



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

**REPORT ON APERC ACTIVITIES**

**THE 65<sup>TH</sup> MEETING OF  
THE APEC ENERGY WORKING GROUP (EWG-65)**

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# **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 8th 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.

Work on the Outlook 9th edition has started. APERC researchers are developing scenario assumptions.

#### **MILESTONES**

The Outlook 9th edition is scheduled to be published in 2025. APERC researchers formally began preparation 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, 21 editions have been issued up to 2022.

## 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

The drafting of APEC Energy Overview 2023 is ongoing 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.

The APERC Gas Report 2022 was published in January 2023 and the APERC Coal Report 2022 was published in February 2023. The APERC Oil Report 2022 is still being finalized.

### MILESTONE

A summary of each of the three APERC Fossil Fuel Reports 2022 was presented at EWG64. Next year, in addition to the Oil, Gas, and Coal Reports, we also plan to publish a Hydrogen Report.

## 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

After the relaxation of travel restrictions due to the COVID-19 pandemic, APERC organized the 29<sup>th</sup> Seminar on Energy Modelling on 6-10 March 2023 in Tokyo. In 2022, 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 for the schoolyear 2023-2024 started on 14 April and will be completed on 21 July 2023.

### MILESTONE

APERC will organize the 30<sup>th</sup> Seminar on Energy Modelling in March 2024.

APERC will dispatch energy modelers to a one-week course on energy modelling using the OSeMOSYS software that will be held in Thailand tentatively in summer of 2023, upon the request of the Energy Policy and Planning Office (EPPO) of the Ministry of Energy.

## 3. Building Energy Data Management Networks

### BACKGROUND

APERC has built an online communication network with energy organizations 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 organizations.
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. The APEC Energy Statistics 2020 and APEC Energy Handbook 2020 were published in March 2023 and are now being disseminated to EWG and EGEDA members, other APEC fora and international energy organizations.

The 20th APEC Workshop on Energy Statistics, Phase II of the joint workshop on energy efficiency indicators with IEA, was held on 15-17 November 2022 online. The workshop aimed to enhance the skills of EGEDA members to be able to fill out the energy efficiency indicators template. A common methodology for constructing a basic set of energy efficiency indicators for APEC economies was developed for estimating end-use energy consumption using the results from energy consumption surveys or some assumptions in the absence of surveys. The workshop also aimed to establish a firm plan on the sources of activity data.

APERC held two (2) in-person training courses on energy statistics in February and March 2023. These were the short-term course on energy statistics that was held on 6-16 February 2023, and the special training course on energy statistics for Viet Nam that was held on 27 February to 3 March 2023. Seven persons from different government agencies in Viet Nam participated in the special training course. This course aimed to harmonise the efforts of these agencies in the collection, processing, analysis, and dissemination of energy statistics. These agencies are the Electricity and Renewable Energy Authority (EREA); Oil, Coal and Gas Department; Viet Nam's EGEDA Office; the Institute of Energy (IE) of the Ministry of Industry and Trade (MOIT), and the General Statistics Office (GSO).

## MILESTONE

The APEC Energy Statistics 2021 and APEC Energy Handbook 2021 will be published in the first quarter of 2024. While the APEC Energy Handbook will continue to be printed, the APEC Energy Statistics 2021 will be made available only online.

The 21st APEC Workshop on Energy Statistics will be held in Tokyo in September 2023. The objective of the workshop is to expand the knowledge of the members on hydrogen, district cooling, grid-scale battery storage, and other new technologies such as electric vehicles, etc. It is expected that with knowledge acquired on these new technologies, members would be able to collect data and report them to the EGEDA secretariat, enriching the APEC energy database and providing more information for modelling energy transition.

For the middle-term course for the fiscal year 2022 to 2023, APERC has sent an invitation to Papua New Guinea (PNG) and Peru. The course could start on 5 June 2023. This course was postponed from February/March 2023 due to the renovation of the APERC office.

As for the EGEDA Training Program on Energy Statistics for the fiscal year 2023 to 2024, the short-term course and the middle-term course will be held in the fourth 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 was 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 organizations 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. The final report of the Follow-up PREE in Indonesia (PREE Phase 10) was published in June 2022 and is available both on APEC and APERC websites.

## MILESTONE

Communication with the Chilean government to host the next Follow-up PREE is ongoing.

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

### OBJECTIVE

In order to streamline and prioritize 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 EGEEC instead of CEEDS workshops.

### PROGRESS

A trial EEP Workshop in conjunction with EGEEC45 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 EGEEC47 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.

The fifth EEP Workshop was held 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.

APERC held the sixth EEP Workshop (PREE Phase 11) online on 29 March 2022 in conjunction with the EGEEEC58 meeting which was hosted by China. Its theme was energy efficiency project financing. 47 participants from 13 APEC economies attended the workshop and they discussed investment expansion tools and financing models for energy efficiency projects. A summary report was published in July 2022 and its main points were presented at EWG64 through the APERC workshop.

## MILESTONE

The seventh EEP Workshop (PREE Phase 12) is scheduled to be held in October 2023 in conjunction with the EGEEEC61 meeting.

## **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

Communication with the Peruvian government to host the next PRLCE in November 2023 is ongoing.

## **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 fifth 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 was the last phase of the LCMT Project, to conclude the ten years of implementation. Nikken Sekkei Research Institute finished the focused feasibility study for the three volunteer towns (La Molina of Peru, Khon Kaen of Thailand, and Phu Quoc of Viet Nam), and its feasibility study summary report was published in December 2022. The wrap-up symposium was held online on 10 September 2021 and its summary report was published in October 2022.

## **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 organized 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 (the fourth 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, 51 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 organizations 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 Oil & Gas 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. The sixth OGSN Forum was virtually held on 21 April 2023 after four years of postponement due to the COVID-19 pandemic in conjunction with EGCFE 2023 on 20 April 2023, which was the first meeting after the rescoping of the expert group.

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 fifth OGSE which was postponed in 2020 due to the COVID-19 pandemic is rescheduled to take place in Bangkok on 6-8 September 2023 and will be hosted by the Ministry of Energy of Thailand. The exercise will cover the supply emergency scenarios in oil and gas.

The OGS Newsletter will continue to be published every other month, and the next issue (Issue No 52) is scheduled to be published in June 2023.

The seventh OGSN Forum is planned to be held in conjunction with EGCFE 2024.

The 19<sup>th</sup> OGSS report entitled “Oil and Gas Security During the Energy Transition” is scheduled to be published in mid-2023.

The 20<sup>th</sup> OGSS topic is in its formative stages. APERC is putting forward a topic to study refinery constraints titled “What are the Energy Security Implications of Recent Declines in both APEC and Global Spare Petroleum Refining Capacity?”

## 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, three virtual workshops were held in Chile and Chinese Taipei in January 2022, and in the Philippines in February 2022 and the APEC Energy Resiliency Guidelines were approved by EWG in January 2023.

APERC supported Japan’s Ministry of Economy, Trade and Industry (METI) with Washington CORE, the 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 The Institute of Energy Economics, Japan (IEEJ) was selected as a contractor. APERC supported METI in the preparation for the tendering process.

Considering the delay of the Project schedule due to the tendering process and the effects of Covid 19 and the Ukraine situation, the extension of the Project completion date until December 31, 2023 was requested and approved.

## MILESTONE

A workshop is being planned to be held in September 2023, with the expected project completion date of December 2023. APERC will continuously support METI with its contractor for the Project completion.

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

### BACKGROUND

Regarding energy transitions, there is no “single best solution” for achieving carbon neutrality, as each economy has different economic and social structures and geographical situations. APERC considers that various, pragmatic, and sustainable energy transitions, that reflect the different circumstances of each economy, are essential. To achieve such energy transitions, sharing knowledge and experience among members is important.

APERC organized the APEC Symposium on the Holistic Approach of Decarbonization towards Carbon Neutrality as an APEC project under the auspices of Japan’s METI. It was held online on 30-31 August 2021 and its summary report was endorsed in February 2023.

### OBJECTIVE

The objective of this Project is to hold sectoral symposia to follow up the APEC Symposium on the Holistic Approach of Decarbonization towards Carbon Neutrality held in 2021 to further discuss two issues, which are important elements of that holistic approach. One is the decarbonization of fossil fuel use including hydrogen, ammonia and CCUS, and the other is energy efficiency and energy management system.

### PROGRESS

Two symposia were originally planned to be held in the third quarter of 2022 and/or the first half of 2023. However, due to the effects of Covid-19 and the Ukraine situation, both two symposia were delayed and postponed.

### MILESTONE

A symposium on the decarbonization of fossil fuels is planned to be held in October 2023, and another symposium on energy efficiency in January 2024, respectively.

The Project is expected to be completed in March 2024 after the two symposia above are completed.

## **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 executant, 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 is preparing assumptions and developing scenarios, to be shared with economies in the second half of 2023.

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

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

#### **C. TOPICAL STUDIES**

APERC will publish three Fossil Fuel Reports (Coal, Gas, and Oil) and a Hydrogen Report in 2023 in support of the EGCFE. In addition, 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 organize the 29<sup>th</sup> Seminar on Energy Modelling in March 2023.

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

The following are the plans for FY2023-2024:

1. Collect, process and analyze the 2021 annual energy demand and supply data,
2. Publish the APEC Energy Statistics 2021 and APEC Energy Handbook 2021,
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 October 2023 in conjunction with the EGEEEC61 meeting.

APERC will continue communication with the Chilean government to host the next follow-up PREE (PREE Phase 13).

### **B. PRLCE**

Preparation for a project proposal for the next PRLCE Phase 7 (PRLCE in Peru) is ongoing.

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

The fifth OGSE to be hosted by the Ministry of Energy of Thailand will be held in Bangkok on 6-8 September 2023.

APERC will continue to issue OGS Newsletter every other month. The seventh OGSN Forum is planned to be held in conjunction with EGCFF 2024 meeting.

After the decision on the topic, the 20<sup>th</sup> OGSS is planned to be completed and published by mid-2024.

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

APERC will assist Japan's METI to conduct APEC Energy Resiliency Enhancement Project.

### **E. SYMPOSIA ON THE HOLISTIC APPROACH OF DECARBONIZATION FOR ENERGY TRANSITION**

APERC will organize a symposium on decarbonization of fossil fuels in October 2023, and another symposium on energy efficiency in January 2024, respectively.

### **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 2023 APERC Annual Conference took place on 25-26 April 2023 in person for the first time in the last four years.

#### **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 26 April 2023 in person for the first time in the last four years in conjunction with the APERC Annual Conference.

## IV. APERC RESEARCH STAFF

APERC visiting researchers are generally drawn from energy research organizations, 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 for 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 30 April 2023, 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*
Emily Medina*
Risa Pancho
Finbar Maunsell*
Phawida Jongsuwanwattana
Le Kieu Ly Tran*
Takako Hannon
Ikuno Yamaguchi

\* 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	
Revenue from:															
Japanese Government	374	626	681	729	619	634	594	547	525	528	498	446	447	418	
Australian Government									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>	
Expenses:															
Energy Efficiency / APEC Energy Demand & Supply Outlook / Related Research Programmes	227	443	494	550	455	469	434	390	379	377	377	338	339	318	
Oil & Gas Security															
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	2023	
Revenue from:															
Japanese Government	409	425	494	580	657	653	689	672	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>672</b>	
Expenses:															
Energy Efficiency / APEC Energy Demand & Supply Outlook / Related Research Programmes	315	308	325	325	432	501	522	423	388	406	338	330	474	423	
Oil & Gas Security				107	68	183	124	161	119	100	59	43	224	163	
Energy Data Network & Know-How Transfer	94	94	86	68	100	97	91	86	73	44	40	90	90	86	
<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>	<b>672</b>	