Asia-Pacific Economic Cooperation

APERC Asia Pacific Energy Research Centre

6. APEC Symposium on Promoting Energy Efficiency and Energy Management Systems

APERC Workshop

The 67th Meeting of APEC Energy Working Group (EWG67)
25 February 2024 – Lima, Peru

Mr Yoshiaki IMAIZUMI, Deputy General Manager of Research

Outline

Objectives and Outcomes

Agenda

Session Highlights

Evaluation

Next Step

Objectives and Outcomes

Objectives

- Follow up on the recommendations of the APEC Symposium on the Holistic Approach of Decarbonization towards Carbon Neutrality held online in August 2021.
- Focus on energy efficiency and energy management systems as the 2nd sectoral symposium on carbon neutrality, following the symposium on decarbonization of fossil fuels in October 2023.

Outcomes

- January 23, 2024 – Symposium (in-person)
- January 24, 2024 – Site visit (Tokyo Denki University)
- Venue: Shinagawa Prince Hotel, Tokyo, Japan
- 63 Participants from 14 economies (Female participants 41%)

(Australia, Chile, China, Hong Kong China, Indonesia, Japan, Korea, Malaysia, the Philippines, Singapore, Chinese Taipei, Thailand, the United States, Viet Nam)

DISCLAIMER

- The summary of each speech/presentation was not reviewed/approved by each speaker and is therefore should not be quoted.

CONFIDENTIALITY

- The contents of this presentation are **CONFIDENTIAL** until the draft report is deemed approved and endorsed by the EWG members.

Day 1 Agenda

9:00 Session 1: Opening remarks & 2 Keynote speeches

9:45 Session 2: Energy Efficiency in Building: Current Situation and Room for further improvement

11:20 Session 3: Energy Efficiency in Transport: Current Situation and Room for further improvement

13:55 Session 4: Energy Efficiency in Industry: Additional Potential for Achieving Carbon Neutrality in APEC

15:35 Session 5: Energy Management System and Smart City

16:40 Closing remarks

Session 1: Opening Remarks and Keynote Speech

Dr Kazutomo Irie, President of Asia Pacific Energy Research Centre (APERC) –Opening remarks

- Welcomed participants and explained the background & objectives of the Symposium.
- Emphasized the importance of the energy transition, energy efficiency, and sharing knowledge & experiences among APEC economies.

Mr Hideyuki Umeda, Director for International Policy on Carbon Neutrality, Ministry of Economy, Trade and Industry (METI), Japan –Keynote speech

- Emphasized that Japan needs to reduce 62 million kL in final energy consumption in FY2030, which will be achieved by improvement of energy efficiency and expansion of non-fossil energy.
- Concluded Japan's demand-side policies support clean energy transition. Japan will keep contributing to energy efficiency and decarbonization in APEC region by sharing its experience and policies.

Dr Meng Liu, APEC EGEEC Chair and Deputy Chief, Division of Resources and Environment, China National Institute of Standardization, China –Keynote speech

- Recommended an increased focus on evaluating the cost-effectiveness of energy efficiency policies.
- Emphasized the importance collecting and reporting energy efficiency data.

Session 2: Energy Efficiency in Building: Current Situation and Room for Further Improvement

Mr Wallace Leung (Electrical and Mechanical Services Department, Hong Kong, China) –Improving Energy Efficiency in Buildings in Hong Kong, China

- Buildings account for 90% of electricity consumption and 60% of carbon emissions in Hong Kong, China. The reduction targets of 30-40% and 20-30% were set for electricity consumption in commercial and residential buildings, respectively, by 2050. Hong Kong, China has improved energy intensity by 33.3% from 2005 to 2021.
- The regulatory approach is implemented by 1) Ordinance on energy audit of buildings, 2) Mandatory Labelling covering 80% of residential consumption, and 3) Building Regulation for commercial buildings & hotels.

Ms Courtney Sourmehi (Department of Energy, the USA) –Modeling US buildings energy efficiency

- The National Energy Modeling System (NEMS) projects that electricity consumption will be the fastest growing fuel in buildings in the United States through 2050 . The drivers of energy building use include the relative efficiency of electric appliances and continued population shifts to warmer regions.
- In the residential and commercial sectors, higher equipment efficiencies and compliance with building codes extend ongoing declines in energy intensity.
- Despite historical growth in heat pump adoption, natural gas continues to be the biggest source for space heating for new single-family homes.

Session 2 (continued)

Dr Subbu Sethuvenkatraman (Commonwealth Scientific and Industrial Research Organisation (CSIRO), Australia) –Energy Efficiency of Buildings in Australia

- 60% of building energy use is through electricity and buildings account for 18% of total emissions.
- Digitalization of buildings involves connecting the buildings and getting access to all data in a cost-effective way, and then delivering benefits through analytics.
- The pathway for decarbonization is achieved by a combination of energy efficiency measures supported by policies and technology changes with digitalization, and high uptake of renewable energy resources.

Dr Naoko Doi (Institute of Energy Economics, Japan (IEEJ), Japan) –Japan's Path for Carbon Neutrality and the Role of Energy Efficiency in Buildings

- Promoting the introduction of zero energy buildings, energy efficiency renovation of stock buildings, and efforts in operational energy efficiency improvement are the keys in the building sector.
- In the second supplementary budget for households in FY2023, a total of 421.5 billion yen are being provided for the energy efficiency of residential sector.
- Japan's evolving energy efficiency policies include promoting carbon neutrality of water heaters, demand response ready appliances, and consumers' engagement which would requires the electric/gas retailers to set energy saving targets.

Session 2 (continued)

Q&A and Discussions

- The US EIA is looking to create an open-source version of the national energy modeling system. From a building's perspective, they will take a deep look into how they can add the income dimension and to more robustly representative policy development.
- The government of Hong Kong, China takes the lead by showing the commitment to the private sector through implementing minimum energy saving requirement, energy audit, retro-commissioning, etc. The government shows the private buildings' achievements to the society and provides technical advice to SMEs or encourages them to apply the finance subsidy for energy sector retrofit.
- Data is the primary basis for continuous commissioning or tuning in Australia. Starting with basic instrumentation or monitoring is going to be important. Data driven M&V provided will be a major motivator for people to participate in energy efficiency schemes and benefit from them.
- The Energy Conversion Law in Japan has been amended to include non-fossil energy. All energy sources, including all fossil fuels and renewables need to be regulated. The regulated industry and commercial sectors must report the annual fuels consumption aside from the fossil fuels.

Session 3. Energy Efficiency in Transport: Current Situation and Room for further improvement

Professor Qiang Meng, (National University of Singapore, Singapore) - Energy Efficiency in Transport Sector of Singapore

- The roadmap of the Land Transport Authorities was issued in 2020. It aims to reduce peak land transport emissions by 80% in 2050 through a holistic vehicle electrification plan.
- On the maritime industry, each container requires tugboats. Therefore, electric tugboats and optimal tugboat scheduling are needed to save energy.
- On the aviation industry, Changi Airport is upgrading its lighting and chilling systems to enhance energy efficiency of airport operations. The Airport will step up its solar deployment on terminal buildings.

Mr Huzaimi Nor Bin Omar, (Green EV Charge Sdn Bhd, Malaysia) - Improving Energy Efficiency in Transport in Malaysia

- National Energy Transition Roadmap (NETR) 2023-50 was launched, focusing on carbon emission reduction towards realizing the Net Carbon Emission 2050.
- Manufacturing incentives and voluntary energy efficient vehicle labeling schemes are implemented. Electric vehicles take center stage as the primary focus that EV penetration is expected to be 15% by 2030, 38% by 2040, and 80% by 2050.
- National EV Taskforce (NEVTF) and National EV Steering Committee (NEVSC) look at the progress of EVs.

Session 3 (continued)

Dr Noriel Christopher Tiglao, (University of the Philippines, the Philippines) - Improving Energy Efficiency in Transport in the Philippines

- In 2015, the transport sector contributed to 34% of the total Philippines greenhouse gas emissions, with road transport accounting for 80% of those emissions.
- Based on the transportation modeling, expansion of mass transit network is the single policy scenario that contributed to a higher overall reduction in petroleum and alternative fuel consumption levels.
- The Comprehensive Roadmap for the Electric Vehicle Industry has four components: EVs and charging stations, manufacturing component, research and development, and human resource development.

Mr Takao Aiba, (Japan Automobile Manufacturers Association, Inc., (JAMA), Japan) - Achievement and potential of multi-pathway approach in road transport sector

- Japan has reduced 23% of CO2 emissions from the road transport sector, comparing with 9% in the US and 3 % in Germany and the Netherland.
- An integrated approach is essential. There are four pillars: 1)automobile manufacturers should provide more fuel-efficient vehicles, 2)fuel suppliers should provide diversified fuel supply, 3)users/customers should select environmentally friendly cars, and 4)governments should enforce traffic flow improvement.
- Study findings show supply of carbon-neutral fuel, comprising of biofuel and synthetic fuel, will be necessary.

Session 3 (continued)

Q&A and Discussions

- The government of Singapore is concerned about how to meet electric capacity on the grid. A smart charging strategy is also important. The highest charging demand is after 6 pm. The government might need a sub-system of the grid.
- Malaysia tries to understand the demand for generation and distribution on the grid. Currently initiatives on EVs are integrated. Malaysia understands there is huge potential for energy storage.
- In the Philippines monitoring enforcement and evaluation are key things. Moreover, there is a need to work with the private sector for reporting. Co-production and co-creation is a slogan.
- In Japan the fuel economy standards using the top-runner approach set a very high target to reduce CO2 emissions. Backed by government incentives, the share of HEVs grew dramatically, which contributed to improving fuel economy in Japan.

Session 4: Energy Efficiency in Industry: Additional Potential for Achieving Carbon Neutrality in APEC

Dr Tze-Chin Pan, (Industrial Technology Research Institute, Chinese Taipei) -Improving Energy Efficiency in Industry in Chinese Taipei

- Given that over 90% of industrial energy needs are supplied by electricity due to semiconductor manufacture, Chinese Taipei focuses on improving efficiency in electricity usage.
- Designated factories with large energy use are faced with a mandatory target to incrementally improve average annual electricity savings by at least 1% compared to a baseline.
- This target is currently under discussion regarding the potential strengthening of future targets to also encompass reductions in fossil fuel usage or setting more ambitious.

Mr Minkyu Kim (Korea Energy Economics Institute, Korea)-Improving Energy Efficiency in Industry in Korea

- Under the Korea's voluntary energy efficiency targets program, the government collaborates with about 30 significant energy-intensive corporations, which account for over 60% of industrial energy usage.
- Those corporations pledge to annual improvement targets for their energy intensity with a partnership agreement with the authorities.
- The Korean LEEN initiative (Learning Energy Efficiency Networks) fosters innovation and facilitates knowledge-sharing among small and medium-sized companies, through workshops, diagnostic services, and other collaborative activities.

Session 4 (continued)

Mr Wisaruth Maethasith (Ministry of Energy, Thailand) - Improving Energy Efficiency in Industry in Thailand

- The key policy measures targeted at the industrial sector encompass mandatory energy management standards for designated high energy usage factories and buildings.
- The designated facilities are obligated to appoint energy managers, implement management systems, and submit annual compliance reports to be verified by independent auditors.
- Thailand provides financial incentives such as equipment subsidies, which cover upper 30% of project costs for energy efficiency upgrades that meet the stipulated payback criteria.

Mr Akira Ishihara (Energy Conservation Center, Japan)- Improving Energy Efficiency in Industry in Japan

- Considering the revisions to Japan's Energy Conservation Act, new strategies have been devised with the objective of promoting a transition in energy usage away from fossil fuels.
- Benchmark targets, which were previously applicable only to the most energy-intensive industries, have been expanded to additional sub-sectors within both the industry and commercial buildings.
- Overall, Japan's experience emphasizes the importance of integrated policy packages that combine clear economy-wide objectives with tailored support measures, suited to the varying circumstances of industries and company sizes.

Session 4 (continued)

Q&A and Discussions

The following points were made by each speaker regarding the significance of government promotion on energy conservation policies:

- The existence of a target is necessary for the progress of energy conservation. The existence of a target allows more efficient use of economic subsidies, leading to efficient energy conservation.
- Improving awareness of the effects of energy conservation is important for promoting energy conservation. A lack of accurate information on the economy and effects of energy conservation leads to a lack of awareness, hindering energy conservation. Therefore, government intervention is necessary.
- Differences in judgment criteria between management and operational workers can be a factor hindering energy conservation. Even if the workers feel energy efficiency deterioration of the equipment, the management may hesitate to make new investments for equipment. Third-party perspectives are need.
- There is a need to address cases where energy conservation investments are not made due to lack of knowledge of energy conservation for investment decision-makers. Workers should provide information to decision-makers.

Session 5: Energy Management Systems and Smart City: Current Situation and Room for further improvement

Mr Minh Tran, (Institute of Regional Sustainable Development, Viet Nam）- APEC Low-Carbon Model Town(LCMT) Project

- "Da Lat" was selected as the case studies to prevent emissions caused by incineration of solid waste and to contribute to generation of electricity for local consumption.
- Introduction of EVs leads to reduction of dependence on fossil fuel run vehicles and GHG emission. Modal shift leads to reduce road congestion and provide added attraction to tourists. Energy management systems can help reduce energy by up to 20% when installed.

Mr Felix William Fuentebella, (Department of Energy, the Philippines)-Energy Management Systems and Smart Cities

- The Philippines energy plan 2023-2050 shows RE share in power generation to be 35% by 2030 and 50% by 2050. The plan implements an energy management system among designated establishments, an energy management program by government, and efficiency guidelines for buildings design.
- The Smart and Green Grid Plan(SGGP) forms part of the Philippines Energy Transition Program. The aggressive RE targets require the timely expansion of the transmission system to integrate and manage the additional RE capacity to come online from 2024 to 2040.

Session 5 (continued)

Dr Sentagi Sesotya Utami, (Universitas Gadjah Mada (UGM), Indonesia)- Implementation of Energy Management System on Campus Buildings in Indonesia

- In Indonesia, the Integrated Smart and Green Building (INSGREEB) in campus building is installed.
- INSGREEB started in 2012, focusing on integrating building physics and acoustics using smart instrumentation and systems, and adapted to Covid-19 conditions. The innovation continues with a new paradigm "Healthy, but still energy efficient from 2020.

Q&A and Discussions

- Energy management systems can be implemented effectively at the institution, city, and economy-wide level.
- Artificial intelligence (AI) software has great potential but is far from being realized. Future efforts should focus on using AI to meet human needs for energy services more efficiently, which requires better measurement systems.

Evaluation Survey

Survey Statements	Strongly Agree	Agree	Disagree	Total
➢ The objectives of the symposium were clearly defined.	20	4	1	25
➢ The symposium achieved its intended objectives.	19	5	1	25
➢ The agenda items and topics covered were relevant.	20	5	0	25
➢ The content was well organized and easy to follow.	21	4	0	25
➢ Will you apply project content and gained knowledge at your workplace?	18	6	1	25
➢ The time allotted for the symposium was sufficient.	14	10	1	25
➢ The symposium included diverse viewpoints across economies and professions (government, private sector, academia).	21	4	0	25
➢ The symposium was effective in sharing successful expertise, best practices, and knowledge.	20	4	1	25
➢ The symposium was a good foundation for future international cooperation and discussion among APEC economies.	20	5	0	25
➢ The symposium was a good opportunity to provide you with new insights and awareness on promoting energy efficiency and energy management system.	21	3	1	25
➢ The symposium improved your understanding of promoting energy efficiency and energy management system.	18	6	1	25

Next Step

- **3rd Carbon Neutrality Sectoral Symposium**

  APEC symposium on "Bioenergy"

  Dates: October 2024

  Venue: Thailand

  Co-Organizer: Ministry of Energy, Thailand

Asia-Pacific
Economic Cooperation

APERC
Asia Pacific Energy Research Centre

Thank you.

https://aperc.or.jp