renewable share to the new power installed capacity. BCG Economic Model was for inclusive and sustainable growth, would be applied to (i) increase value of agriculture products, (ii) strengthen energy security, and (iii) develop bio-based industries.
- (5) **The United States** reported its Inflation Reduction Act signed in August 2022 which was estimated to reduce its carbon emissions by 40% below 2005 levels by 2030. It would impact on both energy supply and demand including lowering consumer energy costs, accelerating manufacturing of solar panels, wind turbines, batteries, and decarbonizing the economy.
- (6) **APEREC** reported the implementation of renewable energy certification in 6 APEC Southeast Asia economies including Indonesia, Malaysia, Philippines, Singapore, Thailand, and Viet Nam. The market type, cumulative issued RECs, and trading market were presented. Since RECs market could attract additional investment in renewable energy generation, economy was encouraged to establish a legal framework and governance body for its RECs market.

### **3.6 Discussion: Key Areas for Collaboration with APEC Expert Groups and other Cross Fora**

The collaborative actions listed below were discussed by the attending economies.

- (1) The EGNRET members were encouraged to have cooperation on

hydrogen energy with EGCFE.

- (2) The EGNRET would continue to work with EGEEC and cooperate with research centers
- (3) The EGNRET members were encouraged to cooperate on achieving decarbonization and energy transition.

### **3.6 Discussion: Potential New Energy-Related Goals**

EGNRET Secretariat reported the background information of potential energy-related goals. The suggestions proposed by EGNRET members were listed below.

- (1) The existing goals to be monitored as suggested.
- (2) Proposing new energy-related goals. For instance, it was suggested to discuss with APEC Transportation Working Group on initiating a net-zero transportation goal.
- (3) The goal should link the renewable energy sector, energy efficiency sector, as well as relevant infrastructure and facilities. Clean electrification was crucial on the pathway toward net-zero emissions. This concept could link renewable energy and other sectors together, facilitating renewable energy development.

## **3.7 Administration and Operation**

### **3.7.1 Coming Events and Next Expert Group meeting**

- (1) EGNRET Chair announced that the upcoming 64<sup>th</sup> Energy Working Group Meeting (EWG 64), hosted by Malaysia, held on October 31 to November 3, 2022 in virtual format.
- (2) The EGNRET 58 meeting would be hosted by the United States in physical format and it was planned to be held in April 2023.

### **3.7.2 Chair and Vice Chair Selection**

The selection was held at EGNRET 57 for the positions of Chair and Vice-Chair of EGNRET for the next two years (2023-2024).

EGNRET members reached consensuses to select Dr. Chi-Wen Liao from Chinese Taipei as the EGNRET Chair, and Ms. Munlika Sompranon from Thailand as the Vice Chair for a two-year term (2023-2024). The selection results will be circulated to EGNRET members for endorsement. Furthermore, the selected Chair, Dr. Liao nominated 3 secretaries, Dr. Tarcy Sih-Ting Jhou, Dr. Tom H.T Lee, and Dr. Keng-Tung Wu to operate the EGNRET Secretariat after EGNRET 57. It was endorsed by EGNRET representatives.

#### **4. Joint Meeting of EGEEC 59 and EGNRET 57 (10:00 AM – 11:10 AM on October 7, 2022)**

The Joint Meeting was co-chaired by Dr. Tom H.T. Lee, Chair of EGNRET and Mr. Vy Ek-chin, Chair of EGEEC.

##### **4.1 EGEEC Report**

The EGEEC Secretariat presented the EGEEC 59 outcomes, key conclusions, and actions. EGEEC announced that the Philippines will host the Joint meeting between EGEEC 61 and EGNRET 59 in the second half of 2023.

##### **4.2 EGNRET Report**

The EGNRET Secretariat reported the outcome of EGNRET 57. The Chair and Vice-Chair selection for the 2022-23 term and project updates. The EGNRET Chair and Vice Chair for the 2022-2023 term are Dr Chi-Wen Liao and Mrs Munlika Sompranon, respectively.

##### **4.3 Key Areas for Collaboration with APEC Working Groups and Sub-fora**

EGEEC Secretariat shared the information that EGEEC and EGNRET organized a joint workshop "APEC's Goals of Doubling the Renewable Energy

Share in the Energy Mix and Reducing Energy Intensity" (EWG 08 2021S) on November 29 and 30, 2022. This workshop had four main topics including (1) highlighted global climate action and APERC's energy demand and supply outlook, (2) key drivers of the successful policies and initiatives in energy efficiency in APEC, (3) key drivers of the successful policies and initiatives in renewables in APEC, and (4) emerging low-carbon technologies and economic instruments.

EGNRET Chair encouraged member economies from both Expert Groups to participate this APEC project, which was important action for collaboration between two expert groups.

#### **4.4 Closing Remarks**

Dr. Prasert Sinsukprasert, the Director-General of the Department of Alternative Energy Development and Efficiency (DEDE), Ministry of Energy, Thailand gave the closing remarks. He thanked all the speakers and delegates for participating in the Joint Meeting and appreciated the efforts from Thailand team and the support from EGNRET and EGEEC to make the meeting successful.

## ANNEX A: LIST OF EGNRET 57 and JOINT MEETING PARTICIPANTS

No	Full Name		Economy / APEC Sub-fora	Organization
	First Name	Last Name		
1	Michael	Paunescu	Canada	Government of Canada
2	Jean-Philippe	Bernier	Canada	Natural Resources Canada
3	Pengcheng	Li	China	China National Institution of Standardization
4	Meng	Liu	China	China National Institution of Standardization
5	Ren	Liu	China	China National Institution of Standardization
6	Leo	Cheng	Hong Kong, China	Electrical and Mechanical Services Department
7	Chun-Yin	Li	Hong Kong, China	Electrical and Mechanical Services Department
8	George	Liu	Hong Kong, China	Electrical and Mechanical Services Department
9	Virginia	Luk	Hong Kong, China	Electrical and Mechanical Services Department
10	Elaine	Yip	Hong Kong, China	Electrical and Mechanical Services Department
11	Hendro	Gunawan	Indonesia	Ministry of Energy and Mineral Resources
12	Arief	Santoso	Indonesia	Ministry of Energy and Mineral Resources
13	Naoko	Doi	Japan	The Institute of Energy Economics, Japan
14	Takao	Ikeda	Japan	The Institute of Energy Economics, Japan
15	Zulkiflee	Umar	Malaysia	Energy Commission Malaysia
16	Patrick	Aquino	Philippines	Department of Energy, Philippines
17	Cephas	Cabatit	Philippines	Department of Energy, Philippines
18	Ruby	Deguzman	Philippines	Department of Energy, Philippines
19	Daniel Collin	Jornales	Philippines	Energy Utilization Management Bureau
20	Peter	Sablay	Philippines	Energy Utilization Management Bureau
21	Mara Camille	Castillo	Philippines	Energy Utilization Management Bureau
22	Francis	Jusay	Philippines	Department of Energy, Philippines
23	Charisse	Pascual	Philippines	Department of Energy, Philippines
24	Lucius	Tan	Singapore	Energy Market Authority
25	Yun-Tzu, Nicole	Guo	Chinese Taipei	Industrial Technology Research Institute (ITRI)
26	Shih-Hua	Hsu	Chinese Taipei	Bureau of Energy



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No	Full Name		Economy / APEC Sub-fora	Organization
	First Name	Last Name		
27	Huei-Chi	Lo	Chinese Taipei	Bureau of Energy
28	Chung-Hsien	Chen	Chinese Taipei	Bureau of Energy
29	Rainie	Lee	Chinese Taipei	Bureau of Energy
30	Chn Li	Chang	Chinese Taipei	Bureau of Energy
31	Yu-Hsuan	Chiang	Chinese Taipei	Chung Hsing University
32	Wei-Cheng	Wang	Chinese Taipei	Cheng Kung University
33	Alicia		Chinese Taipei	Feng Chia University
34	Chen-Yeon	Chu	Chinese Taipei	Feng Chia University
35	Ching-Yu	Li	Chinese Taipei	Industrial Technology Research Institute (ITRI)
36	Henry	Lo	Chinese Taipei	Industrial Technology Research Institute (ITRI)
37	Prasert	Sinsukprasert	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
38	Ruangdet	Panduang	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
39	Adisak	Choosuk	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
40	Sarat	Prakobchat	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
41	Watcharin	Boonyarit	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
42	Munlika	Sompranon	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
43	Sutthasini	Glawgitigul	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
44	Yaowateera	Achawangkul	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
45	Pongpan	Vorasayan	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
46	Natthaphon	Roonprasang	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy



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**APEC EXPERT GROUP ON  
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No	Full Name		Economy / APEC Sub-fora	Organization
	First Name	Last Name		
				Energy
47	Tantita	Jungpraasertchai	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
48	Atchariya	Jangchay	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
49	Lapatsatorn	Jiengwareewong	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
50	Sukanya	Nanta	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
51	Warote	Chaintarawong	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
52	Patcharee	Sattayarangsan	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
53	Siriphath	Khwunpetch	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
54	Thiti	Ratchadatikun	Thailand	Department of Alternative of Energy Development and Efficiency (DEDE), Ministry of Energy
55	Dusit	Anatarka	Thailand	APEC Automotive Dialogue
56	Alison	Delgado	United States	Energy Efficiency Hub Digitalisation Working Group, Pacific Northwest National Laboratory (PNNL)
57	Adam	Borison	United States	The US Support for Economic Growth in Asia (US-SEGA)
58	Nadira	Mailewa	United States	The US Support for Economic Growth in Asia (US-SEGA)
59	Lina	Kelpsaite	United States	Collaborative Labeling and Appliance Standards Program (CLASP)
60	Cary	Bloyd	United States	Pacific Northwest National Laboratory (PNNL)
61	Derek	Greenauer	United States	UL Solutions (UL LLC)
62	Tuan	Nguyen	Viet Nam	Ministry of Industry and Trade
63	Claudia Zegarra Espinoza		Perú	Ministry of Energy and Mines Peru
64	Jesus Walter Carrasco		Perú	Ministry of Energy and Mines Peru
65	Takuo	Miyazaki	APEC Secretariat	APEC Secretariat



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**APEC EXPERT GROUP ON  
NEW & RENEWABLE ENERGY TECHNOLOGIES**

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