



**ASIA PACIFIC ENERGY RESEARCH CENTRE  
(APERC)**

**REPORT ON APERC ACTIVITIES**

**THE 64<sup>TH</sup> MEETING OF  
THE APEC ENERGY WORKING GROUP (EWG-64)**

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## CONTENTS

I.	PROGRESS IN ONGOING WORK.....	3
II.	FUTURE WORK PLAN .....	19
III.	RESEARCH MANAGEMENT .....	22
IV.	APERC RESEARCH STAFF.....	23
V.	REVENUE AND EXPENSES .....	24

# **I. PROGRESS IN ONGOING WORK**

## **1. Research Activities**

### **A. APEC ENERGY DEMAND AND SUPPLY OUTLOOK**

#### BACKGROUND

APERC had previously produced seven editions of the APEC Energy Demand and Supply Outlook.

#### OBJECTIVE

The key objectives of the APEC Energy Demand and Supply Outlook are to facilitate APEC cooperation by providing policymakers with:

- a useful reference work on energy in the APEC region;
- a statistically supported review of the challenges and opportunities facing the APEC economies individually and as a region; and
- a source of ideas and approaches for evaluating these energy challenges and identifying potential solutions and opportunities.

#### PROGRESS

As with past editions, the Outlook eighth edition comprises two volumes: Volume I provides APEC-wide results, and Volume II provides the outlook for each APEC economy.

The Outlook 8th edition was published in September 2022 after approval by EWG. APERC researchers are sharing the findings with member economies and other stakeholders.

The Outlook 8th edition utilises APEC energy data, instead of IEA, to underpin its analysis. Other improvements to the analysis include a transparent, open-source modelling approach. The modelling tools developed for the Outlook will also be used for training activities in APEC economies.

Preliminary work on the Outlook 9th edition has started.

#### MILESTONES

- The Outlook 9th edition is scheduled to be published in 2025. APERC will formally begin preparation for gathering assumptions, developing scenarios, and starting analysis in early 2023.

### **B. APEC ENERGY OVERVIEW**

#### BACKGROUND

At the EGEDA 11<sup>th</sup> meeting held in March 2000, the APEC Energy Overview was proposed by Australia and approved at the EWG19 meeting in April 2000.

The APEC Energy Overview is an annual publication, which contains updated energy demand/supply data as well as a description of energy policies and notable energy developments in energy efficiency, infrastructure development, upstream development, energy source diversification, regulatory reform and environmental protection.

Energy demand/supply data are drawn from the APEC Energy Database. APERC is responsible for coordinating information gathered from member economies and preparing a draft Overview for EGEDA review. The Overview is published on both the APEC and APERC websites.

Since the inaugural issue of the 2001 edition, 20 editions have been issued up to 2021.

## OBJECTIVE

The objective of the APEC Energy Overview is to share information on the energy policies of member economies and provide useful information and insights to policymakers in the region.

## PROGRESS

APEC Energy Overview 2022 was published in September 2022.

## MILESTONE

Preparation for APEC Energy Overview 2023 has just started and its publication is expected in July 2023.

## C. TOPICAL STUDIES

### BACKGROUND

Along with the Outlook and the Overview, APERC has been conducting research on topics relevant to energy issues and policies in the APEC region.

### OBJECTIVE

The objective of the topical studies is to share information on member economies' energy policies and provide useful information and insights to policymakers in the region.

### PROGRESS

Since 2017 three separate studies focusing on coal, oil, and natural gas have been designed to support the Expert Group on Clean Fossil Energy (EGCFE) in broadening its perspective. The reports review supply, demand, trade, and price developments over the past ten years and projected developments over the next five years.

A paper on fossil fuel quality standards in APEC that had its origin in the 2019 oil report was presented at the 2020 IAEE Asia-Oceania Conference in Auckland, NZ and the APERC Workshop at EWG59. The paper explores the costs and benefits of imposing stricter gasoline and diesel quality standards. Another paper presented at the IAEE Asia-Oceania Conference is based on the 2018 APERC report, Perspectives on Hydrogen in the APEC Region.

While APERC Oil Report 2021 and APERC Coal Report 2021 were published in January 2022, APERC Gas Report 2021 was published in February 2022.

#### MILESTONE

APERC Fossil Fuel Reports 2022 series have been drafted in due course and a summary of each of the three reports will be presented at EWG64.

## **2. Accepting Trainees and Dispatching Experts**

#### BACKGROUND

APERC accepts energy modelling trainees, chiefly from developing economies in the APEC region. These trainees learn about preparing energy demand and supply outlooks and related matters.

APERC also sends experts to APEC economies to help develop energy data and prepare energy demand and supply outlooks, including experts on modelling techniques such as data management, energy balance preparation, macroeconomic modelling, and energy supply planning.

#### OBJECTIVE

The objective is to build the capacity of APEC economies in energy data management and projecting energy demand and supply.

#### PROGRESS

Due to travel restrictions brought about by the COVID-19 pandemic, APERC organised the 28<sup>th</sup> Seminar on Energy Modelling on 7-18 March 2022 online. APERC did not dispatch experts to APEC economies to provide training on energy statistics and energy modelling, as it did not receive requests from member economies. The cooperation course on “Energy Future of the Asia Pacific Region” at Kyoto University Graduate School of Energy Science has been conducted from April to July 2022.

#### MILESTONE

APERC will organise the 29<sup>th</sup> Seminar on Energy Modelling in March 2023.

In view of the absence of requests from member economies, there is no scheduled online training for specific economies as of now. However, if requested, APERC will provide online trainings or dispatch experts to requesting economies when travel restrictions are over.

## **3. Building Energy Data Management Networks**

#### BACKGROUND

APERC has built an online communication network with energy organisations in APEC member economies. The network allows uniform management of energy data submitted by APEC economies and the preparation of energy balance tables based on the data.

APERC is also the Secretariat of the APEC Expert Group on Energy Data and Analysis (EGEDA) that meets once a year.

APERC supplies data provided by APEC member economies to the Joint Organisations Data Initiative's (JODI) database and works jointly with member economies to improve data quality.

In addition, in order to upgrade Energy Data Management Networks, APERC started to accept energy statistics trainees from developing APEC economies. APERC also started to send experts to APEC economies to help improve the quality of their energy statistics.

## OBJECTIVE

The key objectives are:

1. To improve the availability and consistency of energy data and to develop, manage and review the operation of an up-to-date and consistent APEC Energy Database, principally covering energy demand and supply data.
2. To continue to develop an APEC energy data collection and dissemination network.
3. To participate in international cooperation/collaboration activities on energy statistics with the United Nations Statistics Division (UNSD), International Energy Agency (IEA), The International Renewable Energy Agency (IRENA), the Joint Organisations Data Initiative (JODI) and other international organisations.
4. To implement energy statistics training courses for APEC member economies.
5. To track the APEC aspirational goals on reducing energy intensity by 45% in 2035 from 2005 levels and doubling the 2010 share of renewable energy in the APEC energy mix by 2030 and other similar measurable goals that may be set by the energy ministers.
6. To report to and advise the APEC EWG on each of the above activities.

## PROGRESS

In April 2015, APERC established the internal Energy Statistics & Training Office (ESTO) to ensure efficient progress with activities described under points 3 and 4 above.

APERC collected and processed the 2020 annual energy supply and demand data from the 21 member economies. APERC is currently preparing the drafts of the APEC Energy Statistics 2020 and APEC Energy Handbook 2020.

The 19th APEC Workshop on Energy Statistics, Phase I of the joint workshop on energy efficiency indicators with IEA, was held on 28-30 June 2021 online. The objective of the workshop was to improve the submission and compilation of energy efficiency indicators in APEC by introducing collection and estimation methodologies through lectures and hands-on exercises. The workshop also aims to impart to the members the importance of energy efficiency indicators in policymaking. The following were the topics discussed:

- The importance of energy data in policymaking.
- Build capacity in identifying data gaps and how to address issues relating to the collection of both end-use energy consumption data and activity data.  
Identify from the exchange of information the best strategies that could be adopted to improve data collection of member economies. Try to develop estimation methodologies for the members to improve their own energy statistics.

Due to the continuing COVID-19 pandemic, the short-term course and the middle-term course in 2021 were also cancelled and were replaced by a one-week short course. The planned special training course on energy statistics for Viet Nam is postponed. This course was proposed by APERC to Viet Nam so that the three government agencies in the economy that are involved in preparing energy statistics can harmonise their efforts in the collection, processing, analysis and dissemination of energy statistics. These agencies are the Electricity and Renewable Energy Authority (EREA) and the Institute of Energy (IE) of the Ministry of Industry and Trade (MOIT), and the General Statistics Office (GSO).

## MILESTONE

The APEC Energy Statistics 2020 and APEC Energy Handbook 2020 will be published in the first quarter of 2023.

The 20th APEC Workshop on Energy Statistics, Phase II of the joint workshop on energy efficiency indicators with IEA, will be held online in November 2022. The objective of the workshop is to expand the knowledge of the members in end-use data collection and estimation, and how to make use of the collected end-use data and activity data. Following the knowledge obtained from Part I, the participants will learn more through:

- Data gaps analysis;
- Hands-on exercises on data estimation by modelling;
- Simulation of how to conduct end-use energy consumption surveys;
- Sharing of experiences by member economies, and;
- Learning the use of administrative data.

As for the EGEDA Training Program on Energy Statistics for 2022, the short-term course and the middle term course and the special training course for Viet Nam will be held in the first quarter of 2023.

## 4. Policy Cooperative Activities

### A. PEER REVIEW ON ENERGY EFFICIENCY (PREE)

#### BACKGROUND

Improving energy efficiency offers many cost-effective opportunities to achieve energy security, improve business productivity and mitigate greenhouse gas emissions. In the Sydney Declaration of September 2007, APEC Leaders agreed to start a peer review of energy efficiency policies through the voluntary APEC Energy Peer Review Mechanism.

At the EWG35 meeting (Iquitos, March 2008), the APEC Peer Review on Energy Efficiency (PREE) was proposed by Japan and endorsed by EWG members.

These activities are undertaken as part of the PREE, namely:

1. Peer Review of volunteer member economies on the progress towards their goals in energy efficiency improvement ('Peer Review of volunteer member economies') including following up of implementation of recommendations at former hosting economies of Peer Review (Follow-up PREE) since 2012; and

2. Energy Efficiency Policy Workshop which provides a capacity building opportunity for robust policymaking development in APEC, succeeding the Cooperative Energy Efficiency Design for Sustainability (CEEDS) workshops for the same purpose.

## **1. PEER REVIEW**

### OBJECTIVE

The objectives of the APEC Peer Review of Energy Efficiency (PREE) are:

1. To share information on energy efficiency performance as well as policies and measures for improving energy efficiency among member economies;
2. To provide opportunities for learning from other member economies' experiences and for broadening communication among energy efficiency policy experts;
3. To explore how energy efficiency overall/sectorial goals and action plans could be effectively formulated in each APEC economy under review, taking into account the diversity of possible strategies to be used;
4. To monitor progress toward attaining energy efficiency goals on an overall and/or sectoral basis and toward implementing action plans; and
5. To provide recommendations on how the implementation of action plans could be improved to achieve energy efficiency goals.

### PROGRESS

Guidelines for the Peer Review were endorsed by EWG in late 2008.

The inaugural Peer Review for New Zealand was carried out during the period of 23-27 February 2009. This was followed by Peer Review for Chile during the period of 16-20 March 2009. The draft Review Reports of PREE for New Zealand and Chile were discussed and endorsed by EWG members at the EWG37 meeting in Santiago in April 2009.

The third Peer Review on Viet Nam was conducted on 8-12 June 2009. The draft Review Report of PREE for Viet Nam was discussed and endorsed by EWG members at the EWG38 meeting in Bali in November 2009.

The fourth Peer Review on Thailand was carried out on 9-13 November 2009. The draft Review Report of PREE for Thailand was discussed and endorsed by EWG members at the EWG39 meeting in Tokyo in March 2010.

The fifth Peer Review on Chinese Taipei was carried out on 23-27 August 2010. The draft Review Report of PREE for Chinese Taipei was discussed and endorsed by EWG members at the EWG40 meeting in Brunei-Darussalam in November 2010.

The sixth Peer Review on Peru was carried out on 8-12 November 2010. The seventh Peer Review for Malaysia was carried out on 26 November-3 December 2010. The draft Review Reports of PREE for Peru and Malaysia were discussed and endorsed by EWG members at EWG41.

The eighth PREE on Indonesia was carried out on 10-14 October 2011. The draft Review Report of PREE for Indonesia was discussed and endorsed by EWG members at the EWG43 meeting.

The ninth PREE on the Philippines was carried out on 6-10 February 2012. The draft Review Report of PREE for the Philippines was discussed and endorsed by EWG members at the EWG44 meeting.



The first Follow-up PREE activity, a training workshop on analytical methods to monitor the effectiveness of implementing energy efficiency measures, was carried out in Viet Nam on 27 February-2 March 2012. The Summary Report was submitted to the EWG44 meeting.

The tenth PREE on Brunei Darussalam was carried out on 11-15 June 2013. The draft Review Report of PREE on Brunei Darussalam was discussed and endorsed by EWG members at the EWG46 meeting.

The second Follow-up PREE in the Philippines, focusing on industrial sectors and commercial buildings, was carried out on 15-19 September 2014. The draft Review Report was discussed and endorsed by EWG members at the EWG48 meeting.

The third Follow-up PREE in Thailand was focused on the transport sector. During 3-7 August 2015, six experts from Australia; Indonesia; Japan; the United States (two); and UNEP participated in the Follow-up Peer Review. The draft Review Report was discussed and endorsed by EWG members before the EWG50 meeting.

The 11th PREE in Mexico was carried out on 6-10 March 2017. The review team completed the workshops in Mexico with the relevant agencies and Ministries. The final report was completed and circulated to the EWG members for their endorsement in October 2017, with 46 recommendations across eight fields of energy efficiency.

The Follow-up PREE in Malaysia (PREE Phase 7) was carried out on 26-30 March 2018. The focus sector for the peer review were the transportation and industry sectors. Six experts from Australia; Indonesia; Malaysia; Thailand; the USA, and International Energy Agency (IEA) joined the Follow-Up PREE Malaysia. The final report was published in November 2018.

The 12th PREE planned to take place in Russia (PREE Phase 8), was initially scheduled for October 2018. However, due to the restructuring of the federal government of Russia, it was cancelled.

The Follow-up PREE in Peru (PREE Phase 9) was conducted on 18-22 March 2019 in Lima, Peru. The Review Expert Team was composed of six experts from five APEC economies (Hong Kong, China; Mexico; New Zealand; Thailand and the USA) and an expert from the German Corporation for International Development (GIZ). Unlike previous Follow-up PREEs, this one was not focused on a specific sector and was an overall assessment of energy efficiency, as per the request of the Peruvian government. The Expert Team gave 47 preliminary recommendations on six subsectors. Around 40 participants attended the peer review meeting, and 26 presentations from 12 different relevant organisations were made. The Follow-Up PREE report was drafted by APERC and was endorsed by EWG in February 2020. The final report is available on the APEC and APERC websites.

The Follow-up PREE for Indonesia (PREE Phase 10) was held online on 9-11 November 2021. The focus sector for the review were the transport, industry, buildings, home appliances and energy supply sectors.

## MILESTONE

The final report of the Follow-up PREE in Indonesia (PREE Phase 10) was published in June 2022 and its summary will be reported at EWG64.

APERC will invite all eligible economies to host the next PREE.

## **2. ENERGY EFFICIENCY POLICY (EEP) WORKSHOP**

## OBJECTIVE

In order to streamline and prioritise its activities, APERC decided to integrate the Cooperative Energy Efficiency Design for Sustainability (CEEDS) project into PREE as a forum to discuss key issues in the previous PREEs further and to hold an ‘Energy Efficiency Policy (EEP) Workshop’ once a year in cooperation with EGEEEC instead of CEEDS workshops.

## PROGRESS

A trial EEP Workshop in conjunction with EGEEEC45 in Singapore was held on 23 March 2015 as a Self-Funded project. The focus was on the fundamentals of energy efficiency policymaking and the development of stable funding mechanisms for agencies and programmes.

The first EEP Workshop was held in conjunction with EGEEEC47 as part of PREE Phase 5, focusing on energy efficiency policy and program evaluation.

The second EEP Workshop was carried out in Jeju Island, Korea, alongside the EGEEEC 49 meeting. Based on feedback from economies, the topic of energy efficiency policy evaluation was selected again, but in greater depth and with more specific practical applications. This workshop was attended by 30 participants from 15 APEC member economies. The feedback was very positive, including verbal encouragement to continue with this from several attendees. The EEP Workshop Summary Report: Policy and Program Evaluation II was published in June 2017.

The third EEP Workshop was held in Washington, D.C., USA, on 10 April 2018, alongside the EGEEEC51 meeting. The workshop focused on conformity assessment – the process of ensuring a product or service meets the standards or regulations it is designed or advertised for – and was delivered mainly by the CLASP consultancy with additional presentations by several invited experts. There were 29 participants from 11 economies. A summary report was published on the APEC and APERC websites in early September 2018.

The fourth EEP Workshop was held in Hong Kong, China, on 18 March 2019, alongside the EGEEEC53 meeting. The workshop was titled “Energy Efficiency in the Transport Sector: developing policy for fuel economy regulation” and was delivered mainly by the Retyna consultancy with additional presentations by invited experts and economy representatives. There were 41 participants from nine economies. A summary report was published on the APEC and APERC websites.

APERC held the fifth EEP Workshop on 18 November 2020 in conjunction with the 55th EGEEEC meeting online. The workshop is titled “economic recovery through energy efficiency”, and it covers some ways in which strengthening energy efficiency policy and making investments in energy efficiency can stimulate economic growth. More than 60 participants were present. A summary report of the workshop was published in January 2021.

The sixth EEP Workshop was held online on 29 March 2022 in conjunction with the EGEEEC58 meeting. Its theme was energy efficiency project financing.

## MILESTONE

A summary report of the sixth EEP Workshop was published in July 2022 and its main points will be reported at EWG64. The seventh EEP Workshop is scheduled to be held in 2023.

## **B. PEER REVIEW ON LOW-CARBON ENERGY POLICIES (PRLCE)**

## BACKGROUND

In their Fukui Declaration in June 2010 on ‘Low-Carbon Paths to Energy Security: Cooperative Energy Solutions for a Sustainable APEC’, the APEC Energy Ministers instructed the EWG to ‘explore mechanisms to encourage economies to set individual goals and action plans for introducing low-emission power sources, building upon the success of the PREE, with assistance from APERC and relevant technology expert groups.’

Modelled on the successful Peer Review of Energy Efficiency (PREE), PRLCE assists volunteer economies in developing policies that support energy security and environmental protection through promoting low-carbon energy supply (e.g. renewable energies).

## OBJECTIVE

The objectives of the PRLCE are:

1. To share experiences and knowledge among APEC economies on the best practices to promote low-emission power sources by means of the elaboration of a Peer Review Report on Low-Carbon Energy Policies;
2. To elaborate a Peer Review Report on Low-Carbon Energy Policies for APEC economies, attending to their particular circumstances and conditions, so that the strategies and measures recommended are the most efficient for contributing to the design of effective public policies in this field; and
3. To provide peer-reviewed recommendations that might be voluntarily adopted to encourage APEC economies to introduce or accelerate their power supply from low-emission sources, monitoring their progress to assess their effectiveness.

## PROGRESS

Guidelines for PRLCE were endorsed by EWG members in August 2011.

The first PRLCE focused on renewable energy was held in Thailand on 21-25 May 2012. The peer review was conducted by a team of nine experts (from China; Japan; Malaysia; Chinese Taipei; the United States; Viet Nam; IRENA; and APERC). The draft Review Report of PRLCE in Thailand was discussed and endorsed by EWG members at the EWG44 meeting.

The second PRLCE focused on the National Renewable Energy Program (including the Feed-in Tariff (FIT) system for renewable energy) was held in the Philippines on 19-23 November 2012. The peer review was conducted by a team of nine experts (from China; Japan; Malaysia; New Zealand; Thailand; IRENA; and APERC). The draft Review Report of PRLCE for the Philippines was discussed and endorsed by EWG members at the EWG46 meeting.

The third PRLCE focused on renewable energy was held in Indonesia on 13-17 May 2013. The peer review was conducted by a team of eight experts (from China; Japan; Malaysia; Thailand; the United States; and APERC). The draft Review Report of PRLCE for Indonesia was discussed and endorsed by EWG members at the EWG46 meeting.

The fourth PRLCE for Malaysia focused on renewable energy was held on 9-13 December 2013. The peer review was conducted by a team of nine experts (from Australia; China; Japan; New Zealand; Chinese Taipei; Thailand; and APERC). The draft Review Report of PRLCE for Malaysia was discussed and endorsed by EWG members at the EWG47 meeting.

The fifth PRLCE for Viet Nam focused on renewable energy was held on 18-22 January 2016. The peer review was conducted by a team of 12 experts (from Australia; Japan; Korea; New Zealand; the Philippines; Chinese Taipei; Thailand; and APERC). The draft Review Report of PRLCE for Viet Nam was endorsed by EWG members through circulation and published on the APEC website as well as the APERC website.

The sixth PRLCE for Papua New Guinea focused on hydropower resources was held on 1-4 August 2017. The peer review was conducted by a team of 11 experts (Hong Kong, China; Indonesia; New Zealand; the Philippines; Chinese Taipei; Thailand, the US and APERC). The Review Report of PRLCE for PNG was endorsed and posted on the APEC and APERC websites.

## MILESTONE

APERC will invite all eligible economies to host the next PRLCE.

## C. LOW-CARBON MODEL TOWN (LCMT) PROJECT

### BACKGROUND

This project directly responds to the declaration at the ninth APEC Energy Ministers Meeting, held in Fukui, Japan, on 19 June 2010.

Ministers discussed low-carbon paths to energy security, which provide cooperative energy solutions for a sustainable APEC as well as economic growth. They noted that the introduction of low-carbon technologies in city planning to boost energy efficiency and reduce fossil energy use is vital to manage rapidly growing energy consumption in the urban areas of APEC.

APEC Energy Ministers, therefore, agreed to launch an ‘APEC Low-Carbon Model Town (LCMT) Project’ to present successful models for coordinated usage of advanced low-carbon technologies. This project is considered a priority project for APEC.

### OBJECTIVE

The key objectives of LCMT are:

1. To disseminate the basic ideas and effective approaches of the Concept through utilising the LCT-I System, which helps evaluate the progress and status of low-carbon development of various areas in the APEC region;
2. To provide Feasibility Studies of a specified area of low-carbon development projects selected as the LCT-I volunteer towns in the LCMT Project Phase 7 and identify how to improve the low-carbon development plans through the Feasibility Studies; and
3. To share best practices and real-world experiences of low-carbon town design with planners and policymakers throughout the APEC region.

### PROGRESS

#### **LCMT Phase 1: Tianjin, China**

Tianjin, China, was selected as the case study for the LCMT Phase 1 Project. The feasibility study was conducted and completed by a private consulting company in November 2011.

The 'Concept' was completed by the Low-Carbon Model Town Task Force in October 2011.

The policy review for Tianjin, China, was carried out on 30 August-1 September 2011.

### **LCMT Phase 2: Samui Island, Thailand**

Samui Island, Thailand, was selected as the case for the LCMT Phase 2 Project.

The refinement of the 'Concept' was completed by Study Group-A and assisted by APERC.

The feasibility study was carried out by qualified urban design consultants, and a progress report was made at the LCMT Task Force meeting held in conjunction with the EWG44 meeting.

The policy review for Samui Island, Thailand, was conducted by Study Group-B, assisted by APERC, on 24-28 September 2012.

### **LCMT Phase 3: Da Nang, Viet Nam**

Da Nang, Viet Nam, was selected as the case for the LCMT Phase 3 Project.

The refinement of the 'Concept' was considered by Study Group-A and assisted by APERC, and its third edition was completed in January 2014.

The feasibility study was carried out by qualified urban design consultants.

A policy review was conducted by Study Group-B and assisted by APERC on 4-6 December 2013. The policy review report was presented at the seventh LCMT Task Force meeting held in conjunction with the EWG47 meeting.

### **LCMT Phase 4: San Borja, Peru**

San Borja, Peru, was selected as the case for the LCMT Phase 4 Project at the EWG46 meeting.

The refinement of the 'Concept' was considered by Study Group-A, assisted by APERC, and its fourth edition was presented at the LCMT Task Force meeting held in conjunction with the EWG48 meeting. APEC Low-Carbon Town Indicator (LCT-I) System was drafted and presented at the said meeting too.

The feasibility study for the case of San Borja was carried out by qualified urban design consultants, and the results were reported to the ninth LCMT Task Force meeting held in conjunction with the EWG49 meeting.

A policy review for San Borja was conducted by Study Group-B, assisted by APERC on 19-21 January 2015. The policy review report was endorsed and published in January 2016 on the APERC website.

### **LCMT Phase5: Bitung City, Indonesia**

Bitung, Indonesia, was selected as the case for the LCMT Phase 5 Project at the EWG48 meeting.

The 'Concept' refinement was considered with a focus on Low-Carbon Measures. In order to finalise and create the guidelines for the LCT-I System, several trials, including the previous LCMT case towns, were conducted. The project also sought to incorporate the elements of the LCT-I System in the Indicators for City Services and Quality of Life discussed in the Working Group 2 of the Technical

Committee 268 for Sustainable Development in Communities in the International Organization for Standardization (ISO). The 5<sup>th</sup> Edition of the 'Concept' was presented at the 10<sup>th</sup> LCMT Task Force meeting held in conjunction with the EWG50 meeting.

The Feasibility Study for Bitung City, North Sulawesi Province, Indonesia, was carried out by a qualified urban design consultant and reported to the 10<sup>th</sup> LCMT Task Force meeting.

A policy review was conducted by Study Group-B and assisted by APERC on 30 November -2 December 2015. The policy review report was endorsed and published in June 2016 on the APEC website as well as the APERC website.

### **LCMT Phase 6: Mandaue City, the Philippines**

Mandaue, the Philippines, was selected as the case for the LCMT Phase 6 at the EWG49 meeting.

The Feasibility Study for Mandaue City, the Philippines, was carried out by a qualified urban design consultant and the report was published in June 2017 on the APEC website.

The first edition of the LCT-I System was established together with the sixth edition of the 'Concept'. The sixth edition of the 'Concept' is the final edition for the time being, and it was presented at the 12<sup>th</sup> LCMT Task Force meeting held in conjunction with the EWG52 meeting. The APEC liaison officer attended the ISO meetings to share information.

A policy review was conducted by Study Group-B and assisted by APERC on 7-9 December 2016. The policy review report was endorsed and published on the APEC and APERC websites in May 2017.

### **LCMT Phase 7: Krasnoyarsk City, Russia**

Krasnoyarsk, Russia, was selected as the case for the LCMT Phase 7 at the EWG49 meeting.

The Feasibility Study for Krasnoyarsk City, Russia, was conducted by a qualified urban design consultant, and the report was endorsed by the EWG member in April 2018.

The first LCMT Symposium was held on 14-15 September 2017 in Jakarta, Indonesia, for the dissemination of LCT through utilising the LCT-I System. The summary report was endorsed and published on the APEC and APERC websites in April 2018.

A policy review was conducted by Study Group B and assisted by APERC on 5-7 December 2017. The policy review report was published on the APEC and APERC websites in October 2018.

The APEC liaison officer attended the ISO meetings to follow up the discussion for establishing the global standard.

### **LCMT Dissemination Phase 1 (Phase 8):**

LCMT Dissemination Phase 1 started in August 2017 and ended in March 2019.

The second LCMT Symposium was held on 20-21 September 2018 in Da Nang, Viet Nam, for the dissemination of LCT through utilising the LCT-I System. The summary report was published on the APERC website in February 2019.

A focused feasibility study for three volunteer towns of the Dissemination Phase 1 (Banda Aceh of Indonesia, Hang Tuah Jaya and Shah Alam of Malaysia) was led by Nikken Sekkei Research Institute. The report was approved in May 2019.

#### **LCMT Dissemination Phase 2 (Phase 9):**

LCMT Dissemination Phase 2 started in August 2018 and ended in June 2020.

The third LCMT Symposium was held in San Borja, Lima, Peru, on 21-22 October 2019 and its summary report was approved and published on the APERC website in June 2020. It was the first outdoor meeting of the LCMT project.

The consulting agency, represented by the Institute of Regional Sustainable Development (Viet Nam), conducted the feasibility study for Davao of the Philippines and Da Lat of Viet Nam. Two feasibility study reports were also approved in June 2020.

#### **LCMT Dissemination Phase 3 (Phase 10):**

The project proposal for LCMT Dissemination Phase 3 was approved in October 2019. This phase is the last phase of the LCMT Project, to conclude the ten years of implementation. Nikken Sekkei Research Institute has finished the focused feasibility study for the three volunteer towns (La Molina of Peru, Khon Kaen of Thailand, and Phu Quoc of Viet Nam). The wrap-up symposium was held online on 10 September 2021.

### **MILESTONE**

While the summary report of the wrap-up symposium was published in October 2022, the report of the feasibility study will be published after the endorsement by EWG.

## **D. OIL & GAS SECURITY INITIATIVE (OGSI)**

### **BACKGROUND**

APEC Energy Ministers met in St. Petersburg, Russia, on 24-25 June 2012. They encouraged the EWG and APERC to work on activities to improve the response to oil and gas emergency situations, including emergency response workshops and exercises. EWG and APERC are expected to perform these activities in collaboration with the International Energy Agency (IEA) and the Association of Southeast Asian Nations (ASEAN).

This instruction by energy ministers was confirmed at the highest level: APEC leaders agreed to promote activities to improve the response to oil and gas emergency situations in the APEC region at Vladivostok, Russia, on 8-9 September 2012.

As part of the APEC Oil & Gas Security Exercises (OGSE), APERC organised two fora and two exercises. The first Security Forum, a kick-off meeting, was held on 18-19 April 2013 in Tokyo. Scenarios for the Security Case Study Exercises were developed by APERC with the cooperation of outside experts. The first exercise was a joint exercise by Southeast Asian APEC economies on 17-19 September 2013, held in Bangkok, Thailand. The second exercise was carried out for Indonesia on 22-24 October 2013 in Jakarta. The results of the two exercises were presented at the second Security Forum, a wrap-up meeting held on 25 March 2014 in Tokyo. Likewise, the APERC's survey on the



Development of APEC's Approach to Oil and Gas Security was drafted and discussed during the said Forum. Results of the Exercises and the survey were compiled into a Final Report, which was presented to the EWG47 meeting.

In reporting the result of OGSE to the EWG47 meeting, APERC proposed the APEC Oil & Gas Security Initiative (OGSI), a new project which succeeded OGSE. OGSI consists of three pillars: Oil & Gas Security Exercise (OGSE) on a voluntary basis and not on a scheduled basis, Oil & Gas Security Network (OGSN) by officials in charge of oil and gas security policy in each economy, and Oil & Gas Security Studies (OGSS) on research topics related to oil and gas security in the APEC region.

OGSI was endorsed as an APEC Self-Funded project at the EWG48 meeting.

## OBJECTIVE

The key objectives of OGSI's major pillars are:

1. To provide vital information on global developments and issues on oil and gas security;
2. To share experiences and insights on the challenges confronting the APEC economies relating to oil and gas security and supply emergency threats; and
3. To establish and apply APEC Oil and Gas Security Exercise Model Procedure as a guiding framework to address different emergency supply scenarios.

## PROGRESS

The Philippines volunteered to undertake the first APEC Oil and Gas Security Exercise (OGSE) under the Oil and Gas Security Initiative, focusing on oil and gas supply emergencies. The OGSE in the Philippines was held in Manila on 7-9 December 2015. This OGSE was also the first case to apply and test the implementation of the APEC Oil and Gas Security Exercise Model Procedure (EMP). The report of OGSE in the Philippines was presented at the second Energy Resiliency Task Force meeting held in conjunction with the EWG51 meeting.

The second OGSE in Australia was held in Melbourne on 29-31 March 2017 with a focus on regional capacity building. Representatives from Indonesia, the Philippines and Thailand also participated.

The third OGSE in Peru was held in Lima on 6-8 November 2017. Its final report was published on the APEC and APERC's websites in July 2018.

Finally, the Oil and Gas Security Exercise in Chile (4<sup>th</sup> OGSE) was held in Santiago on 13-15 March 2019. The OGSE in Chile was a 'blind' type exercise where participants were briefed about hypothetical oil and gas supply disruptions without prior notice, with seven experts from different institutions forming the Review Expert Team. The final report was endorsed by EWG and is available on the APEC and APERC websites since December 2019.

The OGS Newsletter, which is part of the Oil and Gas Security Network (OGSN), is being produced and has been circulated bi-monthly since December 2014. To date, 41 OGS Newsletters have been released. In conjunction with APERC's independence in April 2020, all articles in OGS Newsletter have been solely written by the APERC researchers starting from the 33<sup>rd</sup> issue released in the same month.

The first OGSN Forum was held in Kitakyushu City, Japan, on 23-24 April 2015 and the initial results of the OGSS as well as EMP were presented. The second OGSN Forum was held in Kagoshima City, Japan, on 10-11 March 2016, and APERC reported the implementation of OGSE in the Philippines, the results and the progress of OGSS. Representatives from 19 APEC economies and five international



and regional energy organisations participated in the Forum. Australia held a session on the risk management principles for energy security. The third OGSN Forum was held in Irkutsk City, Russia, on 29-30 June 2017. The fourth OGSN Forum was held in Tokyo, Japan, on 7-8 March 2018 in conjunction with the EGCFE meeting on 9 March 2018. The fifth OGSN Forum was held in Sendai City, Japan, on 10-12 April 2019 in conjunction with the second EGCFE oil and gas meeting.

Six OGSS reports on Oil Supply Security and Emergency Policy in the APEC region, the Impact on Oil Distribution, the Energy Reform in Mexico, Prospects and Compromise Points of the Arab Spring, Petroleum Product Trading and Security, and Melting of the Arctic Sea Ice were published on the APERC website in November 2015. One report on Plans for Fuel Supplies during Disasters in Expectation of Nankai Megathrust Earthquakes was published in October 2016. Four studies on Oil and Gas Security Indexation, Impact of Low Oil Price on Energy Security, Natural Gas Security in APEC, and Superiority of LPG: A Disaster-Resistant Energy Source were published in 2017. Three more reports were published in the summer of 2018: Energy security of APEC economies and changing downstream oil environment, Investments in Natural Gas Supply Chain under the Low Price Environment, and APEC Oil and Gas Security Indexation 2017 Update. In 2019, two reports were completed and published in September: Small-scale LNG in Asia Pacific and Emerging energy security risks in changing energy landscape. The 17<sup>th</sup> OGSS report entitled “*Changing LNG market dynamics – impacts on supply security in the APEC region*” was published in September 2020. The 18<sup>th</sup> OGSS report entitled “*Impact of COVID-19 on oil and gas security*” was published in April 2022.

## MILESTONE

The 5<sup>th</sup> OGSE scheduled to be hosted by Thailand was postponed. Thailand will discuss with APERC what date would be best to re-organise the activity. The Minister of Energy or the Permanent Secretary for the Ministry of Energy will host this exercise at the Ministry of Energy, Energy Complex in Bangkok. The exercise will cover the supply emergency scenarios in two stages - the first stage of the scenario is on oil, and the second is on gas.

The 6<sup>th</sup> OGSN Forum will be held in Japan, though its schedule is not decided yet. The OGS Newsletter will continue to be published every other month, and the next issue (Issue No 49) is scheduled to be published by the end of December 2022.

The 19<sup>th</sup> OGSS report entitled “*The impact of the energy transition on oil and gas security*” is scheduled to be published in early 2023.

## 5. Energy Resiliency Enhancement Project

### BACKGROUND

In recent years, APEC member economies have been suffering from natural disasters such as earthquakes and typhoons, causing severe damage to the energy infrastructure. In this narrative, EWG established APEC Energy Resiliency Principle (the Principle) with the great help of Energy Resilience Task Force and APEC member economies. Under the Principle, the draft of APEC Energy Resiliency Guidelines was circulated among APEC member economies for endorsement by EWG after three virtual workshops were held in Chile and Chinese Taipei in January 2022, and in the Philippines in February 2022.

APERC supported METI of Japan and Washington CORE as a project contractor, to prepare for holding three workshops smoothly, especially logistics matters.

## OBJECTIVE

As the follow-up actions based on the Principle, the Energy Resiliency Enhancement Project aims to enhance the ability to secure a stable energy supply by effectively dealing with disasters and implements the following key activities as the first phase project (the Project).

- 1) Develop an evaluation model by identifying, collecting, and assessing indicators to evaluate energy resiliency;
- 2) Create Energy Resiliency Sectoral Guidelines for energy infrastructure companies to promote initiatives in the public and private sectors; and
- 3) Hold a workshop to raise awareness and knowledge of energy resiliency in the region.

## PROGRESS

The Project started in August 2022. A tendering process was conducted to select a contractor for the project implementation. Only one proposal had been received at the original tendering deadline. Based on the APEC secretariat recommendation, the tendering deadline was extended twice to avoid one-company bids. Three proposals were received finally and it is in the process of proposal evaluation. APERC supported METI in the preparation for the tendering process.

The Project schedule was delayed one month due to the tendering process. We will accelerate the selection process and other project activities.

## MILESTONE

The first phase of APEC Energy Resiliency Enhancement Project is expected to be completed in June 2023. APERC will continuously support METI and its contractor for the Project completion.

## **6. Symposia on the Holistic Approach of Decarbonization for Energy Transition**

### BACKGROUND

Sharing knowledge and experience among members is important to achieve various, pragmatic and sustainable energy transitions. APERC organised the APEC Symposium on the Holistic Approach of Decarbonisation towards Carbon Neutrality as an APEC project under the auspices of Japan's Ministry of Economy, Trade and Industry (METI).

### OBJECTIVE

The symposium was held to demonstrate the importance of the holistic approach of decarbonization towards carbon neutrality. It intended to enhance the capacity of APEC economies to pursue decarbonization towards carbon neutrality.

### PROGRESS

- The symposium was held online on 30-31 August 2021.
- More than 180 individuals registered (including speakers and organisers)
- 27 experts participated in speeches, presentations and panel discussions

- Presentations
  - potential of decarbonization in the APEC region
  - hydrogen and ammonia
  - energy saving
  - renewable energy power
  - issues for electricity security
  - CCUS
  - nuclear energy
  - transition finance
- Panel Discussions
  - how to pursue carbon neutrality while strengthening energy security and resiliency

## MILESTONE

A summary report of the symposium has been completed and will be published after the endorsement by EWG in 2022.

APERC is planning to follow up the symposium by holding a series of sectoral symposia related to decarbonisation for the energy transition. The first one will be Symposium on Promoting Energy Efficiency, which is scheduled to be held in early 2023.

## II. FUTURE WORK PLAN

APERC's Future Work Plan is designed to assist EWG in responding to the instructions by APEC Energy Ministers for the coming years as described in Part I.

APERC conducts research activities, particularly producing the *APEC Energy Demand and Supply Outlook*. In addition, APERC, as the designated executants, assists project overseers by carrying out APEC projects on the condition that a budget from the APEC fund is approved for those projects by the APEC BMC.

As agreed in EWG47, APERC is now directly responsible to EWG. APERC will keep close cooperation with the Expert Group of Energy Data and Analysis (EGEDA) as well as other expert groups under EWG in planning and implementing its activities.

### 1. Research Activities

#### A. APEC ENERGY DEMAND AND SUPPLY OUTLOOK

The Outlook 9th edition is scheduled to be published in 2025. APERC will formally begin preparation for gathering assumptions, developing scenarios, and starting analysis in early 2023.

#### B. APEC ENERGY OVERVIEW

The APEC Energy Overview 2023 will be published in July 2023.

#### C. TOPICAL STUDIES

APERC will encourage its researchers to conduct research on energy affairs and policies in the APEC region for the interest of APEC economies as well as for the preparation of the Outlook ninth edition.

## **2. Accepting Trainees and Dispatching Experts**

APERC will organise the 29<sup>th</sup> Seminar on Energy Modelling in March 2023.

## **3. Building Energy Data Management Networks**

The following are the plans for FY2022-2023:

1. Collect, process and analyse the 2021 annual energy demand and supply data;
2. Publish the APEC Energy Statistics 2020 and APEC Energy Handbook 2020;
3. Participate in international cooperation on energy statistics such as the Energy Statistics Development Group (ESDG) of IEA, JODI, International Energy Statistics (InterEnerStat) meetings, etc.; and
4. Run the EGEDA Training Program on Energy Statistics.

## **4. Policy Cooperative Activities**

### **A. PREE**

The seventh EEP Workshop is scheduled to be held in 2023.

APERC will invite all eligible economies to host the next PREE.

### **B. PRLCE**

The PRLCE will be an essential instrument to achieve the APEC aspirational goal to double the share of renewable energy in the energy (or power) mix in the APEC region. APERC will invite all eligible economies to host the next PRLCE.

### **C. OIL & GAS SECURITY INITIATIVE (OGSI)**

The new date of the 5<sup>th</sup> OGSE will be discussed between Thailand and APERC.

The 6<sup>th</sup> OGSN Forum will be held in Japan, though its schedule is not decided yet. The Forum will probably be held in conjunction with the next EGCFE oil and gas meeting.

APERC will continue activities for OGSI, including issuing OGS Newsletter and publishing reports of OGSS.

### **D. ENERGY RESILIENCY ENHANCEMENT PROJECT**

APERC will assist Japan's Ministry of Economy, Trade and Industry to conduct APEC Energy Resiliency Enhancement Project.

### **E. CARBON NEUTRALITY SYMPOSIA**

APERC is planning to follow up the Symposium on the Holistic Approach of Decarbonisation towards Carbon Neutrality by holding a series of sectoral symposia related to decarbonization towards

energy Transition. The first one will be Symposium on Promoting Energy Efficiency which is scheduled to be held in early 2023.

### **III. RESEARCH MANAGEMENT**

#### **1. APERC Annual Conference**

The APERC Annual Conference is held to gather experts from around the world to help APERC's research activities.

The 2022 APERC Annual Conference took place on 25-26 April 2022 online.

#### **2. APERC Advisory Board**

Establishing the APERC Advisory Board was endorsed by the EWG16 meeting in Cairns, Australia, in August 1998. The Terms of Reference were endorsed by the EWG17 meeting in Oakland, the United States, in April 1999.

The Advisory Board is a group of representatives of major research institutions located in the APEC region who help facilitate APERC's cooperative research. Its primary role is to give professional advice on APERC's ongoing and proposed research, such as methodologies, approaches, databases, and information sources, as well as relevant experts to be involved. APERC carefully considers the advice provided by its Advisory Board members in proposing its research plan to the EWG.

The latest Advisory Board Meeting was held on 27 April 2022 in conjunction with the APERC Annual Conference.

## IV. APERC RESEARCH STAFF

APERC visiting researchers are generally drawn from energy research organisations, both government and non-government, in APEC member economies. The minimum term of visiting researchers supported by APERC's budget is one year, which may be extended subject to consultations between APERC and the visiting researcher.

APERC would like to invite all economies to nominate candidates of visiting researchers to serve at APERC. In principle, APERC accepts one researcher from each APEC member economy.

APERC offers to the visiting researchers: 1) living allowance; 2) furnished housing in Tokyo; 3) family, education, commuting and moving allowances; and 4) health insurance.

As of 31 October 2022, APERC has a total of 26 research staff, of which 16 are visiting researchers from APEC economies.

**Table 1: APERC Research Staff**

Name
Kazutomo Irie (President)
Glen Sweetnam (Senior Vice President) *
Munehisa Yamashiro (Vice President/General Manager)
Yoshiaki Imaizumi (Deputy General Manager)
David Michael Wogan (Assistant Vice President) *
Edito Barcelona
Thanan Marukatat*
Elvira Torres Gelindon
Nobuhiro Sawamura
Alexander Izhbuldin*
Manuel Antonio Heredia Munoz*
Jeongdu Kim*
Phung Quoc Huy*
Christopher James Doleman*
Mathew Horne*
Asmayati Bt Ab Manan*
Ario Jati*
Zhichao Li*
Nabih Matussin*
Reiko Chiyoya
Emily Medina*
Risa Pancho
Yu-Hsuan Wu*
Finbar Maunsell*
Phawida Jongsuwanwattana
Takako Hannon

\* Visiting Researchers from APEC economies.

## V. REVENUE AND EXPENSES

Since its inception, APERC's budget has been provided by the Japanese government and, in fiscal 2004, 2005 and 2006, also by the Australian government.

This budget has been used to facilitate research activities, cooperative efforts, know-how transfer programmes to the member governments, and the energy data network service.

The table below is a summary of annual financial statements since APERC was established in July 1996.

**Table 2: APERC Revenues and Expenses**

Unit: million yen

Fiscal Year	1996 9mns	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
<b>Revenue from:</b>														
Japanese Government	374	626	681	729	619	634	594	547	525	528	498	446	447	418
Australian									8	8	8			
<b>Total of Revenue</b>	<b>374</b>	<b>626</b>	<b>681</b>	<b>729</b>	<b>619</b>	<b>634</b>	<b>594</b>	<b>547</b>	<b>533</b>	<b>536</b>	<b>506</b>	<b>446</b>	<b>447</b>	<b>418</b>
<b>Expenses:</b>														
Energy Efficiency/APEC Demand & Supply Outlook/ Related Research Programmes Oil & Gas Security	227	443	494	550	455	469	434	390	379	377	377	338	339	318
Energy Data Network & Know-How Transfer	147	183	187	179	164	165	160	157	154	159	129	108	107	100
<b>Total of Expenses</b>	<b>374</b>	<b>626</b>	<b>681</b>	<b>729</b>	<b>619</b>	<b>634</b>	<b>594</b>	<b>547</b>	<b>533</b>	<b>536</b>	<b>506</b>	<b>446</b>	<b>447</b>	<b>418</b>
Fiscal Year	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022 (Plan)	
<b>Revenue from:</b>														
Japanese Government	409	425	494	580	657	653	689	672	672	672	672	672	672	
<b>Total of Revenue</b>	<b>409</b>	<b>425</b>	<b>494</b>	<b>580</b>	<b>657</b>	<b>653</b>	<b>689</b>	<b>672</b>	<b>672</b>	<b>672</b>	<b>672</b>	<b>672</b>	<b>672</b>	
<b>Expenses:</b>														
Energy Efficiency/APEC Demand & Supply Outlook/ Related Research Programmes Oil & Gas Security	315	308	325	325	432	501	522	423	388	406	338	330	474	
Energy Data Network & Know-How Transfer	94	94	86	107	68	183	124	161	119	100	59	43	224	
<b>Total of Expenses</b>	<b>409</b>	<b>402</b>	<b>411</b>	<b>500</b>	<b>600</b>	<b>781</b>	<b>737</b>	<b>670</b>	<b>580</b>	<b>550</b>	<b>437</b>	<b>463</b>	<b>788</b>	